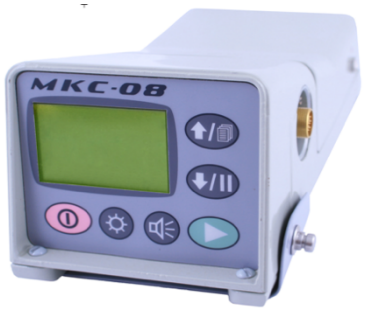
Dosimeter-radiometer MKS-08 of alpha, beta, X-ray, gamma and neutron radiation

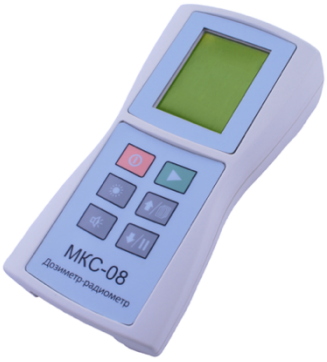
Purpose

Portable multifunctional professional device is intended to measure:

- ambient dose equivalent rate and H*(10) and ambient dose equivalent H*(10):
  - continuous gamma-radiation;
  - X-ray and gamma (including pulsing) radiation;
  - neutron-radiation.
- flow density of alpha-, beta-, gamma-, neutron- radiation.



Console UIK-05/UIK-05-01



Console UIK-06

Features:

- MKS-08 consists of probes (at the Customer's choice) and one of consoles: UIK-05 (a steel case, built-in battery block), UIK-05-01 (a steel case, built-in accumulator block), UIK-06 (a plastic case, built-in accumulator block);
- audible and visual alarms of exceeding the limits during measurements;
- simplicity and reliability, the ability to equip with additional detection blocks;
- short time of measurement and fast automatic adaption to change in radiation situation;
- unique algorithms of search, localization of sources and fields of ionization radiation;
- work in a wide range of temperatures in the field, carrying logs of wells and boreholes;
- radiation survey of the area with geo-references, stored in the nonvolatile memory of up to 2000 measurement results with possibility of transfer to PC and imposition to electronic maps.

BDZA-96
α

BDZA-96b
α

BDZA-96s
α

BDZA-96m
α

BDZA-96t
α

BDZB-96
β

BDZB-96s
β

BDZB-99
β

BDZB-96b
β

BDKS-96s
γ,β

BDMN-96
n

BDKN-96
n

BDMG-96
γ

BDKS-96s
γ,β

BDKS-96b
x,γ

BDPG-96
γ

BDPG-96m
γ

BDKG-96
γ

Main technical characteristic

Measurement console	UIK-05	UIK-05-01	UIK-06
Power supply	galvanic cells R14, size C (4 pcs.)	accumulators, size AA, capacity not less than 2100 mAh (4 pcs.)	accumulators, size AA, capacity not less than 2100 mAh (3 pcs.)
Type of case	steel		plastic
Operating supply voltage, V	5,0		4,0
Sound alarm	✓	✓	✓
Degree of protection, no less than	IP 54		IP 67
Operating temperature range	from minus 20 °C to 50 °C		
Dimensions, mm	210×110×85		165×80×50
Weight, kg	0,9		0,4

Alpha radiation detectors	BDZA-96	BDZA-96s	BDZA-96t
Type of registered radiation	flux density of α-radiation		
Energy range of registered alpha particles	4 MeV – 7 MeV		
Measurement range of alpha particles flux density, $min^{-1}·cm^{-2}$	0,1 – $1·10^4$	0,1 – $3·10^4$	0,3 – $1·10^6$
Limits of tolerable intrinsic relative error, %	± (15 + 5/Ax)		
Typical sensitivity, $s^{-1}·min·cm^2$, no less	0,40	0,18	0,04
Active area of detector, cm^2	70	28	5
Type of detector	scintillation ZnS(Ag)		semiconductor
Registration efficiency of alpha-radiation ^{239}Pu, no less	45 %		
Compensation of own background	✓		-
Own background, $min^{-1}·cm^{-2}$, no more than	0,3		-
Continuous operation time	≥24 h		
Protection class	IP 67		IP 54
Operating temperature range	from minus 20 °C to +50 °C		
Overall dimensions, mm	Ø 130 × 240	Ø 90×240	Ø 50 × 60
Weight, kg	1,0	0,9	0,2

Beta radiation detectors	BDZB-96	BDZB-96b	BDZB-96s
Type of registered radiation	flux density of β-radiation		
Energy range of registered beta particles	from 0,12 to 3,5 MeV		
Measurement range of beta particles flux density, $min^{-1}·cm^{-2}$	1 - $1·10^5$	1 - $1·10^4$	1 - $1·10^5$
Limits of tolerable intrinsic relative error, %	± (15 + 20/Ax)		
Typical sensitivity, $s^{-1}·min·cm^2$, no less	0,15	0,50	0,10
Active area of detector, cm^2	28	80	15
Type of detector	scintillation plastic detector	СБТ-10	Beta-2
Registration efficiency of beta-radiation $^{90}Sr+^{90}Y$, no less	45 %		
Compensation of own background	✓		
Own background during measurement: • alpha-radiation, $min^{-1}·cm^{-2}$, no more than • beta-radiation, $min^{-1}·cm^{-2}$, no more than	 0,1 20		
Continuous operation time	≥24 h		
Protection class	IP 54	IP 67	IP 54
Operating temperature range	from minus 20 °C to +50 °C		
Overall dimensions, mm	Ø 90 × 230	150×200×125	Ø 65 × 65
Weight, kg	0,9	1,5	0,3

Alpha and beta radiation detectors	BDPS-96
Type of registered radiation	flux density of α- and β-radiation
Energy range of registered alpha particles	from 4,0 to 7,0 MeV
Energy range of registered beta particles	from 0,12 to 3,5 MeV
Measurement range of alpha particles flux density , $min^{-1}·cm^{-2}$	0,1 - $3·10^4$
Measurement range of beta particles flux density , $min^{-1}·cm^{-2}$	1 - $1·10^5$
Limits of tolerable intrinsic relative error, %: - α-radiation - β-radiation	 ± (15 + 5/Ax) ± (15 + 20/Ax)
Typical sensitivity, $s^{-1}·min·cm^2$, no less:	

• alpha-channel • beta-channel	0,10 0,10
Own background during measurement: • alpha-radiation, $min^{-1}·cm^{-2}$, no more than • beta-radiation, $min^{-1}·cm^{-2}$, no more than	 0,3 20
Active area of detector, cm^2	28
Type of detector	scintillation ZnS(Ag)
Continuous operation time	≥24 h
Protection class	IP54
Operating temperature range	from minus 20 °C to +50 °C
Overall dimensions, mm	Ø 90 × 280
Weight, kg	1,2

Gamma and beta radiation detectors	
	BDKS-96s
Type of registered radiation	ADER γ, ADE γ, FD β
Energy range of registered gamma particles	50 keV - 3 MeV
Energy range of registered beta particles	0,12 - 3,5 MeV
Measurement range of ambient dose equivalent rate H*(10)	0,1 μSv/h - 1 mSv/h
Measurement range of ambient dose equivalent H*(10)	0,1 μSv - 10 Sv
Measurement range of beta particles flux density , $min^{-1}·cm^{-2}$	$5 - 1·10^5$
Limits of tolerable intrinsic relative error, % • ADER γ, ADE γ, • flux density β	 ± (15 + 2/Ax) ± (15 + 20/Ax)
Energy dependence (gamma-channel)	± 25 %
Typical sensitivity, no less: • gamma-channel • beta-channel	 $4,0\ s^{-1}·\mu Sv^{-1}·h$ $0,10\ s^{-1}·min·cm^2$
Own background during measurement: • beta-radiation, $min^{-1}·cm^{-2}$, no more than	 1
Active area of detector, cm^2	15
Type of detector	Counter type Beta-2 Counter type Beta-2m
Protection class	IP 54
Operating temperature range	from minus 20 °C to +50 °C
Overall dimensions, mm	Ø 80 × 80
Weight, kg	0,4

Gamma radiation detectors				
	BDMG-96	**BDVG-96**	**BDPG-96**	**BDKG-96**
Type of registered radiation	ADER γ, ADE γ	ADER γ, FD γ		Exposure dose rate γ Flux γ
Energy range of registered gamma particles	from 50 кеV to 3 MeV			
Measurement range of ambient dose equivalent rate H*(10)	0,1 μSv/h - 10 Sv/h	0,01 - 30 μSv/h	0,01 - 100 μSv/h	-
Measurement range of ambient dose equivalent H*(10)	0,1 μSv - 10 Sv	-	-	-
Measurement range of gamma particles flux density	-	1 - 2400 $s^{-1}·cm^{-2}$	1 - 8000 $s^{-1}·cm^{-2}$	-
Measurement range of gamma exposure dose rate	-	-	-	$1 - 1·10^4$ μR/h
Measurement range of gamma flux	-	-	-	$4 - 4·10^4\ s^{-1}$
Limits of tolerable intrinsic relative error, %	± (15 + 2/Ax)	± 15		
Energy dependence	± 25 %	-		
Typical sensitivity, no less	4,0 $s^{-1}·\mu Sv^{-1}·h$	2500 $s^{-1}·\mu Sv^{-1}·h$	400 $s^{-1}·\mu Sv^{-1}·h$	1,5 $s^{-1}·\mu R^{-1}·h$
Active area of detector, mm^2	-	Ø 63 × 63	Ø 25 × 40	Ø 18 × 30
Type of detector	Counter СБМ-20 Counter type Gamma-1-1	Monocrystal *NaI(Tl)*		
Protection class	IP67			IP68
Operating temperature range	from minus 20 °C to +50 °C			
Overall dimensions, mm	ø40 × 250	ø90 × 290	480×191×50	ø38 × 400
Weight, kg	0,3	3,0	1,0	2,0

X-ray and gamma radiation detectors	
	BDKS-96b
Type of registered radiation	ADER, ADE x,γ
Energy range of registered X-ray and gamma-radiation	from 15 keV to 10 MeV
Measurement range of ambient dose equivalent rate H*(10) of registered X-ray and gamma-radiation	0,01 μSv/h - 10 Sv/h
Measurement range of ambient dose equivalent H*(10) of registered X-ray and gamma-radiation	0,1 μSv - 10 Sv
Limits of tolerable intrinsic relative error, %	± (15 + 2/Ax)
Energy dependence, %	± 25
Typical sensitivity, no less: • sensitive subrange, $s^{-1}\cdot\mu Sv^{-1}\cdot h$ • rough subrange, $s^{-1}\cdot\mu Sv^{-1}\cdot h$	 8,0 4,0
Active area of detector, mm^2	Ø 30 × 15
Type of detector	Tissue equivalent scintillation detector
Protection class	IP 67
Operating temperature range	from minus 20 °C to +50 °C
Overall dimensions, mm	Ø 60 × 215
Weight, kg	1,0

Neutron radiation detectors		
	BDMN-96	**BDKN-96**
Type of registered radiation	ADER, ADE, FD n	
Energy range of registered neutron-radiation	from 0,025 eV to 14 MeV	
Measurement range of ambient dose equivalent rate H*(10) of neutron-radiation	0,1 μSv/h -0,1 Sv/h	
Measurement range of ambient dose equivalent H*(10) of neutron-radiation	0,1 μSv -10 Sv	
Measurement range of flux density of neutron-radiation	$0{,}1\text{-}1\cdot10^5\ s^{-1}\cdot cm^{-2}$	
Limits of tolerable intrinsic relative error, %	± (15 + 2/Ax)	
Energy dependence, %	± 40	not standardized
Typical sensitivity, no less	$0{,}40\ s^{-1}\cdot\ \mu Sv^{-1}\cdot h$	$1{,}00\ s^{-1}\cdot\ \mu Sv^{-1}\cdot h$
Own background	0,03 μSv/h ($s^{-1}\cdot cm^{-2}$)	
Active area of detector, mm^2	Ø 30 × 5	Ø 18 × 140
Type of detector	thermal neutron detector (in polyethylene moderator, ball Ø 240 mm)	slow neutron counter filled with 3He (in polyethylene moderator, cylinder Ø 100 mm)
Protection class	IP 67	
Operating temperature range	from minus 20 °C to +50 °C	
Overall dimensions, mm	240 × 310 × 290	295 × 142 × 100
Weight, kg	8,3	2,5

Delivery set: measuring console UIK-05/UIK-05-01/UIK-06, radiation detector(s) (at the Customer's choice), charger, belt and cuff, stand, handle, sliding rod 0,7 m, manual, passport, verification methodology, packaging box for dosimeter-radiometer and its accessories.
Optional: sliding rod 1,6 m and/or 4 m, connecting cable 4 m and/or 20 m, head phones, sensor GSP, software, cable to connect to a PC, a box.

Dosimeter-radiometer MKS-08 is registered in the State registry of measuring devices approved for use in Ukraine.

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Devices of radiation and technological control