

DOSEBASE SOFTWARE

OPERATING MANUAL

LVIV 2020

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LEGEND AND ABBREVIATIONS

DB	Database
DKG-21 (23)	Personal Gamma Radiation Dosimeter
PD	Personal Dosimetry
OM	Operating manual
DE	Individual dose equivalent
SW	Software
DER	Individual dose equivalent rate
PC	Personal computer
OS	Operating System
MS Excel	MS Excel software

1 GENERAL INFORMATION

DoseBase SW is designed for contactless programming of personal dosimeters by a system administrator and reading the measured dosimetric information from them, as well as personalization of dosimetric information and its storage in the DB.

DoseBase SW can work with DKG-21 "EcotestCARD", DKG-21M and DKG-23 personal gamma radiation dosimeters.

2 DESCRIPTION AND OPERATION

2.1 Use

DoseBase SW can be used at nuclear power plants, in the companies and institutions that handle ionizing radiation sources in conditions that require PD.

DoseBase SW allows you to:

- register employees;
- register the parameters of each session;
- adjust dosimeter programming options;
- switch the dosimeters into working mode and their programming;
- read and record values of dosimetric measurements;
- generate reports on dosimetric measurements.

2.2 Hardware requirements

2.2.1 DoseBase SW requires an IBM-compatible PC running Windows 7 or later OS. The PC must be equipped with an USB/IrDA Ecotest Adapter or similar model.

2.2.2 The software requires a PC with the following minimum characteristics: Intel Core i5 or AMD Ryzen 5 processor and 4 GB RAM.

2.3 Basic terms and definitions

2.3.1 Administrator

In this OM, the administrator is a user with an access to the PC, on which the DoseBase SW is installed, and, accordingly, the defined rights to process the information contained in the DB.

The administrator has the following rights:

- right to view information - allows him/her to view information in the DB;
- right to edit information - allows the administrator to perform the functions of creating and editing service information in the DoseBase SW and setting the dosimeter programming parameters;

– right to record information - allows the administrator to perform the functions of automated reading of information from dosimeters.

2.3.2 Dosimetric device

In this OM, a dosimetric device or dosimeter is a device used for personnel PD.

The serial number of the dosimeter is entered into the DB from the memory of the device when programming it at the beginning of a session and corresponds to the one applied to the body of the dosimeter during its manufacture.

2.3.3 Employees

In this OM, employees are persons who use dosimetric devices for dosimetric measurements and PD. Registration of personnel in the DoseBase SW consists in recording the following information: First Name, Last Name, Middle Name and Date of Birth.

Registration is carried out in order to establish an unambiguous correspondence between the information of dosimetric measurements and the person who is directly related to these measurements.

2.3.4 Measurement session

In this OM, a measurement session is a sequence of dosimetric measurements performed by a separate employee using a single dosimeter for the period of time from the date of entry with this dosimeter into the controlled zone till exit with the same dosimeter from the controlled zone, and reading of measurement results.

Each measurement session is automatically recorded in the DoseBase SW and determined by a unique identifier in the form of a number.

2.3.5 Accumulated dose

In this OM, the accumulated dose is the total dose received by a person over a given period of time. It consists of radiation doses measured and recorded by the dosimetric device, which are read from it and recorded in the DB. The dose is characterized by the following parameters - measurement time and numerical value of

dose. The unit of dose measurement is mSv. The accumulated dose is calculated each time for a specific employee by generating appropriate reports on:

- all employees;
- specially designated employee;
- all selected sessions;
- separate session.

According to these reports, it is possible to determine:

- time interval by means of the filter on dates of the beginning and the end with accuracy to days;
- values of measured doses, which are read from dosimetric devices;
- which devices were used by this person in a given period of time for dosimetric measurements.

2.3.6 License Code

The license code is formed for each Customer individually, is confidential and cannot be transferred by the Customer to another person.

The license code is entered by the administrator, who has the right to edit the information, after installing the SW in response to the corresponding dialog software request on the first run.

The license code determines the service life of DoseBase SW.

2.3.7 Dosimeter programming

The dosimeter is programmed by contactless method using USB/IrDA Adapter. To perform programming, the administrator must set the programming parameters in the DoseBase SW and perform direct programming of the dosimeter via the USB/IrDA Adapter.

2.4 DKG-21 programming parameters

To program DKG-21 "EcotestCARD" or DKG-21M dosimeters it is necessary to select this type of dosimeter in the "Main" window and specify the following parameters for programming:

- the interval of dose values saving in the history of measurements, min (minimum value of 5 min);
- DE threshold, mSv - sets the value of DE, which triggers light and sound alarms;
- DER threshold, mSv/h - sets the value of DER, which triggers light and sound alarms;
- permission for DER indication. When the permission is activated, the following is available:
 - a) permission to view the DER threshold;
 - b) permission to change the DER threshold;
- permission to indicate the accumulated dose. When the permission is activated, the following is available:
 - a) permission to view the accumulated dose threshold;
 - b) permission to change the accumulated dose threshold;
 - c) permission to reset the accumulated dose;
- permission to display time. When the permission is activated, the following is available:
 - a) permission to correct the clock readings;
 - b) permission to display the alarm clock and permission to adjust the alarm clock.

2.5 Viewing and control of additional information

Additional information that the administrator can view in the technical process of PD, means data that allows controlling:

- events of exceeding the set parameters;
- time of entry and exit of the employee from the controlled zone;
- dose accumulation diagram during the session;
- options and modes of programming of dosimetric devices.

2.6 Preparation of reports

Only the administrator has the right to prepare reports. To view and print the prepared and saved reports, the administrator can use standard commands of MS Excel SW.

3 OPERATING PROCEDURE WITH DOSEBASE SW

3.1 SW installation

In order to start working with DoseBase SW, you need to install the SW by double-clicking on the installer. You must agree to the license agreement in the installation window, specify where to save the program and start the installation process. After that, an icon is added to the desktop. When you double-click on it, the SW starts.

3.2 Connecting USB/IrDA Adapter

Connect the USB/IrDA adapter to the appropriate PC port, wait for the driver to install, or install it manually from the storage medium. Determine the COM port number in the "Device Manager" of the OS (Fig. 1).

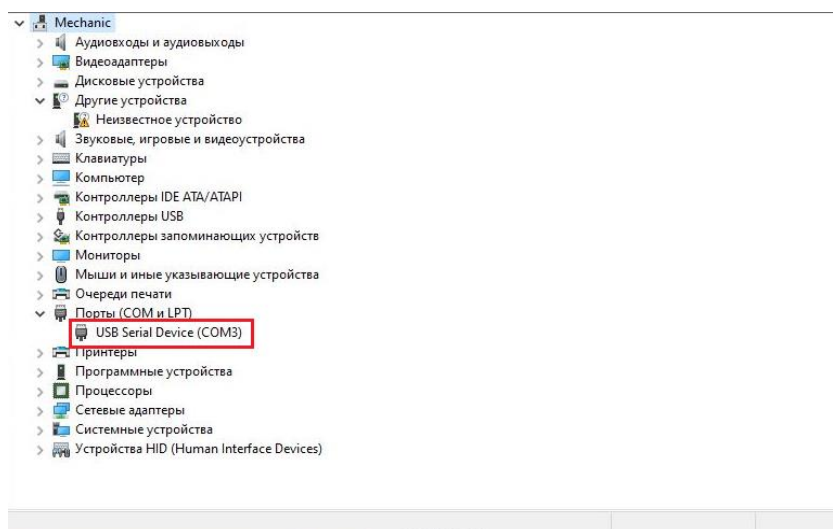


Fig. 1 Determining COM port

3.3 Launching pre-installed software

Launch DoseBase SW by double-clicking on the DoseBase shortcut on the desktop, or by double-clicking on the shortcut on the taskbar.

When you first run the DoseBase SW, you must enter the license code that came with the kit (Fig. 2),

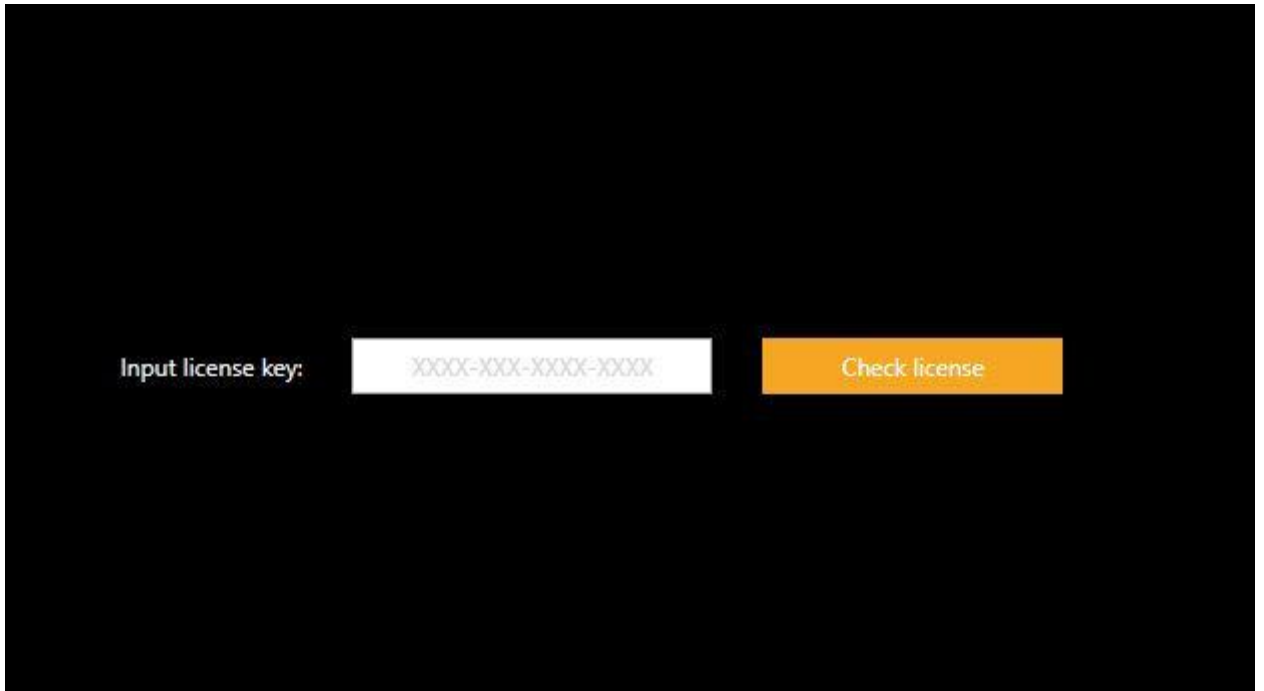


Fig. 2 License code request window

next opens the main program window (Fig. 3).

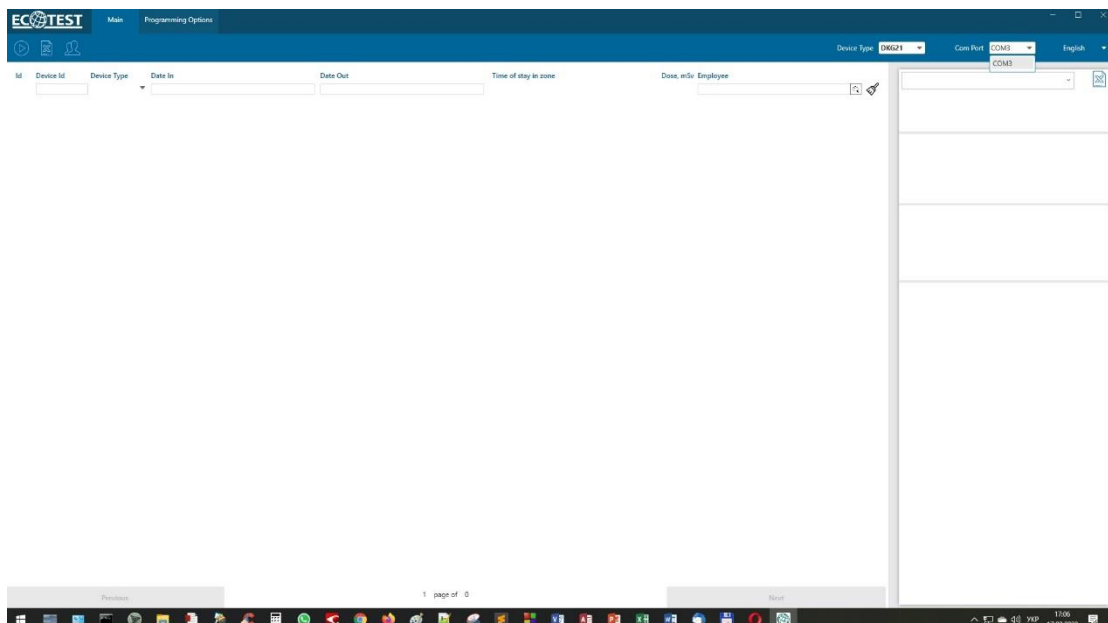


Fig. 3 Main program window

On the "Main" tab of the program window in the field with the "COM-port" list (Fig. 2) select the required COM-port number.



Fig. 4 Selecting COM port

3.4 Entering employee information

On the "Main" tab of the program window, click on the "Employees" icon (Fig. 5).

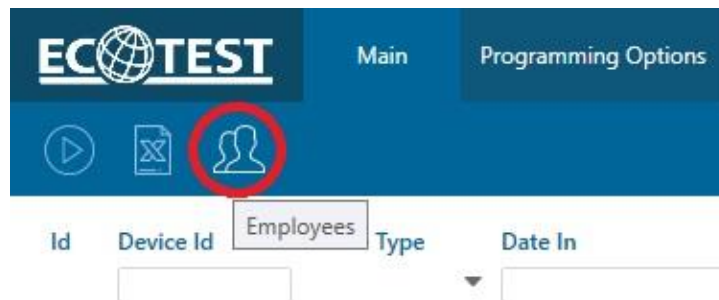


Fig. 5 "Employees" icon

The "Employees" window opens (Fig. 6), which is located on top of the "Main" tab.

Id	Device Id	Device Type	Date In	Date Out	Time of stay in zor	Dose, mSv	Employee
1	1102993	DKG-23	22.11.2019 09:58	22.11.2019 10:10	00:12:27	0.014	Adrian Nicholson

Fig. 6 Employees

In the "Employees" window, by clicking on the "Add" button you open a form for entering data of a new employee (Fig. 7).

Fig. 7 New employee data entry form

After filling in the fields "Last name, first name, middle name and date of birth" of the new employee, click the "Apply" button on the entry form (Fig. 8).

The screenshot shows the 'ECOTEST Employees' application window. On the left, there is an 'Add' button and a form with fields for First Name (Adrian), Last Name (Nicholson), Middle Name (empty), and Date of birth (02.08.1964). Below these fields is a table listing existing employees: Calvin Barnes, Christian Adamson, and David Abrams. The 'Apply' button is highlighted with a red rectangle. On the right, there is a larger form with the same fields, and below it, a table with columns: Id, Device Id, Device Type, Date In, Date Out, Time of stay in zor, Dose, mSv, and Employee. The table contains one entry for Christian Adamson. At the bottom of both panels are 'Previous' and 'Next' buttons and a page indicator '1 page of 1'.

Fig. 8 Entering new employee data

A new employee will be added to the employee DB (Fig. 9).

The screenshot shows the 'ECOTEST Employees' application window after a new employee has been added. On the left, the 'Add' button is still present, and the form fields are the same. Below the form, the table now includes 'Adrian Nicholson' with a date of birth of 8/2/1964 and a dose of 0.014. On the right, the larger form is the same, but the table below it now shows the new employee 'Adrian Nicholson' with Id 1, Device Id 1102993, Device Type DKG-23, and a dose of 0.014. The 'Previous' and 'Next' buttons and page indicator '1 page of 1' are still present at the bottom of both panels.

Fig. 9 Entry form with added employee

Before starting work, it is necessary to enter in the DB the specified service information about the personnel who will work with the dosimeters. After adding all users, the program window should look like in Fig. 10.

The screenshot shows the 'Employees' window in the ECTEST software. On the left, there is a list of employees with columns for 'Employees', 'Date of birth', and 'Dose, mSv'. The list includes Adrian Nicholson, Alan Melone, Barry Edwards, Baxter Darwin, Benjamin Gaksli, Bonnie Whaters, Bruno Bentle, Calvin Barnes, Christian Adamson, and David Abrams. On the right, there is an entry form for a new employee. The form has fields for 'First Name' (Adrian), 'Last Name' (Nicholson), 'Middle Name' (empty), and 'Date of birth' (02.08.1964). Below the form, there is a table showing the entry record for Adrian Nicholson. The table has columns for 'Id', 'Device Id', 'Device Type', 'Date In', 'Date Out', 'Time of stay in zone', 'Dose, mSv', and 'Employee'. The record shows Id 1, Device Id 1102993, Device Type DKG-23, Date In 22.11.2019 09:58, Date Out 22.11.2019 10:10, Time of stay in zone 00:12:27, Dose, mSv 0.014, and Employee Adrian Nicholson.

Id	Device Id	Device Type	Date In	Date Out	Time of stay in zone	Dose, mSv	Employee
1	1102993	DKG-23	22.11.2019 09:58	22.11.2019 10:10	00:12:27	0.014	Adrian Nicholson

Fig. 10 Entry form with added employees

Note: During an emergency when it is necessary to program the dosimeters quickly, it is possible to program the dosimetric devices without first entering service information, and add it later.

3.5 Programming of dosimeters

On the main tab in the field with the "Device type" list, select the appropriate type of dosimetric device to be programmed (Fig. 11).

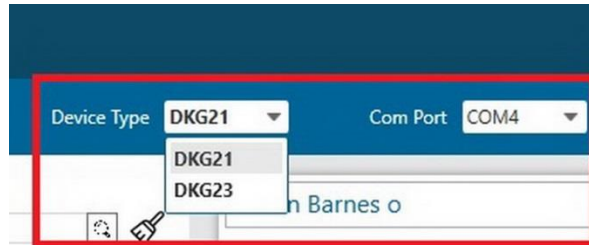


Fig. 11 Device type selection field

Proceed to the "Programming Options" tab (Fig. 12) and make the necessary settings.



Fig. 12 "Programming Options" tab for DKG-21

3.6 Registration of entry into the controlled zone

After setting the "Programming Options", click on the "Programming/Reading" pop-up icon on the "Main" tab (Fig. 13). The icon on the bar looks like in Fig. 14.

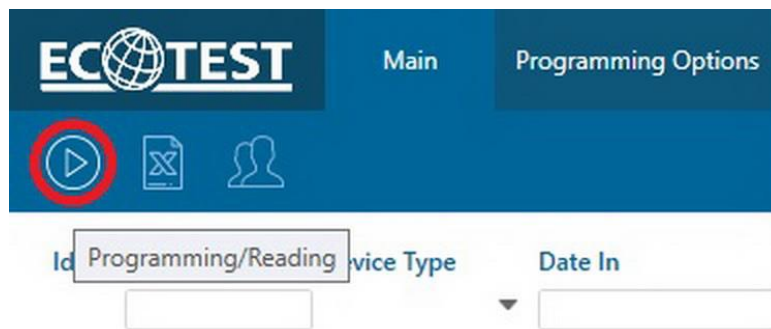


Fig. 13 Starting the programming/reading procedure

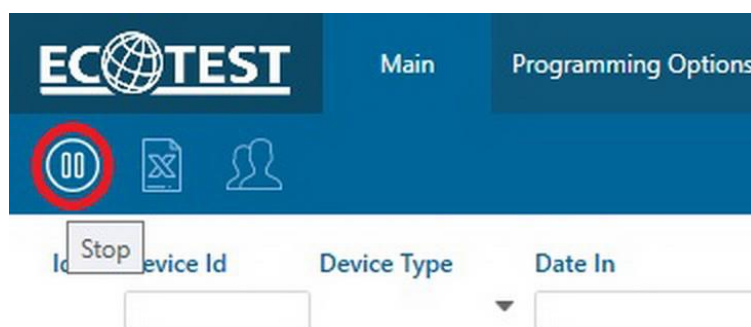
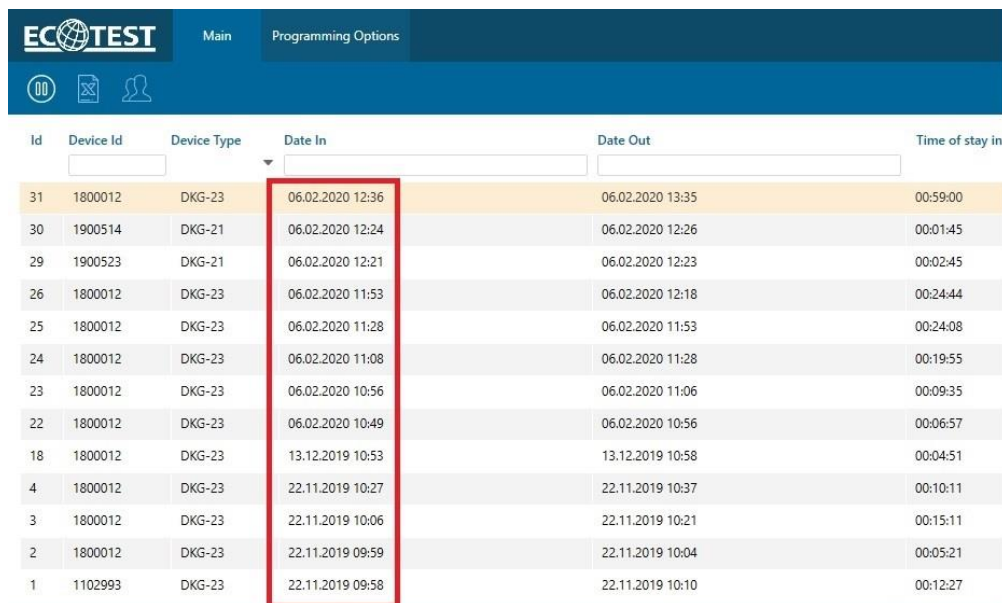


Fig. 14 Programming/reading process started

This means that the DoseBase SW is ready to program the dosimetric device of the selected type.

When using DKG-21 dosimeters (DKG-21 "EcotestCARD", DKG-21M), set the necessary parameters on the "Programming Options" tab and program the dosimeter. To do this, switch on the dosimetric device by long press of the "Mode" button and within 15 s place it with the infrared port window to a similar port of the USB/IrDA Adapter.

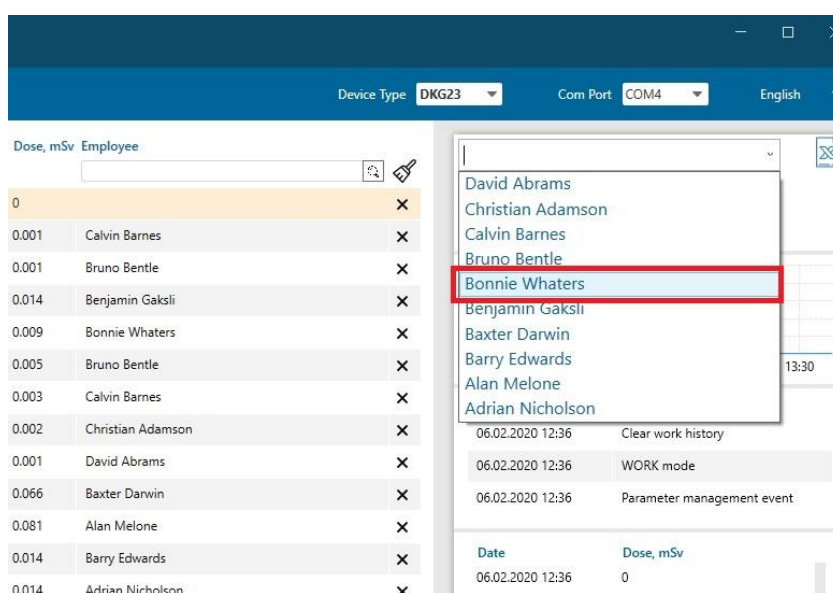
As a result, after the sound signal, the dosimeter is programmed and registered in the DB with the following information: session number, dosimeter number, dosimeter type and entry date in the format DD.MM.YYYY.HH.MM. The dosimeter is programmed, the session is started (**Помилка! Джерело посилання не знайдено.**).



Id	Device Id	Device Type	Date In	Date Out	Time of stay in:
31	1800012	DKG-23	06.02.2020 12:36	06.02.2020 13:35	00:59:00
30	1900514	DKG-21	06.02.2020 12:24	06.02.2020 12:26	00:01:45
29	1900523	DKG-21	06.02.2020 12:21	06.02.2020 12:23	00:02:45
26	1800012	DKG-23	06.02.2020 11:53	06.02.2020 12:18	00:24:44
25	1800012	DKG-23	06.02.2020 11:28	06.02.2020 11:53	00:24:08
24	1800012	DKG-23	06.02.2020 11:08	06.02.2020 11:28	00:19:55
23	1800012	DKG-23	06.02.2020 10:56	06.02.2020 11:06	00:09:35
22	1800012	DKG-23	06.02.2020 10:49	06.02.2020 10:56	00:06:57
18	1800012	DKG-23	13.12.2019 10:53	13.12.2019 10:58	00:04:51
4	1800012	DKG-23	22.11.2019 10:27	22.11.2019 10:37	00:10:11
3	1800012	DKG-23	22.11.2019 10:06	22.11.2019 10:21	00:15:11
2	1800012	DKG-23	22.11.2019 09:59	22.11.2019 10:04	00:05:21
1	1102993	DKG-23	22.11.2019 09:58	22.11.2019 10:10	00:12:27

Fig. 15 The dosimeter is programmed, the session is started

During the stay of the employee with the dosimeter in the controlled zone it is possible to enter his/her data into the DB, if it has not been done before (cl.3.4.3), and to link the employee to the session from the drop-down "Users" list in the upper right part of the "Main" or "Programming Options" windows (Fig. 15), or do it when the employee leaves the controlled zone (Fig. 16).



Dose, mSv	Employee
0	
0.001	Calvin Barnes
0.001	Bruno Bentle
0.014	Benjamin Gaksli
0.009	Bonnie Whaters
0.005	Bruno Bentle
0.003	Calvin Barnes
0.002	Christian Adamson
0.001	David Abrams
0.066	Baxter Darwin
0.081	Alan Melone
0.014	Barry Edwards
0.014	Adrian Nicholson

Device Type: DKG23, Com Port: COM4, English

Users list (dropdown): David Abrams, Christian Adamson, Calvin Barnes, Bruno Bentle, **Bonnie Whaters**, Benjamin Gaksli, Baxter Darwin, Barry Edwards, Alan Melone, Adrian Nicholson

Log entries:

- 06.02.2020 12:36 Clear work history
- 06.02.2020 12:36 WORK mode
- 06.02.2020 12:36 Parameter management event

Current Date: 06.02.2020 12:36, Dose, mSv: 0

Fig. 16 Binding the employee to the session

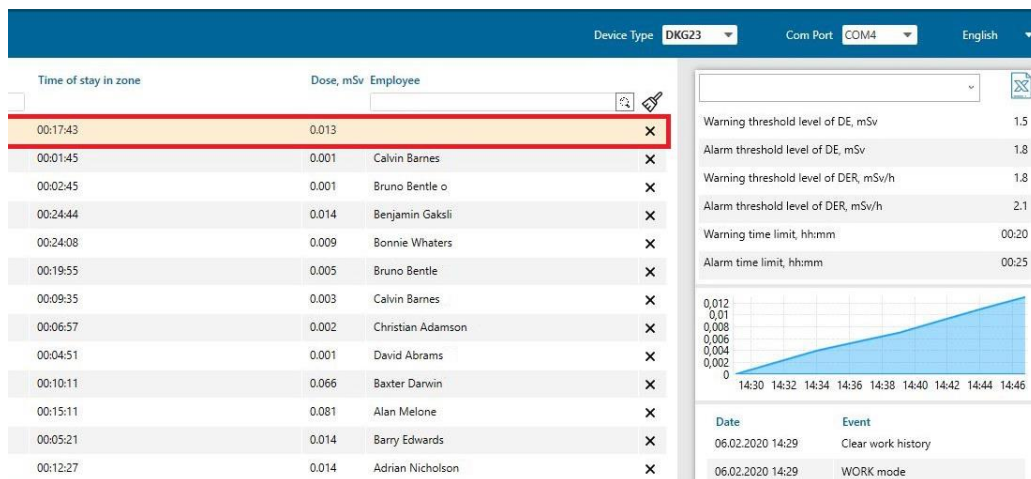


Fig. 17 End of session without employee binding

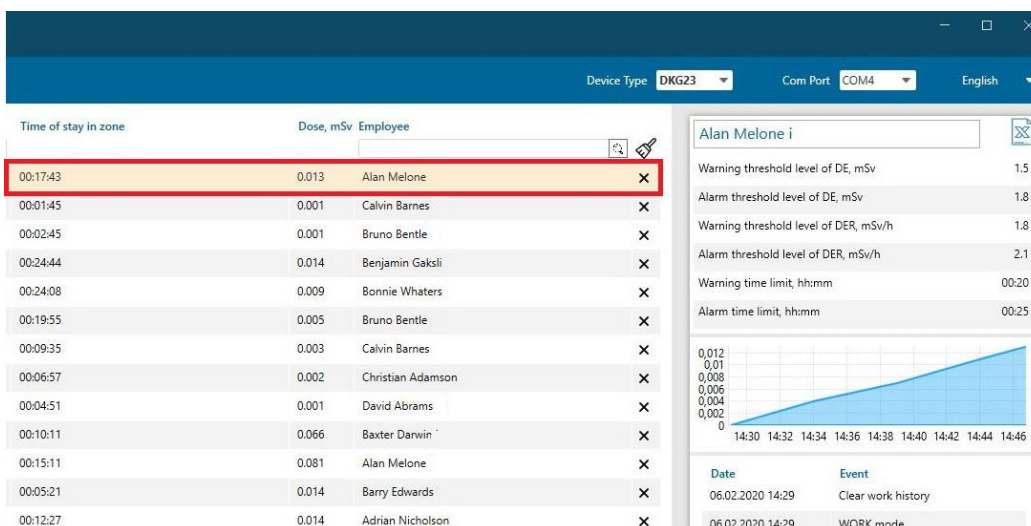


Fig. 18 End of session with employee binding

3.7 Reading/exit from the controlled zone

The "Main" and "Programming Options" tabs in the left part display information about completed and incomplete sessions (Fig. 17, Fig. 18) with or without employee binding. When navigating through sessions, detailed information about that session is displayed in the right part of the window.

On the "Main" and "Programming Options" tabs, the lower part is the same and displays: left - information about the session, right - information about the selected session (Fig. 19, Fig. 20).

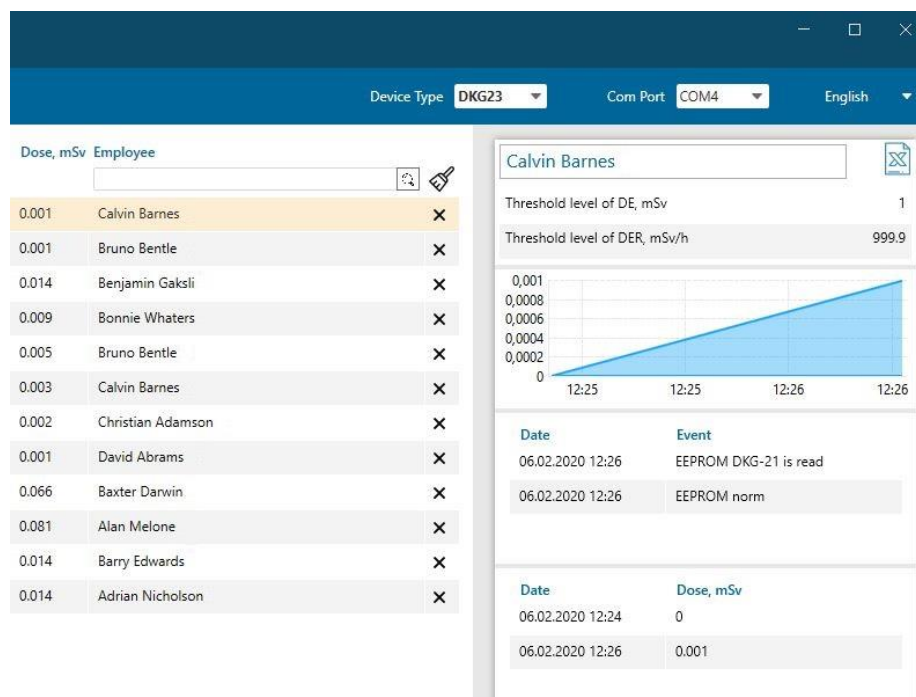


Fig. 19 The right part of the "Main", "Programming Options" tabs (session ended)

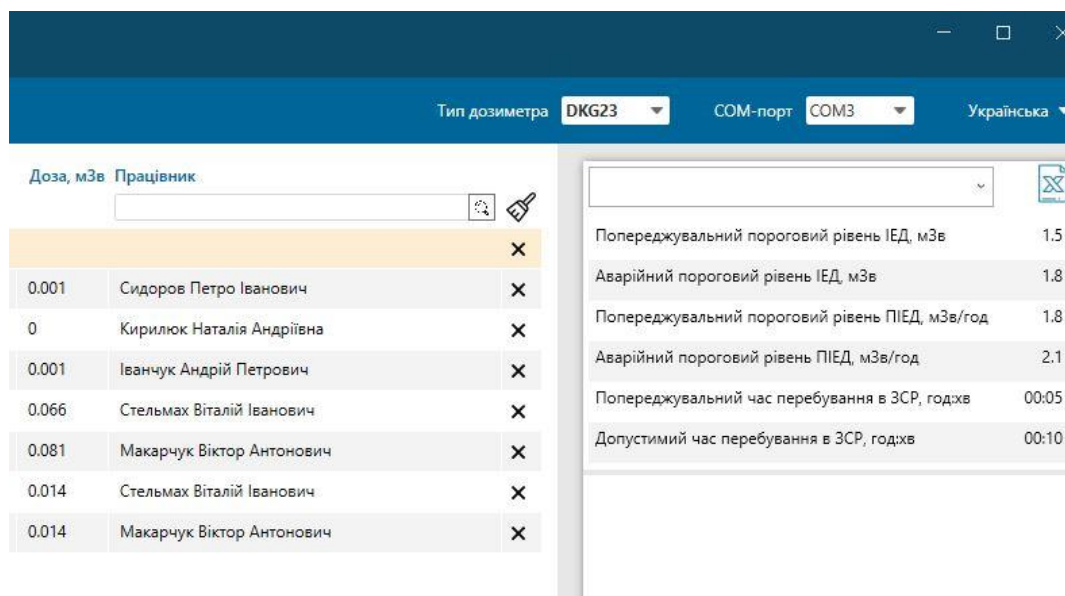


Fig. 20 The right part of the "Main", "Programming Options" tabs (session not ended)

When leaving the work area, switch the DKG-21 dosimeter to read-ready mode (flashing display indicator) with a long press of the "Mode" button, place it with the infrared port window to the appropriate window of the USB/IrDA adapter and hold for a few seconds before triggering of sound signal and display of information about the completion time, session duration, accumulated dose and a pop-up message about reading of the dosimeter in the table on the "Main" tab (Fig. 21).

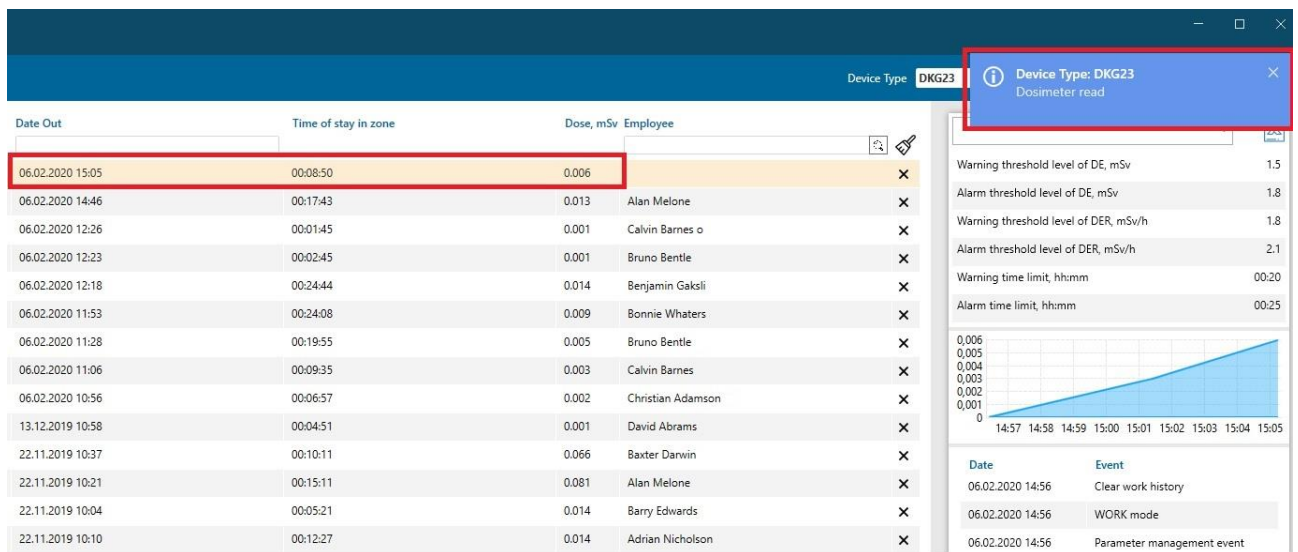



Fig. 21 Information on DKG-21 dosimeter reading

3.8 Generation of reports on employees

3.8.1 Report on all employees

In the "Employees" window (Fig. 10), it is possible to generate reports in .xlsx-format about one (or selected number) of employees by clicking the button with .xlsx-image (Fig. 22) in the left part of the "Employees" tab.

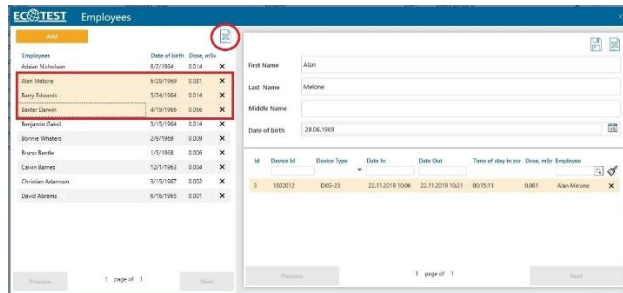



Fig. 22 Button with .xlsx-image

The number of employees for the report on their sessions is selected in the "Employees" window (Fig. 23).

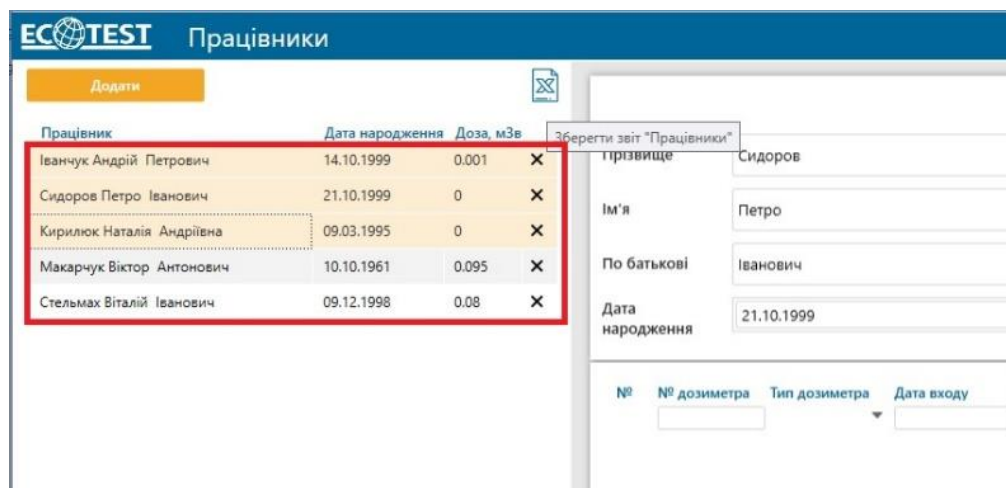




Fig. 23 Selection of employees for the report

The form of the report on employees is shown in Fig. 24.

PIБ	Дата народження	Сумарна доза за добу, мЗв	Сумарна доза за 3 місяці, мЗв	Сумарна доза за 12 місяців, мЗв	Сумарна доза з 1 січня поточного року, мЗв
2	09.03.1995	0	0	0	0
3	21.10.1999	0	0	0	0
4	14.10.1999	0	0,001	0,001	0,001


Fig. 24 Report form on selected employees

3.8.2 Report on a separate employee

The report on the separate employee highlighted in the left part of the window is generated by clicking the button with the .xlsx-image in the right part of the window. When you hover the mouse pointer over the .xlsx button, a screen hint pops up about the name of the report form (Fig. 25).

Id	Device id	Device Type	Date In	Date Out	Time of stay in zone	Dose, mSv	Employee
23	1800012	DKG-23	06.02.2020 10:56	06.02.2020 11:06	00:09:35	0.003	Calvin Barnes
30	1900514	DKG-21	06.02.2020 12:24	06.02.2020 12:26	00:01:45	0.001	Calvin Barnes

Fig. 25 Saving the “Employee” report

When you click the .xlsx-button, a window for saving the file appears (Fig. 26), which suggests a place to save the file in the program installation folder, (Fig. 27) and the possibility to select another location.

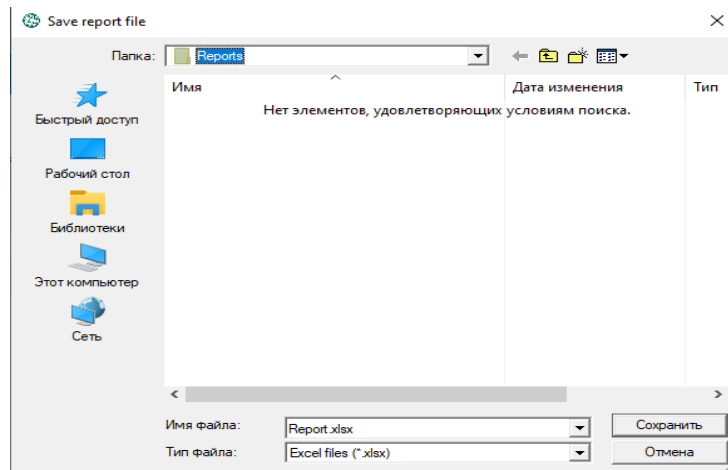


Fig. 26 File saving option

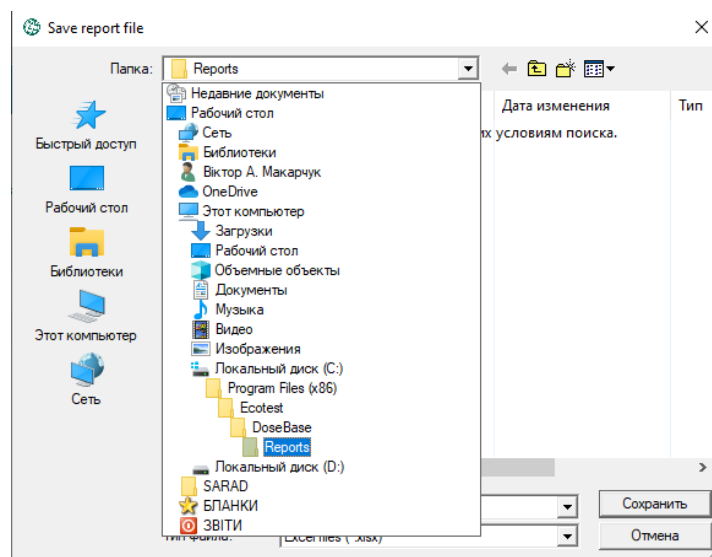



Fig. 27 Suggestion where to save the file.

The form of the report on the selected employee is shown in Fig. 28.

Employee	Date of birth	Accumulated dose per day, mSv	Accumulated dose per 3 months, mSv	Accumulated dose per 12 months, mSv	Accumulated dose from January, mSv
Baxter Darwin	19.04.1966	0	0.060	0.060	0
Barry Edwards	24.05.1964	0	0.034	0.034	0
Alan Melone	28.06.1969	0	0.081	0.081	0


Fig. 28 Report form on the selected employee

3.9 Generating session reports

The report on the sessions, which are displayed on the left side of the "Main" and "Programming Options" tabs, is generated by clicking the .xlsx button of the "Main" tab and will look like in Fig. 29.

1	Last Name	First Name	Middle Name	Date of birth	Session №	Odosimeter Number	Device type	Date in	Date Out	Time of stay at zone	Accumulated dose, mSv
2	Alan			28.05.1969	3	1800012 DKG-23		22.11.2019 10:06:05	22.11.2019 10:21:16	0:15:11	0.081
3						1800012 DKG-23		06.02.2020 14:29:04	06.02.2020 14:46:47	0:17:43	0.013

Fig. 29 Report on selected sessions

The session report highlighted on the left side of the "Main" and "Programming Options" tabs is generated by clicking the .xlsx button on the right side of these tabs, the report for one session will look like in Fig. 30.

1	Benjamin Gakali	Date
2	Device number	1102993
3	Device type	DKG-23
4	Threshold IED level	1
5	Threshold PED level	999.9
6		
7		
8		
9		
10	Date in	06.02.2020 15:09:35
11	Time of stay in zone	00:09:07
12	Dose, mSv	0.013
13		
14	EEPROM DKG-23 is read	06.02.2020 15:18:42
15	EEPROM norm	06.02.2020 15:18:42
16		
17		
18		
19	Dose	0
20		06.02.2020 15:09:46
21		0.013
22		06.02.2020 15:14:46

Fig. 30 Report on one selected session