

SOEKS

DEU Dosimeter

ENG Dosimeter

FRA Dosimètre



DEFENDER

Zertifikat ISO 9001/ ISO 9001 Certificate/ Le Certificat ISO 9001


**Voluntary Certification System
«Unitary Standard»**

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Evaluation of Quality Management Systems, LLC
Bldg 7/9, Buzdrevskiy st., Moscow

Certification authority
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CERTIFICATE OF CONFORMITY

Issued to SOEKS, Limited Liability Company
Altufievskoye shosse, h.48, bld. 1, pr. 1, room 39, Moscow, 127566, Russia
TIN 7842376568

This is to certify that

Quality management system in respect to designing, manufacturing, sale,
warranty and maintenance service of electric and electrical devices

Conforms to the requirements of
GOST R ISO 9001-2008 (ISO 9001:2008)



This Certificate obliges the organization to maintain the quality of its works performed by it according to the requirements of the above regulatory document, and this will be monitored by the Certification Authority of the Voluntary Certification System "Unitary Standard" and confirmed at annual inspections.

This Certificate is issued having an endorsement of the expert committee:
№ EC.C.O.02.01.000777-12, valid 07.03.2012

Registration date 07.03.2012 Valid before 07.03.2015

Head of the Certification Authority Chairman of the Committee

 Finova N.A.  Antonov D. A.

005441

Manufacturer's warranty

The manufacturer guarantees efficient operation of the device provided that the user observes the operating conditions, safety measures, and requirements to storage and transportation described in this manual.

The warranty period for the device is 24 months after the device is purchased through a retailing network; in case of direct sales distribution, the warranty period begins after the ultimate user receives the device. If any malfunctions are detected in the device, the warranty period will be extended for time during which the device is under warranty repairs and the ultimate user is unable to use the device.

We recommend that you read carefully the instructions presented in this manual before contacting the warranty repair service.

Please send all your comments to our e-mail addresses at our official website: **www.soeks.ru** or mail: **soeks@soeks.ru**

This guarantee shall be void if:

- the serial number of the device is not the same as the number in the guarantee coupon;
- the guarantee coupon is not available or illegible because of damage, corrections or erasures;
- requirements to shipment, storage and operation described herein are violated;
- malfunction is caused by third party actions or a force majeure;
- the device or its component parts has signs of shock or other mechanical impact (scratches, cracks, chips, loose parts inside the case, color spots on the display, etc.);
- malfunctions are caused by foreign objects, liquids and insects inside the device;
- the user does or attempts to disassemble and repair the device.

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Dosimeter DEFENDER

Purpose

Dosimeter Defender is designed for measuring the cumulative radiation dose and assessing the product radioactivity level and detecting objects, food or construction materials contaminated with radioactive elements.

Dosimeter Defender can easily assess the level of radioactivity according to the power level of ion radiation (gamma radiation and beta particles stream) while taking into account x-ray radiation.

Base kit

Dosimeter Defender has the following items included in the base kit:

Dosimeter Defender	1 pcs
Passport	1 pcs
Rechargeable batteries (AAA size)	2 pcs
USB power cable-mini USB	1 pcs
Adapter block	1 pcs
Rigid paperboard box	1 pcs

A Geiger-Muller counter is used as ion radiation sensor in our dosimeter Defender.

The manufacturer reserves the right to add new features to the device. Please follow new code modifications on the official website: **www.soeks.ru**. The device's code can be modified only in the manufacturer's service centers.

Specification

Range of indicated background radiation level, mcSv/h	Up to 1000
Registered gamma radiation energy	from 0.1
Measurement range of cumulative dose, Sv	Up to 1000
Levels, mcSv/h	from 0.3 to 100
Time of measurement, seconds	up to 20
Display format of indication	Constantly, number and graphical
Power elements	AAA size batteries rechargeable or non-rechargeable
Power voltage range, V	1.9 - 3.5
Time of continuous work of the device, hours at least**	10
Overall dimensions height x width x thickness, max, mm	105x43x18
Weight (without power elements), max, grams	57
Battery charging current, max, mA	300
Current consumption from charger or USB not more than	500
Output charger voltage	from 4.5 to 5.5
Display	Color TFT, 128x160
Operating temperature range, °C	from -20 to +60

Comment:

* Increasing the number of measurements will improve the reliability of readings.

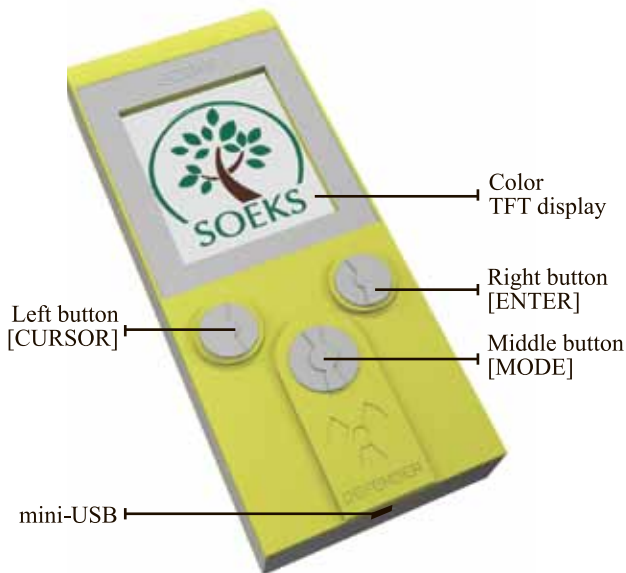
** The time of continuous work of the device is up to 10 hours, with default settings and two batteries of capacity 1350mAh.

Precautions

Before using the product, please read carefully the safety measures below and strictly adhere to them when using the product. Violation of these rules may cause malfunction or cause total failure of the product. The manufacturer's guarantee will be void if the safety measures stated below are violated.

- Protect the product from shock and other mechanical impacts that can damage it.
- Do not use the product in conditions of high humidity, under or in contact with water: the product is not waterproof.
- Do not leave the product in places with intensive sun light or high temperatures for a long time, this can cause electrolyte leakage from power elements, failure of the product, and injuries.
- Do not leave the product for a long time near devices that generate strong magnetic fields, such as magnets or electric motors, and where strong electrical magnetic signals are generated, such as transmitter towers.
- Do not perform measurements close to cell phones and microwaves, this may affect the instrument's readings.
- Do not disassemble and do not try to repair the device on your own.
- Do not connect the device to a PC or socket while it has regular batteries installed.
- Strictly observe polarity when you install power elements, otherwise the device may overheat and fail.

Appearance of the device



Controls

Left button [CURSOR]- scroll down the list. After you reach the lowest (last) position on the list you return to the topmost (first) position. Keyboard lock/unlock

Right button [ENTER]- confirm selection.

Middle button [MODE] – turn the device on/off, shift to «Measuring» mode from the top menu, shift to «Dose» mode from «Measuring» mode, and return to the top menu.

Power

At the back side of the device there is the cover of the battery section. AAA type batteries or accumulators can be used to power the device. The bottom of the battery section shows the manufacturer's trademark - SOEKS - and board model.

The front side of the device has a mini-USB port that can be used to recharge batteries from a computer via a USB-mini-USB cable or from the power mains. If connected to a PC or electric mains, the device can work without power elements.

How to install power elements

- Strictly observe polarity when you install power elements, otherwise the device may fail.
- When the device is turned off, you can leave the power elements installed – the batteries and accumulators are not spent if the device is in standby mode.
- If you expect not to use the device for a long time, it is recommended to remove the power elements after the device is turned off.

Screen Indicators

1. Keyboard lock indicator



- keyboard is active.



- keyboard is locked.
Indicator is flashing.

2. Radiation dose level indicator



- the determined level of cumulative radiation dose is not exceeded.



- the determined level of cumulative radiation dose is exceeded.

3. Diagram

Shows radioactivity during the previous minute. The diagram keeps moving from right to left, and the bar height shows the level of background radiation: the higher the background, the taller the bar. The bar may be blue, yellow and red.

4. USB indicator



- USB cable connected



- batteries are charging



- charging completed

5. Battery charge status indicator:



- normal power level



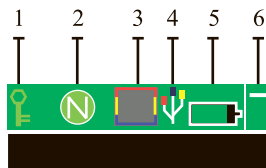
- running down



- low power level



- replace or recharge the batteries



Menu

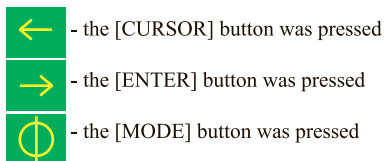
Measuring
Dose

CURSOR MODE ENTER

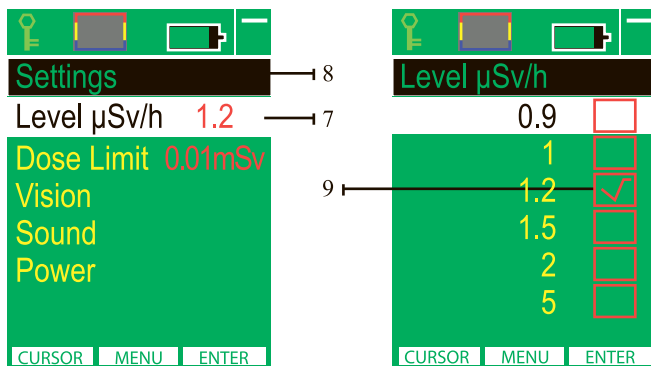
6. Active status indicator

The continuously moving element in the upper right corner of the screen indicates the device's active status.

When buttons are pressed, icons in this area show which button has been pressed.



Menu indication and navigation



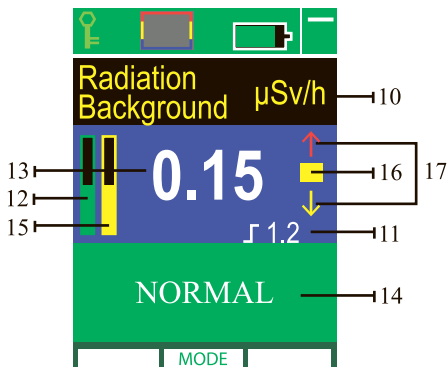
7. The current (selected) line is highlighted with color.

8. Inside a selected menu item, the upper line on the list indicates the parent menu item.

9. As the device is being set up, the current parameter value is flagged with a tick mark.

Indicators in the «Measuring» mode

A screen with the following elements appears in the measure mode:



10. Units: mcSv/h

11. Level

12. Indicator of measured results: filled up within 10 sec. If the background radiation is high the result may be available much sooner.

13. Radiation level. Shown as large digits in the screen center. The first measurement also shows the word «WAIT»

14. The message about radiation background:

- if the measured background is less than 0.4 mcSv/h, a «NORMAL» indication appears on a green background.
- if the measured background is 0.4-1.2 mcSv/h, a «HIGH» indication appears on a yellow background.
- if the measured background is greater than 1.2 mcSv/h, a «DANGEROUS» indication appears on a red background.

15. The indicator of measurement accuracy – with increasing of accuracy fills in with yellow colour. With each measurement (it takes 10 sec.) the column of the indicator of measurement accuracy grows till complete fulfillment. The complete fulfillment takes about 2 minutes (12 measurements). If during the measurement some sharp changes of the radiation are defined (more than three times increasing or ten times decreasing), than the indicator of measurement accuracy zeroes. Thanks to this fact, the defining of sharp changes of radiation background with reflection of exact data takes no more than 10-20 seconds.

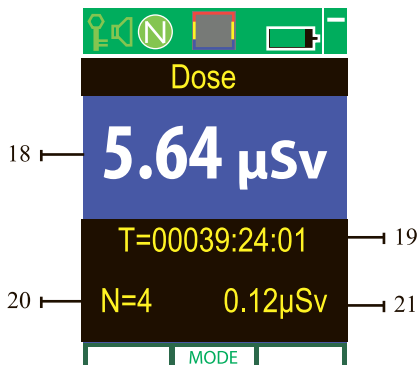
16. The indicator of defining radiation fractions: If the fractions follow often, than the indicator blinks with yellow and red, if the fractions are rare – the indicator is yellow.

17. The indicators of radiation background changes:

- One red up arrow appears when increasing of radiation background is more than 30% of average.
- One red down arrow appears when decreasing of radiation background is more than 30% of average.
- Two red up arrows appear when the increasing of the radiation background is considerable.
- Two green or yellow down arrows appear when decreasing of radiation background is considerable.

Indicators in the «Dose» mode

A screen with the following elements appears in the measure mode:



18. The rate of accumulated radiation dose.

19. Dose accumulation time (hh. mm.ss.)

20. Quantity of switching on of the device during this period.

21. Current radiation background

The device's menu consists of 3 items:

- Menu – device settings
- Measuring – enter the measurement mode
- Dose - measurement of accumulated dose level

Menu

In this section you can preset the parameters for the device.

Items of the **Settings** menu:

- **Level $\mu\text{Sv/h}$.**

You can select the threshold value from 16 preset values on the list.

$\mu\text{Sv/h}$.
No
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
1.2
1.5
2
5
10
30
60
100

If the measured background radiation exceeds the preset level, alarm sound appears.

«No» - alarm sound switching off.

- **Dose Level**

You can select the threshold value from 16 preset values on the list.

No
0,01 mSv
0,05 mSv
0,1 mSv
0,5 mSv
1 mSv
5 mSv
10 mSv
50 mSv
0,1 Sv
0,5 Sv
1 Sv
5 Sv
10 Sv
50 Sv
100 Sv

- **Vision**

In this item you can adjust screen settings: brightness, display time, and color pattern.

- **Brightness**

Select «1» (low), «2» (medium) or «3» (high) brightness level of the screen. To save power and help the batteries last longer it is recommended to use the low or medium brightness level of the screen.

- **Off Time, min.**

Set the time of display backlight in standby mode. You can select from 1 to 15 minutes in the options list.

«No» – backlight is always on while the device is in use.

- **Sound**

In this item you can adjust the sensor sound parameters.

- **Sensor Sound** (yes/no)

●Power

● Off Time, min.

Set the time in minutes after which the device shall automatically shut down.
«No» – the device will work until turned off with the [MODE] button.

Language

In this item you can select the interface language. This device has only 3 options: English, German and French.

Attention! After the [MODE] button is pressed the screen will display the root menu in the selected language. If you made an error and selected the unfamiliar language, press the following sequence of buttons to return to the language selection menu: **middle-right-left-right**. Then select the language you need.

Dose Reset

In this section you can reset the accumulated dose counter.

- No - zeroing not completed (blue indicator «Canceled»).
- Press any key to return to main menu.
- Yes - zeroing completed (red indicator «Reseted»).
- Press any key to return to main menu.

Power control of the device

1. To turn the device on, press and hold the [MODE] button until the display turns on (the screen backlight is on) then release the [MODE] button. After the splash screen the display will indicate the model (code modification version) of the device for 3 seconds.

2. To turn the device off press and hold the [MODE] button until the display shows an animated screen with falling autumn leaves. Then release the [MODE] button.

Pressing and holding the [MODE] button will turn the device off in any mode.

3. While connected to a USB, the device will be on, even without power elements installed. If the device automatically turned on while connected to USB; disconnecting the device from the USB slot will shut down the device.

When the device is off, you can leave the power elements installed – batteries and accumulators are not spent if the device is in standby mode. If you expect not to use the device for a long time, it is recommended to remove power elements after the device is turned off.

Buttons block

For buttons block press and hold left button till the indicator of buttons block will not turn red and start blinking. To unlock buttons press and hold left button till the indicator of buttons block will not turn green. (p.29, p.1)

If the buttons are blocked and the screen is turned off, so when you press any key it temporally switches on and then switches off.

Beginning to Use the Device

1. Install the power source (page 28)
2. Turn the device on (page 37)
3. Before you begin measurements, we recommend that you tune up the device (page 34)
4. When switched on, the device automatically enters the “Measure” mode and starts measuring radioactivity. Approximately in 10 seconds you can see the first measuring results; afterwards the next measurement cycle begins. The measurements are made permanently until the device is switched off, regardless of the current mode. The most accurate results are shown when the indicator of accuracy is full (page 32, article 15).

If the readings are higher than the natural radiation background typical for the locale, this means that the examined object is contaminated by radiation.

Results obtained using the device can not be used for official conclusions regarding the radiological situation.

Measuring radiation background of objects

To measure radiation background of foodstuffs, building materials and other things do this sequence:

1. Measure the level of radiation background several meters away from the target.
2. Move the device directly to the target and measure radiation background as close as possible to the target.
3. Compare the resulting data with the radiation background level measured in step 1.

The difference of readings in step 1 and step 2 will represent the radiation background of the target.

To evaluate radioactive contamination of liquids, the unit must be placed above open surface of the liquid. To protect the unit from contact with the liquid, it is recommended that the unit should be wrapped in a polyethylene bag, but ensuring that the wrapping is one layer of plastic only.

Cumulative dose measurement

Accumulation process of radioactive dose starts right after the device is switched on and goes on permanently until the device is switched off, regardless of the current mode. When you switch on the device again, the accumulation process continues.

You can reset the figures with the function «dose reset» in the top menu (page 36).

If necessary, please use the function of keyboard lock (page 37).

- If the screen goes blank, press any button to reactivate it.



