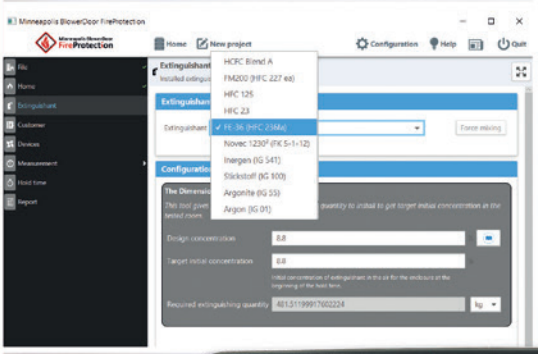
BlowerDoor Reference Guide



BlowerDoor GmbH
MessSysteme für Luftdichtheit

Minneapolis BlowerDoor FireProtection

Software for the determination of extinguishing gas holding times

Sole Agency for Europe, Springe-Eldagsen, Germany

Software publisher for eco-construction, Lille, France

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1 Introduction

1.1 Application purpose and description

With the Minneapolis BlowerDoor measuring system and the Fire Protection Software, you can easily and accurately determine extinction gas holding times in accordance with ISO 14520:2015, ISO 14520:2006, EN 15004:2008, EN 15004:2019, VdS 2380:2019-03 and VdS 2381:2016-06 in rooms of rectangular volume.

The cloud-based software can be installed free of charge on multiple computers and used with multiple employees of a team or a group of companies. The charge for the use is made via a pre-purchased number of tokens; one token will be deducted from your subscription when you import a measurement file – regardless of which user on your team.

1.2 Measurement principle

The door fan test according to the standard forms the basis for the measuring process. You first check the leakage at constant pressure difference with a BlowerDoor measuring system: BlowerDoor Standard, BlowerDoor MiniFan, or BlowerDoor MultipleFan incl. digital pressure gauges DG-1000 or DG-700. Then you perform the door fan test with TECTITE Express 5.1 resp. TECLOG 4 (both according to ISO 9972 or EN 13829), TECTITE Express 4.1, or TECLOG 3 software (→ corresponding reference guides for BlowerDoor measuring systems).

The subsequent field calibration check – another door fan test with a defined additional leakage area (sharp-edged circular calibration check orifice) – is a plausibility check of the correct set-up and the proper function of the measuring systems.

The FireProtection Software calculates the hold time according to the above mentioned regulations from the measured values of the door fan tests. Therefore, the exported data from TECTITE Express (BLD file) is read into the FireProtection Software.

Note: TECLOG 3 and TECLOG 4 BLD-export files must first be opened and saved in TECTITE Express so that they can be then read into FireProtection.

The use of the FireProtection Software requires knowledge of the selected regulation.

2 Set-up possibilities for the field calibration check of the measuring system

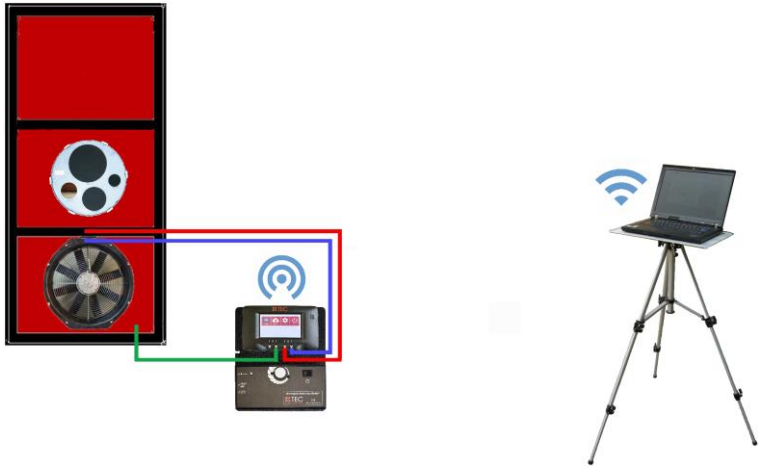


Fig. 2.1: Example of set-up for the field calibration check with the measuring system BlowerDoor Standard with digital pressure gauge DG-1000 (here: WiFi connection). Other communication links are possible.

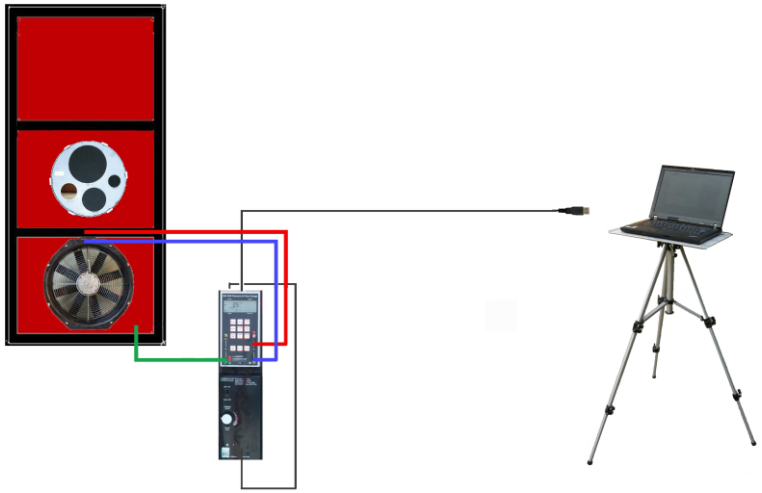


Fig. 2.2: Example of set-up for the field calibration check with the measuring system BlowerDoor Standard with digital pressure gauge DG-700 (here: USB connection). Other communication links are possible.

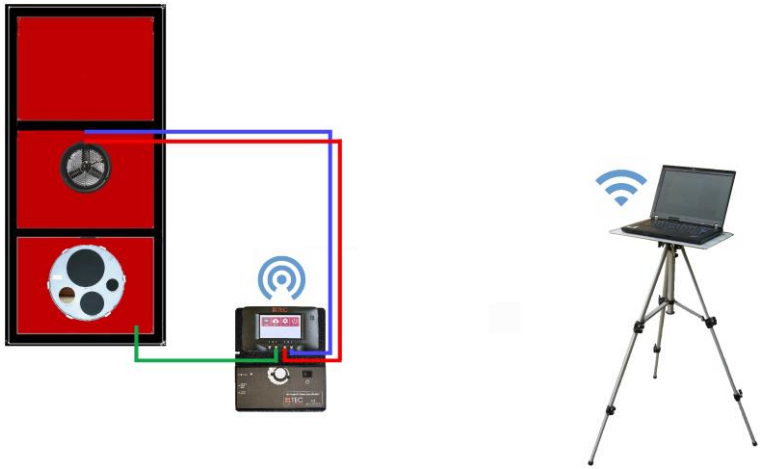


Fig. 2.3: Example of set-up for the field calibration check with the measuring system BlowerDoor MiniFan with digital pressure gauge DG-1000 (here: WiFi connection). The use of DG-700 gauge and other communication links are possible.

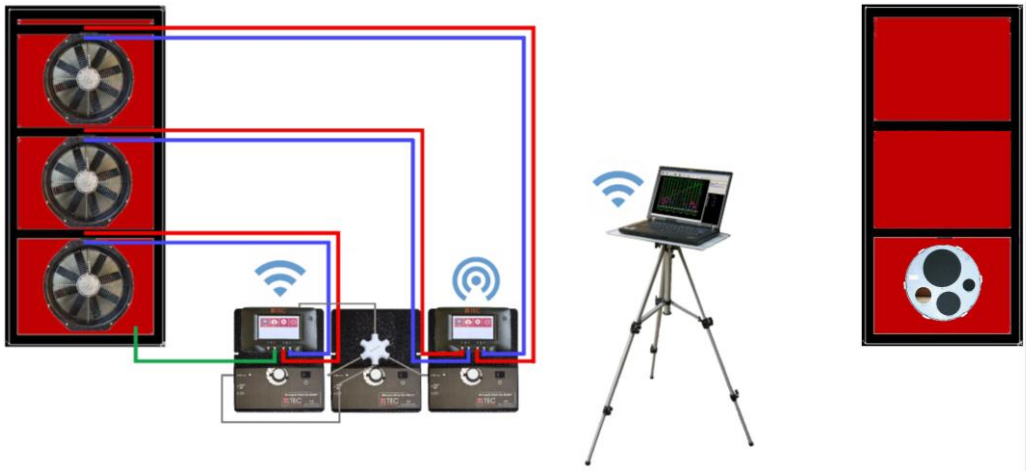


Fig. 2.4: Example of a set-up for the field calibration check with the measuring system BlowerDoor MultipleFan with three measuring fans and two DG-1000 devices. The communication is established via a WiFi network. The use of DG-700 gauges and other communication links are possible.

3 Requirements

3.1 System requirements for the software

Computer

For the Minneapolis BlowerDoor FireProtection software to run smoothly, the computer/laptop must meet the following requirements:

- RAM: ≥ 1 GB, 2 GB recommended
- Hard drive: ≥ 500 MB free
- Internet connection for software download and installation, and for cloud-based data management and storage, and account and subscription management.

The requirements to the computer/laptop regarding the TECTITE Express or TECLOG software as well as the drivers for your pressure gauge can be found in the reference guide for your BlowerDoor measuring system (→ https://www.blowerdoor.com/services/downloads-videos/reference-guides).

Operating system

Minneapolis BlowerDoor FireProtection software runs on the full versions of the operating systems:

- Microsoft Windows 10
- Microsoft Windows 8
- Microsoft Windows 7

Software for the FireProtection reports

- DOCX format: compatible with Microsoft Word 2010 and up, OpenOffice 3.3 and up or LibreOffice 3 and up
- PDF Format: Requires Microsoft Word 2010 and up
- Customization of report templates requires Microsoft Word 2010 and up

3.2 Requirements for the BlowerDoor measuring system

Measurements are made using a Minneapolis BlowerDoor measurement system with one or more:

BlowerDoor measuring fan(s):

- BlowerDoor DuctBlaster B fan,
- BlowerDoor model 4 fan, or
- BlowerDoor model 3 fan (220V)

Digital pressure gauge(s):

- DG-1000, or
- DG-700

BlowerDoor Software

- TECTITE Express 5.1 (measurements according to ISO 9972 or EN 13829)
- TECTITE Express 4.1 (measurements according to EN 13829)
- TECLOG 4 (measurements according to ISO 9972 or EN 13829) plus TECTITE Express 5.1
- TECLOG 3 (measurements according to EN 13829) plus TECTITE Express 4.1 or up

3.3 Recommended accessories for the field calibration check

BlowerDoor panel with 2 openings, field check ring with 4 sealing plugs, indicating labels (6 pieces), timber wedges (10 pieces), 2 capillary tube (40 cm each), 10 m tube (2 pieces), Velcro strap (2 pieces).

Fig. 3.1: Recommended accessories for field calibration check

Fig. 3.2: Installed field check ring and BlowerDoor Standard fan

4 Activating dooApp cloud account and installing Minneapolis BlowerDoor FireProtection software

The software FireProtection allows you to work cloud-based on multiple computers and with multiple members of a team or group of companies.

First, the main account is activated via the dooApp cloud. Then the profile information can be completed, and other individual users can be created and managed. Common data can be set up, shared, and managed via the cloud (e.g., assignment of user rights, customers, devices etc.).

The FireProtection reporting software can be installed on the computers of all individual users and used from there.

4.1 Step no. 1: Activating the dooApp account

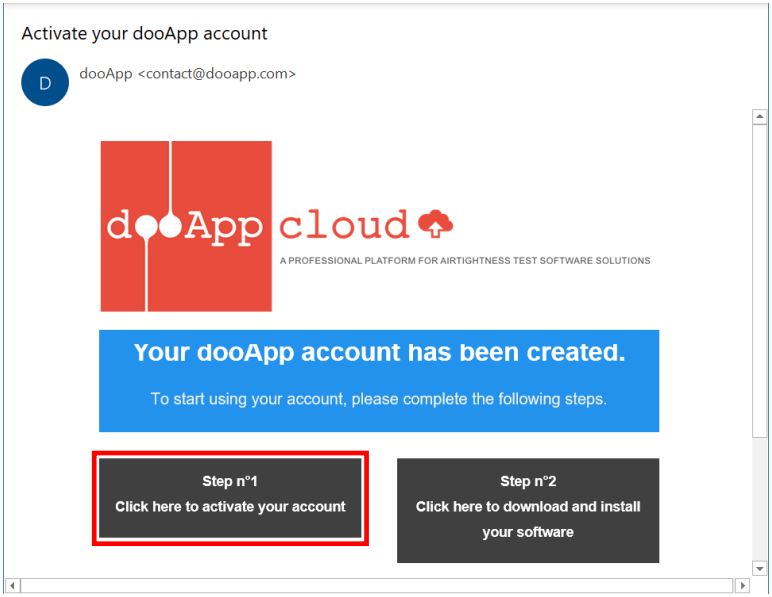


Fig. 4.1

Open the e-mail from the software publisher dooApp and klick on “Step nº1” to activate your account in the dooApp cloud.

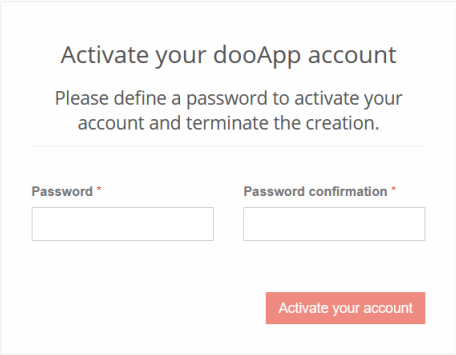


Fig. 4.2

Start activating your dooApp account by defining a password and validate it by clicking on "Activate your account".

Then, in the next window, log in to your account with your e-mail address and the password you just set.

Your account will open.

4.1.1 Completing your profile and company information

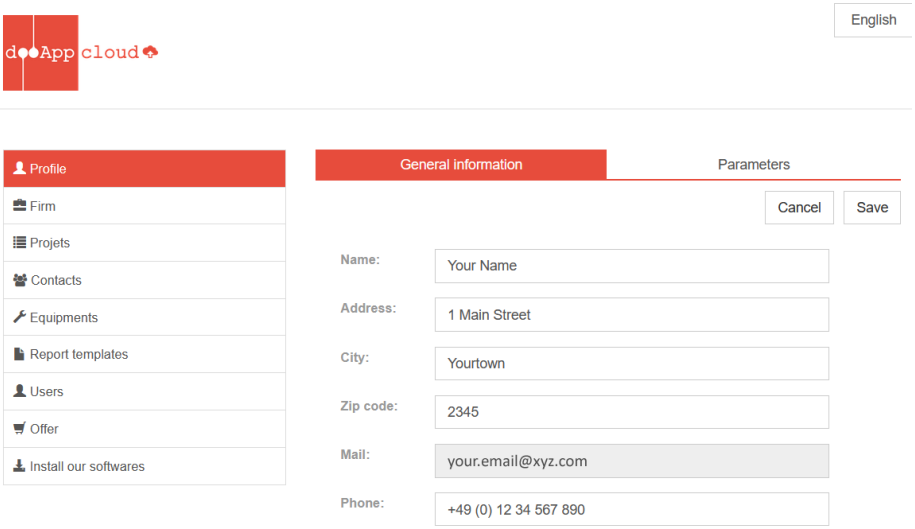


Fig. 4.3

Please complete your general information by selecting "Profile" in the menu on the left.

Click on "Edit" to modify the data. Confirm your input with "Save".

Do the same in the section "Firm".

The data of your "Profile" will appear in the FireProtection software as your description as technician (→ Chap. 5.1.1). The data you enter and save in the "Firm" section will appear as your company description (→ Chap. 5.1.2). The company information will apply to all your users and can be changed by all your users with administrator rights (→ Chap. 4.1.2).

Note: **Both data sets can only be edited online from your dooApp account.**

4.1.2 Optional: Adding and managing other users

Via the “Users” section it is possible to add other users to your account and give them the role of an operator and/or administrator.

Fig. 4.4: Section Users

Each user can login on any workstation where FireProtection is installed (→ Chap. 4.3).

Note:

The tokens to run a project are shared among all your users: Any user of your team can use them.
In section “Offer” you can associate subscriptions to a particular user by clicking on the button “Modify” offer” next to that user and checking the desired subscription from the list. You can also dissociate a subscription from a user by unchecking the subscription from his/her list.

For further information about using the dooApp cloud → Chap. 7.

4.2 Step no. 2: Downloading and installing the software

For the download and installation of the software you need administrator rights and access to the Internet. Either the link in the e-mail from the software publisher or the link in your dooApp account in section “Install our softwares” takes you to the software download link.

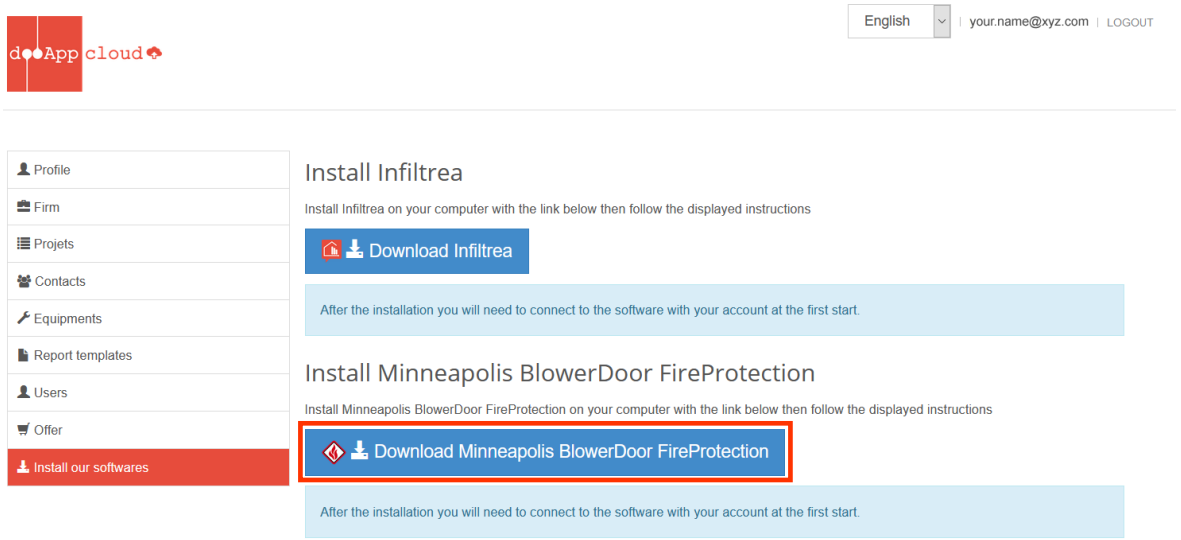


Fig. 4.5

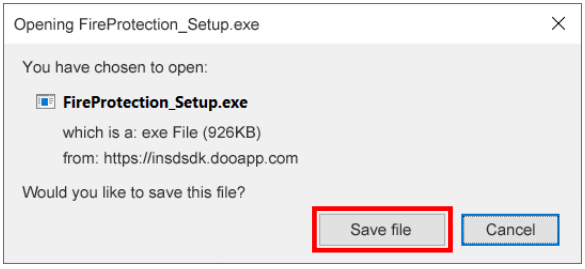


Fig. 4.6

Please confirm the download with “Save file”.

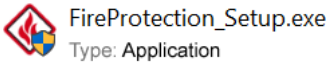


Fig. 4.7

Before installing Minneapolis BlowerDoor FireProtection make sure that all programs are closed.

Start the installation by double clicking on the downloaded file “FireProtection_Setup.exe” from the publisher dooApp SARL.

4.3 Starting Minneapolis BlowerDoor FireProtection

Fig. 4.8

The software Minneapolis BlowerDoor FireProtection can be started by clicking the icon on the desktop.

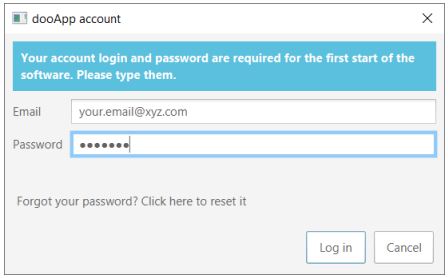


Fig. 4.9

At the very first start of the software and when you have logged out it is necessary to log in for connecting the software with your account.

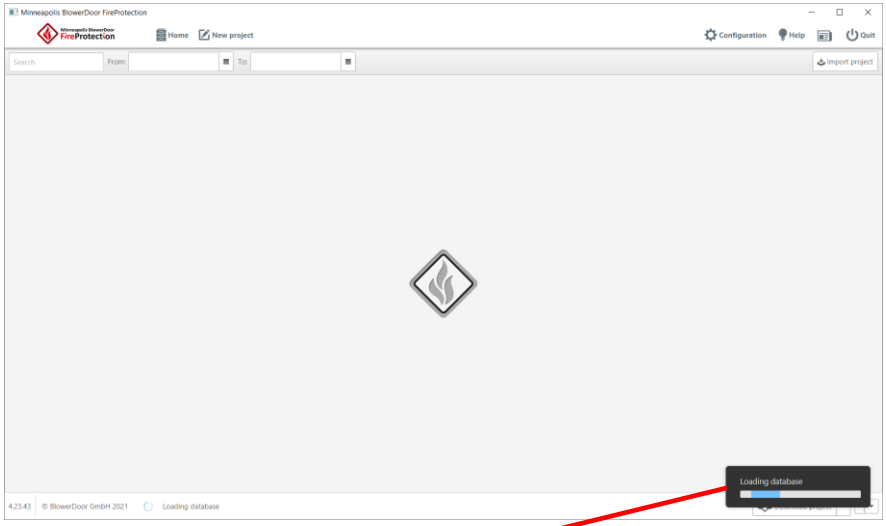


Fig. 4.10: Home screen

The Home screen will open.

Later, all projects will be listed here.

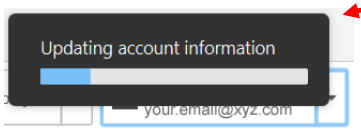


Fig. 4.11

After login, the software is loading the database and updating the information from your account at the dooApp cloud.

4.4 Overview home menu

At launch, you get to the Home menu, which has the following options:

Fig. 4.12

Home: Leads back to home screen.

Fig. 4.13

New project: Creates a new project (→ Chap. 6.3).

Fig. 4.14

Configuration: Overview of global settings in the software. Possibility to set e.g. data of customers, devices, templates and more (→ Chap. 5).

Fig. 4.15

Help: Leads to the imprint, FAQ, support form and support phone as well as links for remote help.

Fig. 4.16

Blog: Folds out the blog menu.
Clicking the icon again closes the blog.

Fig. 4.17

Quit: Exits application.
When closing the software, all projects are sent to your dooApp cloud account.

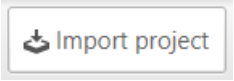


Fig. 4.18

Import project: Allows you to import existing projects.
A sample project is provided.

The menu at the top of the screen is accessible throughout your use of FireProtection.

4.5 Changing software language

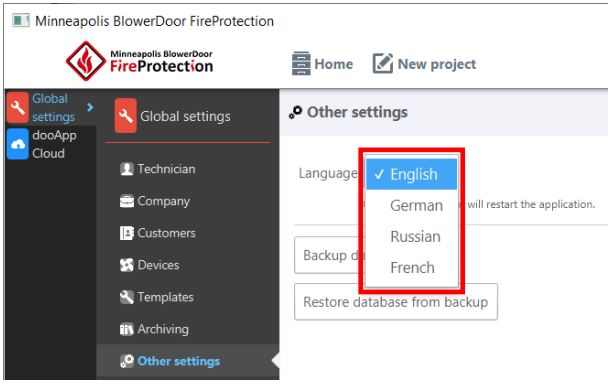


Fig. 4.19

In the menu **Configuration** and submenu **Other settings** the language can be changed. The change of the language requires a restart of the software.

5 FireProtection software: Configuration

5.1 Global settings

5.1.1 Technician

The **Technician** subsection contains the information you have specified about yourself as a measurement operator in your dooApp account. This information can only be edited from your online account (→ Chap. 7). It can be used for all the projects and be included in the reports.

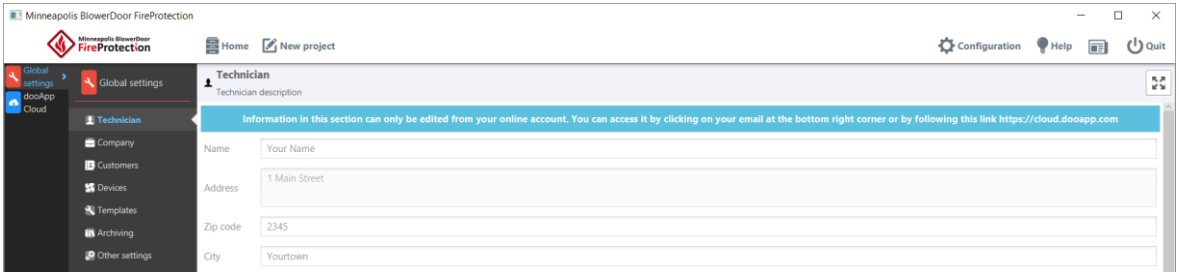


Fig. 5.1

5.1.2 Company

The **Company** subsection contains the information you have specified in your dooApp account in the section "Firm". This information can only be edited from the online account by a user with admin rights. The data can be used for all the projects and be included in the reports.

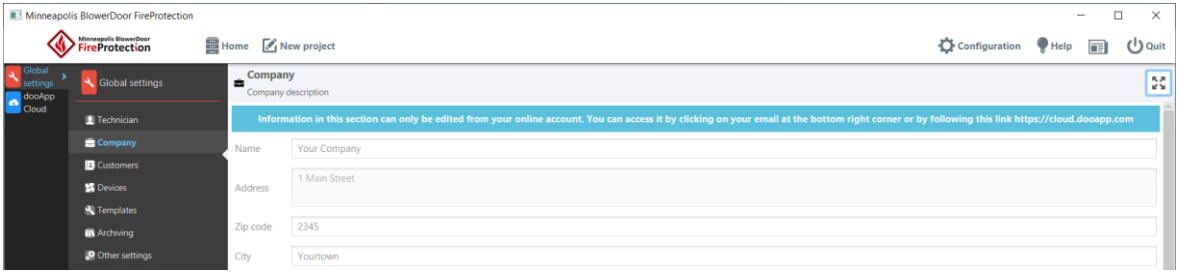


Fig. 5.2

5.1.3 Customers

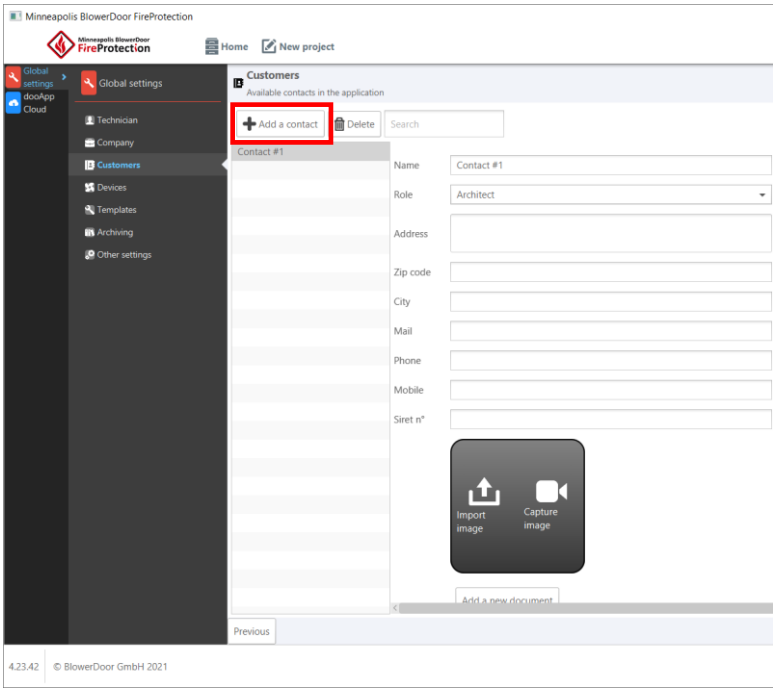


Fig. 5.3

The **Customers** subsection in the FireProtection software allows you to set information about your customers.

With click on "**Add a customer**" a new contact is ready to be filled with data.

All customers are listed.

This information can be used for all the projects and thus be included in the reports, **but** it can only be accessed by this one user.

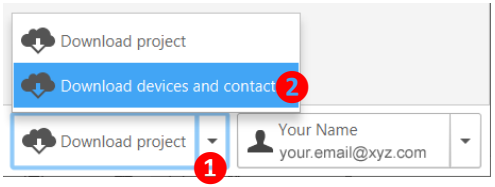


Fig. 5.4

Note:

All contacts that you create in the dooApp cloud can be downloaded in the software by you and all the users of your company who have a subscription.

In the software you just have to choose the action "Download devices and contacts" at the bottom right corner of your screen to download and/or update the contacts.

Contacts loaded from the cloud can be updated only there and only by users with administrator rights.

To add a customer for all users of your team, go to your dooApp cloud account (→ Chap. 7.2).

5.1.4 Devices

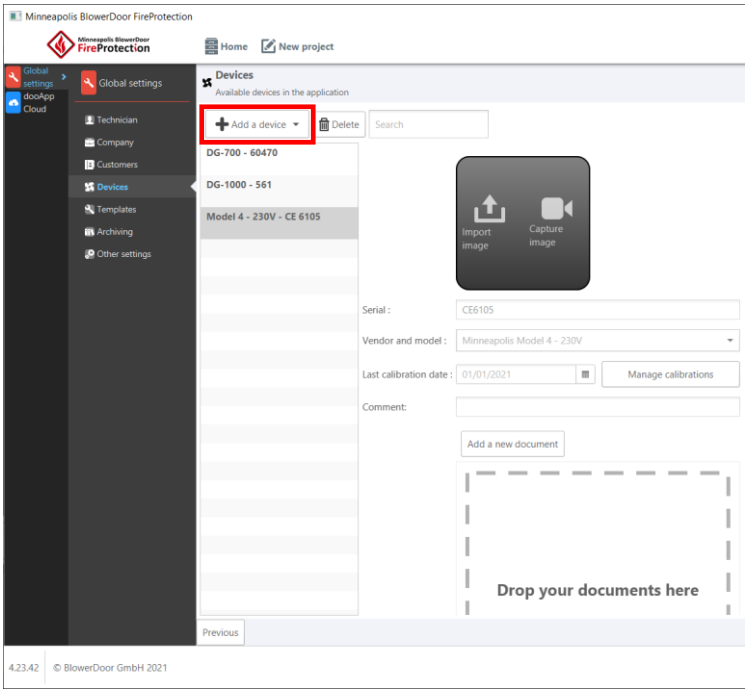


Fig. 5.5

In the **Devices** subsection information about your measuring devices can be compiled and managed.

After having added and configured a device in the software, it will be available to be associated to the projects, **but** only by this one user.

All devices are listed.

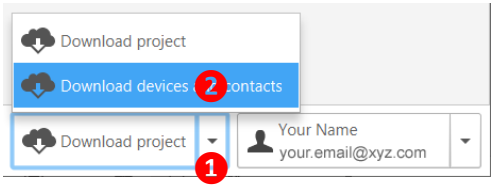


Fig. 5.6

Note:
All devices that you create online in the dooApp cloud in section "**Equipment**" can be downloaded in the software by you and all the users of your company who have a subscription.

Choose the action "Download devices and contacts" at the bottom right corner of your FireProtection screen to download and/or update the data.

Devices loaded from the cloud can be updates only there and only by users with administrator rights.

To add a new device that all users of your team can access to, go to your dooApp cloud account (→ Chap. 7.3).

5.1.5 Add a device and define calibration information in FireProtection software

Note: Devices added in the FireProtection software can only be used by this user. To add a new device that all users of your team can access to, go to dooApp cloud account (→ Chap. 7.3).

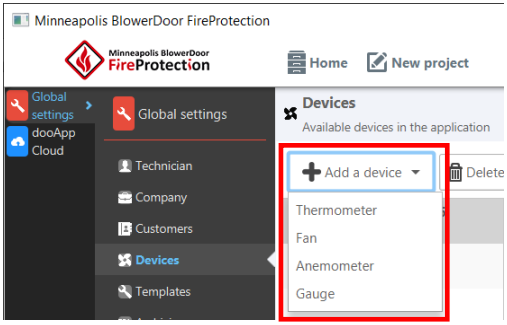


Fig. 5.7

After clicking the button "Add a device" you must first select the type of the device to be added.

Subsequently, the device details can be specified with the serial number, the model designation, comments and calibration information. Calibration certificates can be added by drag and drop.

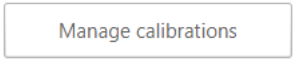


Fig. 5.8

To enter calibration date, click on the "Manage calibrations" button.

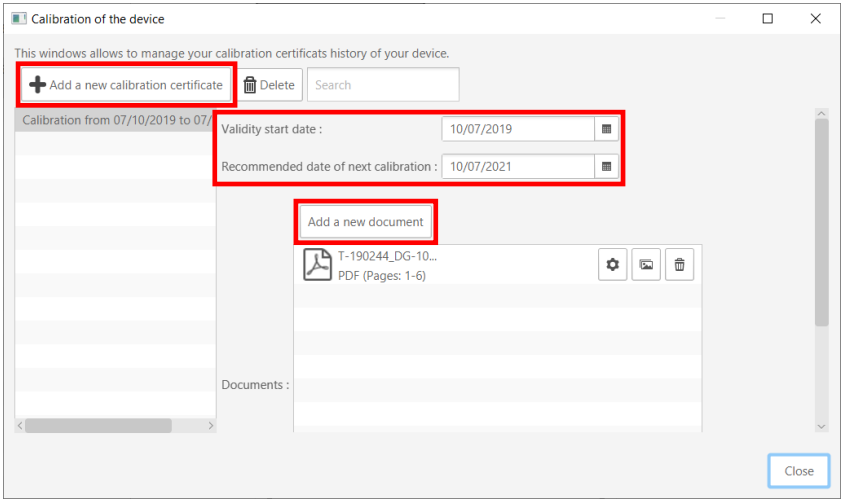


Fig. 5.9

For each calibration you can define calibration information by clicking "Add a new calibration certificate". You can enter the validity start date and add a calibration certificate in documents area.

Information about valid calibration is used in calculations and is added to the generated reports. In a project, the selected fan must have a valid calibration to be able to add to a measurement.

5.1.6 Templates

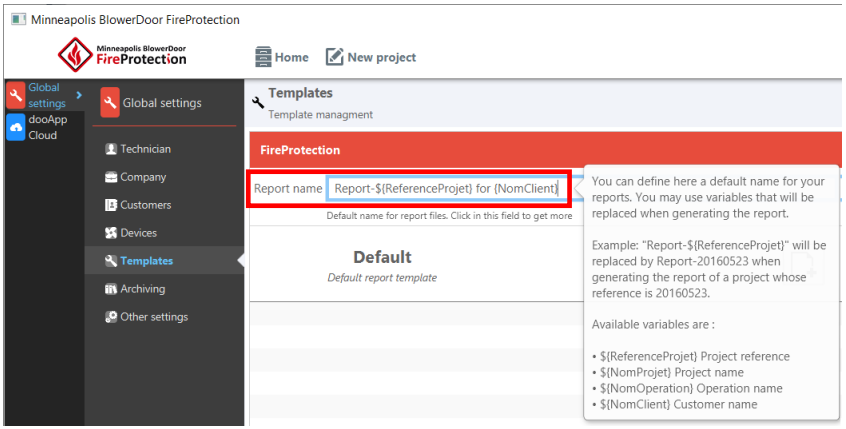


Fig. 5.10

In the **Templates** section it is possible to define a default name for report files. This pattern can contain several predefined variables.

When editing your report, the file is automatically named using your pattern.

You can also manage different report templates. → Chap. 6.11 for how to customize templates with Microsoft Word.

5.1.7 Archiving

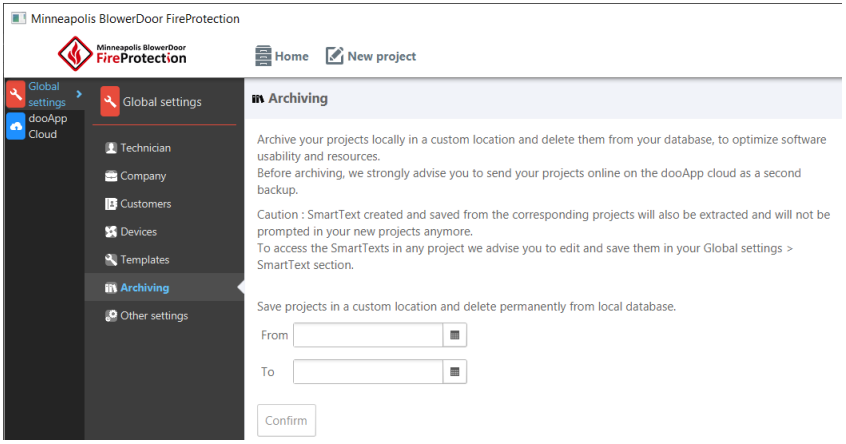


Fig. 5.11

In **Archiving** menu projects can be saved in a custom location and deleted permanently from the local database.

Before archiving your projects, we strongly recommend to send them online to your dooApp cloud as a second backup.

5.1.8 Other settings

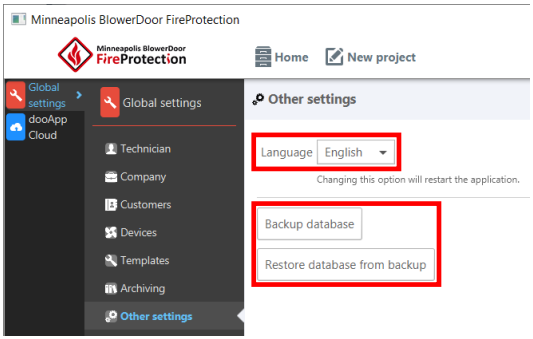


Fig. 5.12

In **Other Settings** menu it is possible to change the software language (→ Chap. 4.5) and to create backups.

When clicking on "*Backup database*" opens a dialog box where you can specify the location for the backup folder.

When restoring database from backups you will receive warning messages. Restoring leads to a restart of the software and the home screen will open.

5.2 dooApp cloud settings

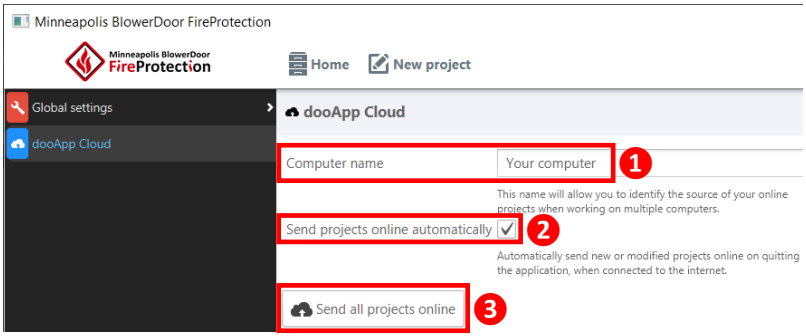


Fig. 5.13

In the dooApp settings is mentioned the computer name (1), which allow you to identify the source of the online projects of your team, when working on several computers.

The name can be adjusted.

As default, all projects are automatically sent to your dooApp cloud account when closing FireProtection software (→ 2). By unchecking the check box, this automatic saving is switched off. It is still possible to manually trigger the online saving of individual projects (→ Chap. 6.1) or all projects by clicking the "Send all projects" button (→ 3).

6 FireProtection projects

6.1 Project list and saving status

All current projects are listed on the home screen and can be selected/opened from there.
There are three different indicators for their status:

Fig. 6.1

Projects stored online in the dooApp cloud are marked as “online”. They are stored there in your secured personal space.

Note: When closing FireProtection software, all projects will be sent automatically to your dooApp cloud account with their editing status at that time. When you reopen your software, they will be marked as “online”.

It is possible to switch off automatic saving of new and updated projects when closing FireProtection software. For details see → Chap. 5.2.

Fig. 6.2

Unsecured new projects can be send manually to your dooApp cloud account by clicking on “Send online”. When you quit the software, all projects will be sent automatically to your dooApp Cloud account (see above).

Fig. 6.3

Updated projects can be manually sent to the dooApp cloud. When you quit the software, all projects will be sent automatically to your dooApp Cloud account (see above).

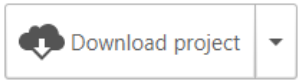


Fig. 6.4

To download projects from your dooApp cloud account choose the action “Download project“ at the bottom right corner of your FireProtection screen. All saved projects are listed and can be selected for download.

6.2 Import/Export project files

Due to cloud services, projects files can be imported and exported to transfer, share and save/archive.

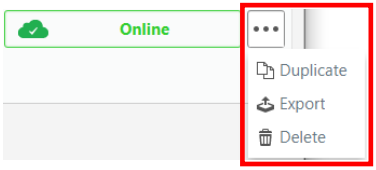


Fig. 6.5

Clicking on the three dots opens the menu.

When duplicating a project, the file screen of the new project opens. All data from the original project is included in this new project.

Clicking on "Export" a dialog box will open to specify a location for the project file. Exported projects files get the extension .infiltrea.

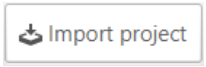


Fig. 6.6

FireProtection project files can be imported via the "Import project" button or simply by drag'n'drop into the project list on home screen.

6.3 Creating a new project

Fig. 6.7

By clicking the "New project" button, a window will open to start the configuration of your new project.

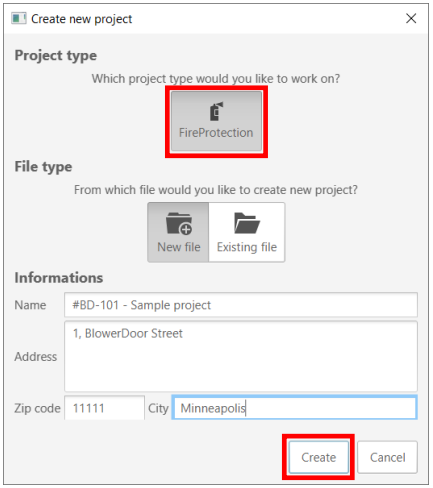


Fig. 6.8

Only if FireProtection is selected as the Project type (the "FireProtection" button is grayed out), a project can be created.

File type

You can choose between:

- Creating a "New file" for your project,
- Selecting an "Existing file" in which to store your new project. (This option is no longer current and will be removed from the software shortly.)

As soon as you click the "Create" button, you will be brought to the file screen of your new project (→ Fig. 6.9).

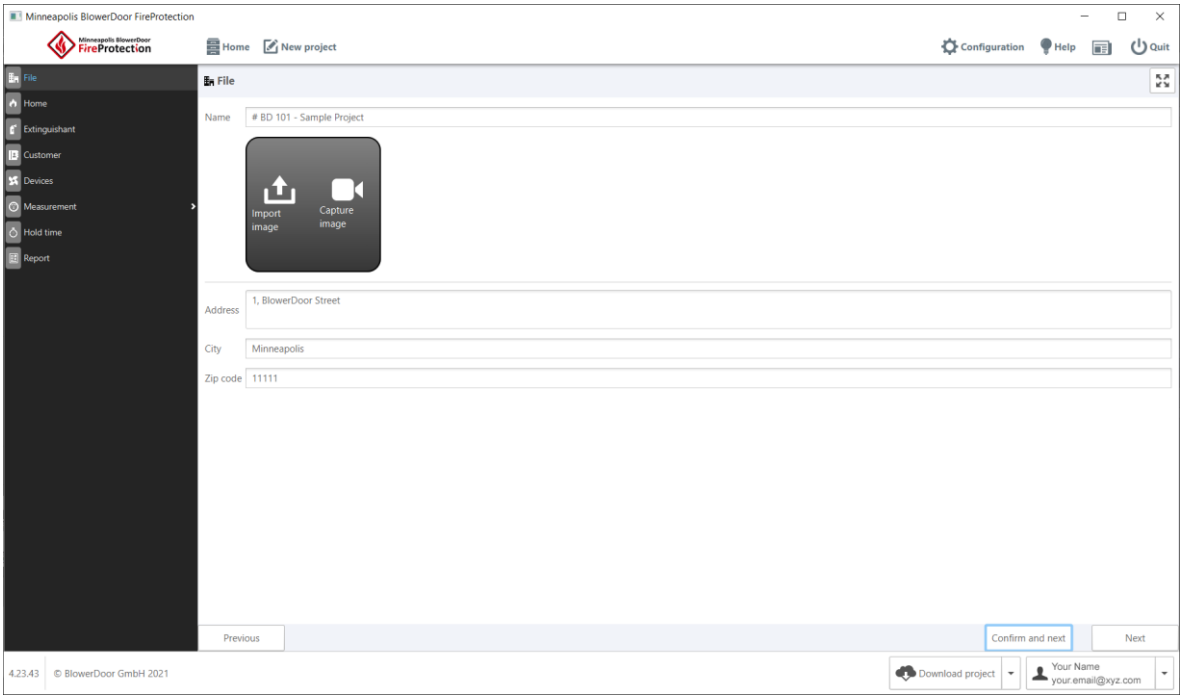


Fig. 6.9: File screen

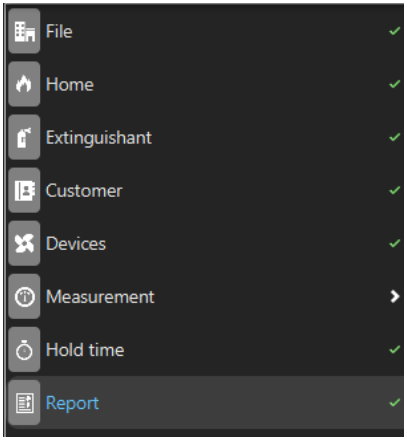


Fig. 6.10

Note:

A report is only available after having confirmed all menu items by “Confirm and next”. Validated menus are displayed with a tick mark.

It is always possible to return to the previous menu by clicking on “Previous”. There it is possible to unmark confirmed menus by clicking the “Reopen“ button.

The following screen will be the home screen of your new project.

6.4 Entering general information about project and tested enclosure

The **Home** section allows to provide a name and a reference number to your project, to select your reference norm, to describe all specifications of your test enclosure including the type of fire risk involved.

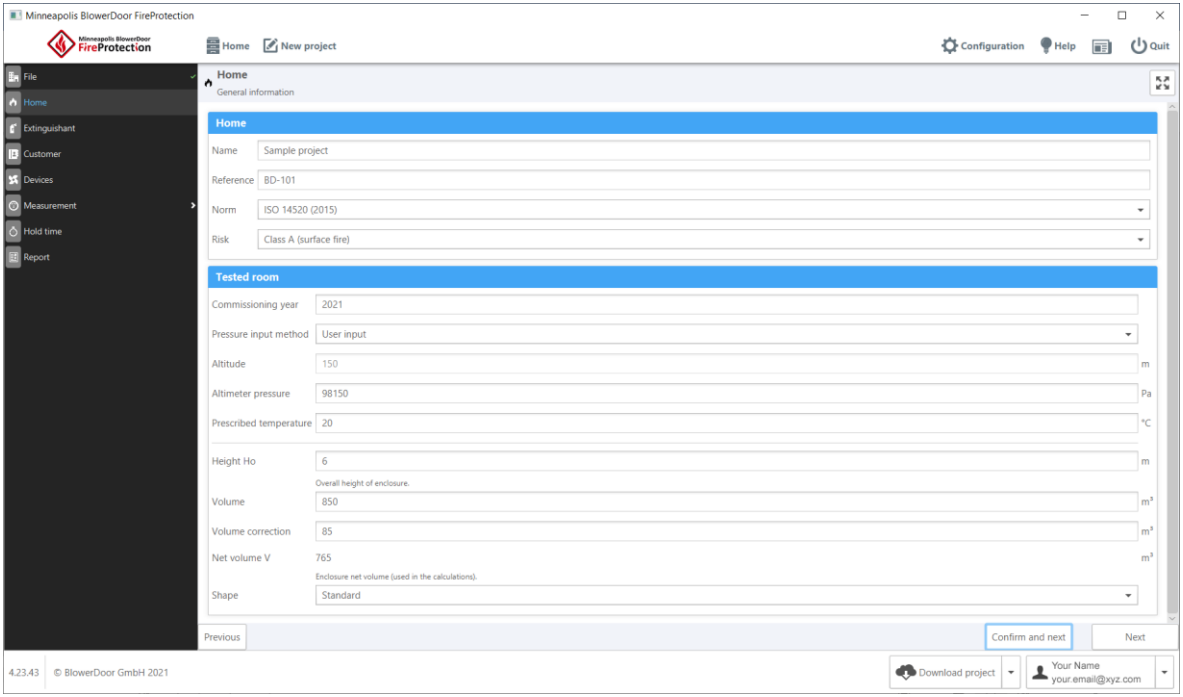


Fig. 6.11: Home section is the start screen for projects

In detail:

- **Name:** Project Name
- **Reference:** Project Reference
- **Norm:** Selection of the measurement standards
- **Risk:** Kind of fire risk run by the enclosure
- **Commissioning year:** Year of construction/start-up of the enclosure

- **Pressure input method:** You can either choose “Altitude based calculation” and enter an “Altitude” directly below to calculate the Altimeter pressure (with ISO altitude factors).
  Or you can choose “User input” to enter directly the atmospheric pressure in the “Altimeter pressure” field.
- **Altitude:** Altitude/Height above sea level of the enclosure
- **Altimeter pressure:** Atmospheric Pressure in the enclosure
- **Prescribed temperature:** Recommended temperature of the enclosure
- **Height H_o:** Overall height of the enclosure
- **Volume:** Volume of the enclosure measured by the Technician
- **Volume correction:** Adjustments to the volume of the enclosure. For example, the volume of a completely sealed unit in the enclosure does not influence the retention of the extinguishant. Therefore, it must be taken away from the “gross” volume of the enclosure.
- **Net volume V:** This is the result volume equal to the measured volume to which the adjustment is applied. This is the only value used in the calculations; the others will be displayed for information purposes only.
- **Shape:** Shape of the enclosure. “Standard” is the most common, i.e. rectangular enclosure

6.5 Configuring the installed extinguishant

The **Extinguishant** screen allows you to describe the specifications of your extinguishing installation and to enter the desired retention conditions.

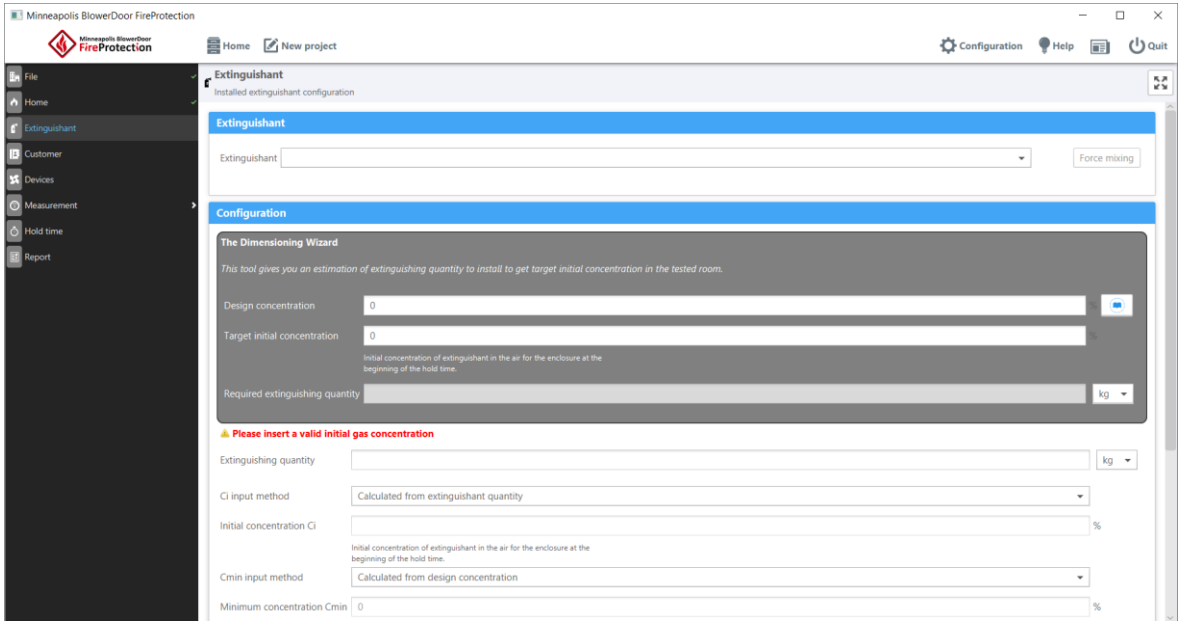
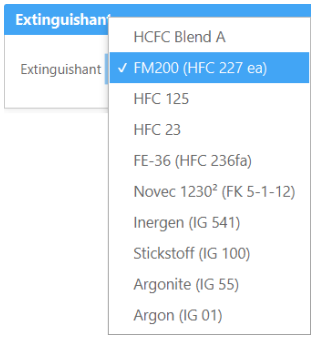


Fig. 6.12: Extinguishant screen

6.5.1 Extinguishant



Use the drop-down menu to select the type of installed extinguishant.

After selection, the chemical formula, CAS registry number and the extinguishant density at 20°C and 101325 Pa atmospheric pressure are listed.

Fig. 6.13

Extinguishants can be either heavier than air (icon of a downward-pointing arrow) or have the same density as air (icon of two circular arrows).

It is possible to force a heavier-than-air gas to behave as a gas with the same density through a mixing device. In this case, click the Force mixing button. To go back, click the same button again.

Fig. 6.14

Since nitrogen (IG 100) has approximately the same density as air, Force mixing Force mixing is preset.

6.5.2 Configuration

The **Dimensioning Wizard** helps you to determine the minimum quantity of extinguishant that you have to install in order to get the target initial concentration in the tested room.

To get help about the Design concentration click on the book icon.

Fig. 6.15

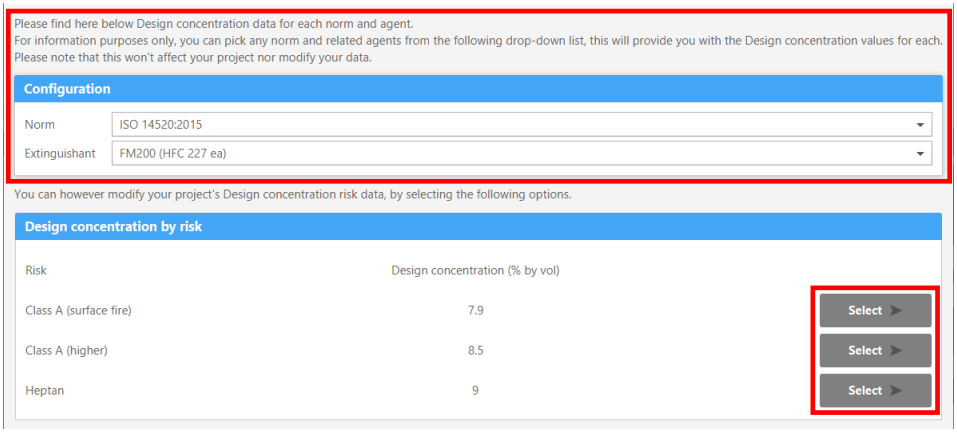


Fig. 6.16

For information purposes only, you can select a norm and one of the related agents from the drop-down list, which will provide you with the "Design concentration by risk".

Note: **Selecting a norm and an extinguishant in the Dimensioning Wizard does not change the previously entered project data!**

Depending on the risk, you can use the "Select" button to choose the value of one of these options.

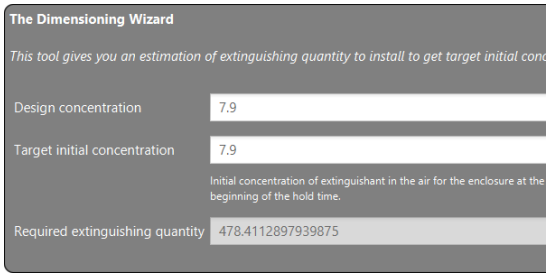


Fig. 6.17

The Design concentration is now displayed.

Enter into the Target initial concentration field the desired concentration (in %)

An amount in kg or m^3 will appear in the Required extinguishing quantity field below. This quantity is calculated based on the selected extinguishant and on the volume and altitude of the testing enclosure.

Note: **The Required extinguishing quantity shown by the Wizard is just a suggestion!**

Fig. 6.18

Below **T**he Dimensioning Wizard you must enter the actual quantity of extinguishant installed in the **Extinguishing quantity** field and select the unit kg or m^3: This is the amount that will be taken into account.

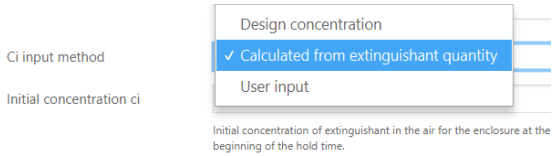


Fig. 6.19

Next, you must determine the actual **Initial concentration ci**. First you select the **Ci input method**. You can do this in three different ways:

- You can select Design concentration.
- Or you can select Calculated from extinguishant quantity: The initial concentration is then calculated according to the actual quantity installed.
- Or User input, which allows you to manually enter the initial concentration of your choice.

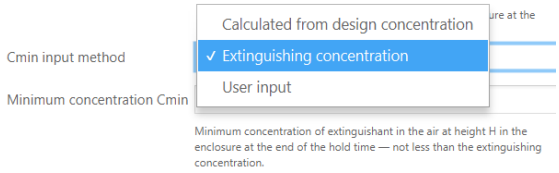


Fig. 6.20

You can determine the **Minimum concentration Cmin** by first selecting **Cmin input method**:

- You can either select Calculated from design concentration: The minimum concentration is then determined by standard recommend-dations, risk and the chosen extinguishant (in general 85%).

- Or you can select Extinguishing concentration: It corresponds to the minimum concentration required to extinguish a fire involving a particular fuel under defined experimental conditions excluding any safety factor.
- or User input to manually enter the minimum concentration of your choice.

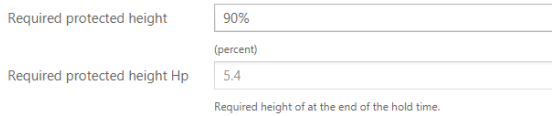


Fig. 6.21

Required protected height [%]

This is the height marking the upper range of the volume covered by the fire protection. (It may be less than the total height of the room, if the objects and equipment to protect do not reach the ceiling of the room).

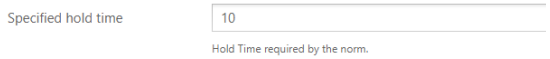


Fig. 6.22

Specified hold time [min.]

This is the time within which you wish that the concentration of extinguishant remains at least equal to the extinction concentration in a volume covering at least the protected height required. Complying with this period of time aims at ensuring that any possible fire started in the enclosure is smothered.

In general, the minimum hold time must be at least 10 minutes; otherwise, it should be specified by the authority.

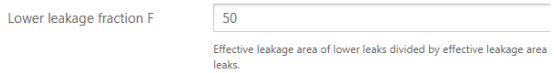


Fig. 6.23

Lower leakage fraction [%]

Distribution of upper and lower leaks. The 50 % default value means that leaks are equally distributed between the upper part and the lower part of the enclosure.

6.6 Customer

When clicking on Select (1) the Customer selection window opens. Available contacts are listed. You can search for (2) and select a customer or add a new one (3).

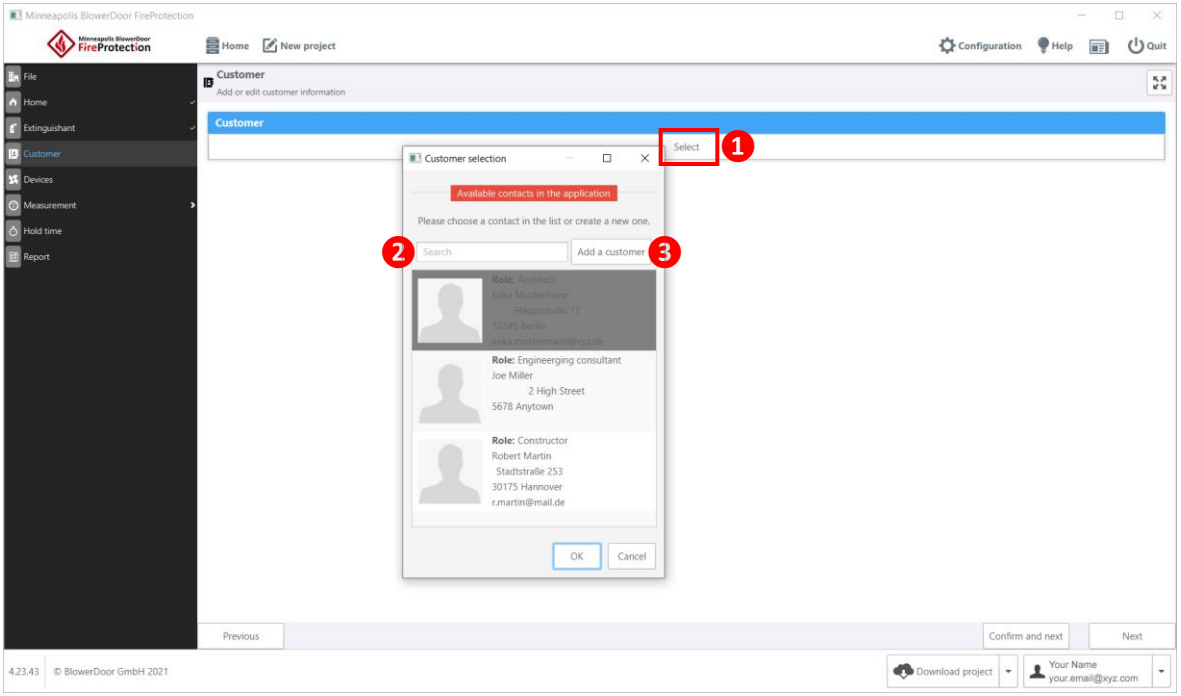


Fig. 6.24

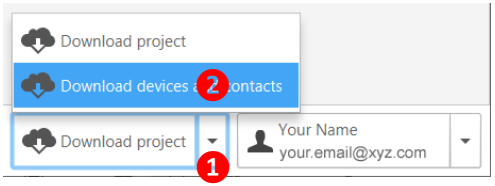


Fig. 6.25

Note:

All **contacts** that you create in the dooApp cloud can also be downloaded in the software by you and all the users of your company who have a subscription.

You just have to choose the action "Download devices and contacts" at the bottom right corner of your screen to download and/or update the contacts.

Contacts loaded from the cloud can be changed only there and only by users with administrator rights.

6.7 Devices

You can select devices used for the test from the devices you have saved in the **Configuration** section of the software.

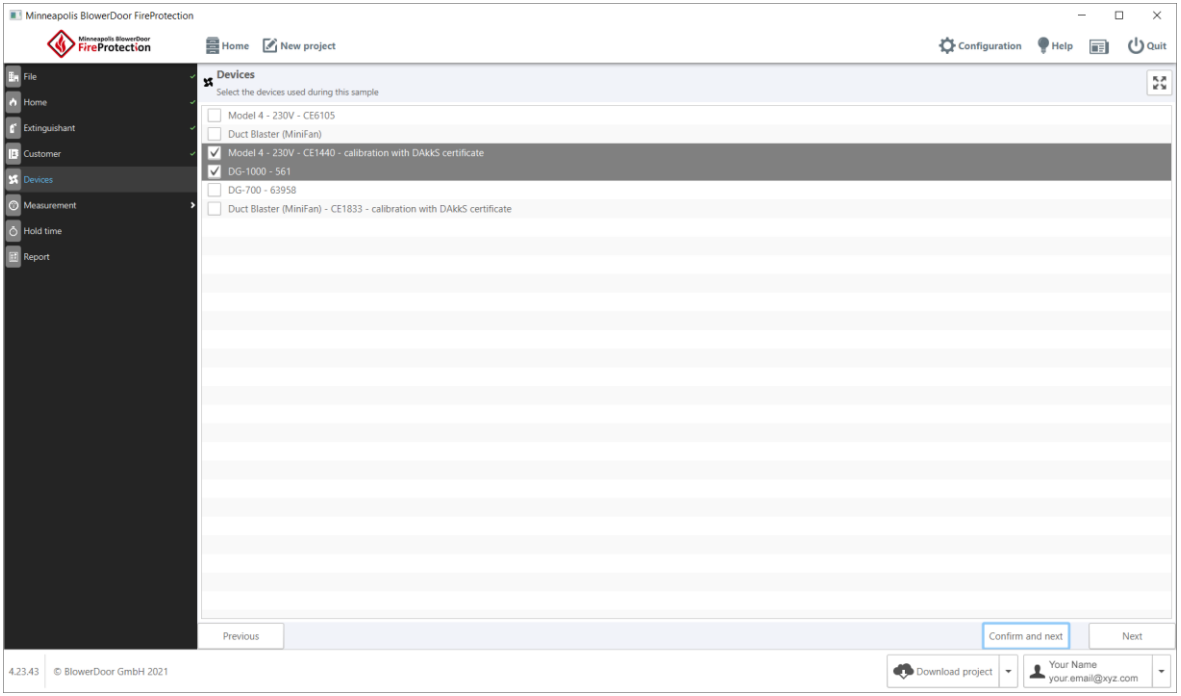


Fig. 6.26

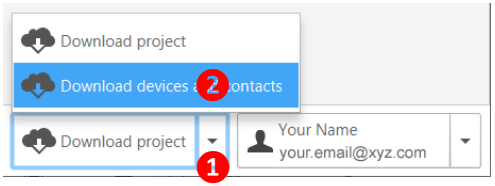


Fig. 6.27

Note:

All devices that you create in the dooApp cloud in section **Equipment** can also be downloaded in the software by you and all the users of your company who have a subscription.

Choose the action "Download devices and contacts" at the bottom right corner of your FireProtection screen to download and/or update the data.

Devices loaded from the cloud can be changed only there and only by users with administrator rights.

6.8 Setting up a door fan test and importing measurement data

6.8.1 Configuration

Once you have defined the project components, you can perform a measurement (door fan test) with BlowerDoor system and software and then import measurement data from TECTITE Express 5.1, TECTITE Express 4.1 (1). Data from the TECLOG 3 or TECLOG 4 must first be opened and saved in TECTITE Express.

At the bottom of your screen, in the Leakage Opening Area field (2) you can enter the leakage area of the opening you have sealed for the test. This area will then be added to the Effective Leakage Area measured during the retention time calculation test.

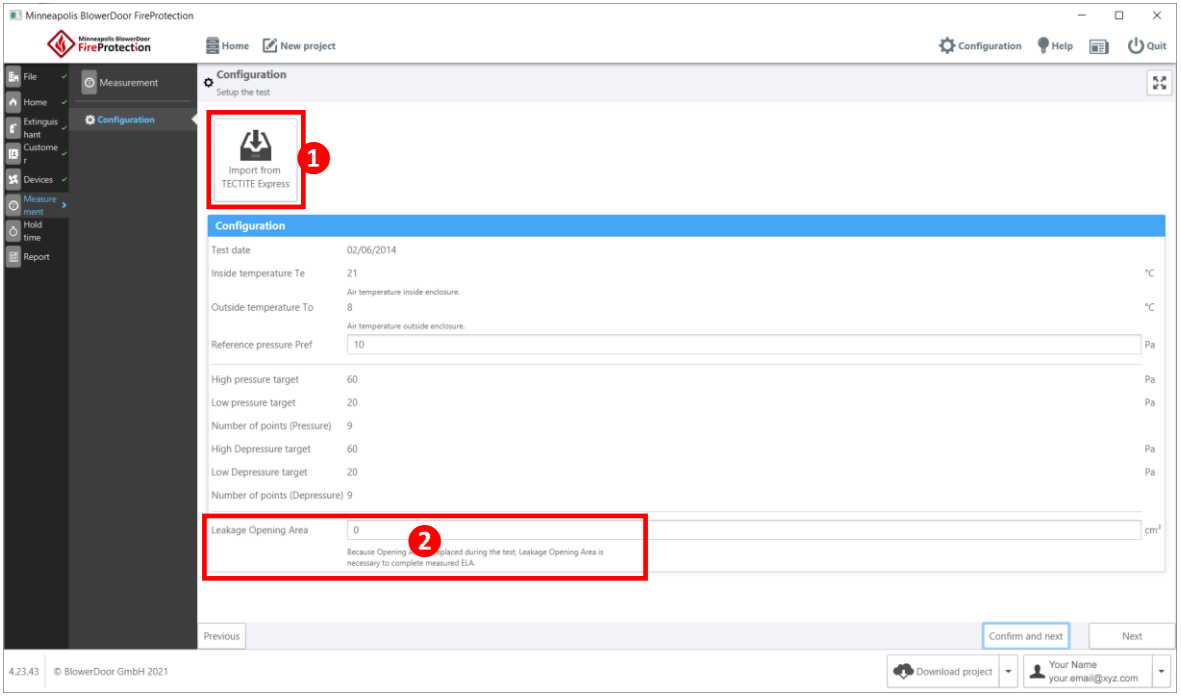


Fig. 6.28: Measurement screen, sub-section Configuration

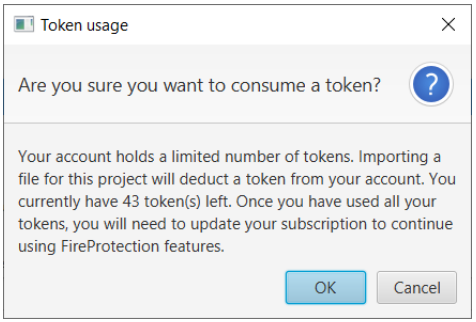


Fig. 6.29

Click the "Import from TECTITE Express" button to import measurement data from a BLD file.

A window opens to warn you that a token will be consumed with the import of measurement data.

If you confirm with OK, a window opens that allows you to select your file.

Note: **Only BLD files from TECTITE Express Version 5.1 and 4.1 can be imported.**
The exported data from TECLOG 4 or TECLOG 3 must first read into TECTITE Software and must be saved there.

Measurement files from previous TECTITE Express versions have the same file extension ".bld", but are not able to be imported to the software FireProtection!

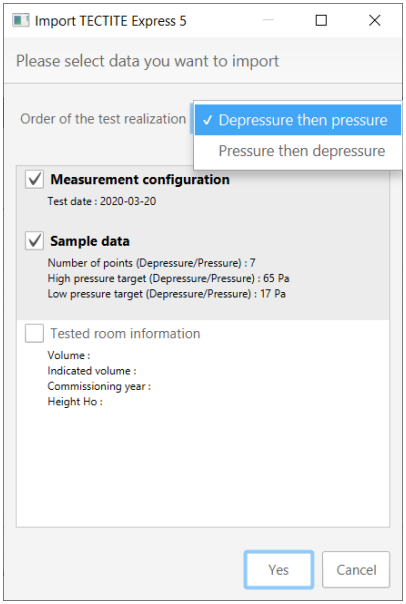


Fig. 6.30

You can select data that you want to import from this file.

Essential information concerning the measurement is imported by selecting Measurement configuration and Sample data.

Note: The Tested room information checking boxes may replace information you have previously entered.
If this data is empty in the TECTITE Express file, it will not be selected by default.

You must specify which measurement was performed at first: "Depressure then pressure" or "Pressure then depressure".

All data you select by a tick in the check box will be imported from BLD file in your project. The screen containing your measurement data will be displayed.

6.8.2 Measurement data (Data entry)

You can view measurement data in the **Data entry** sub-section:

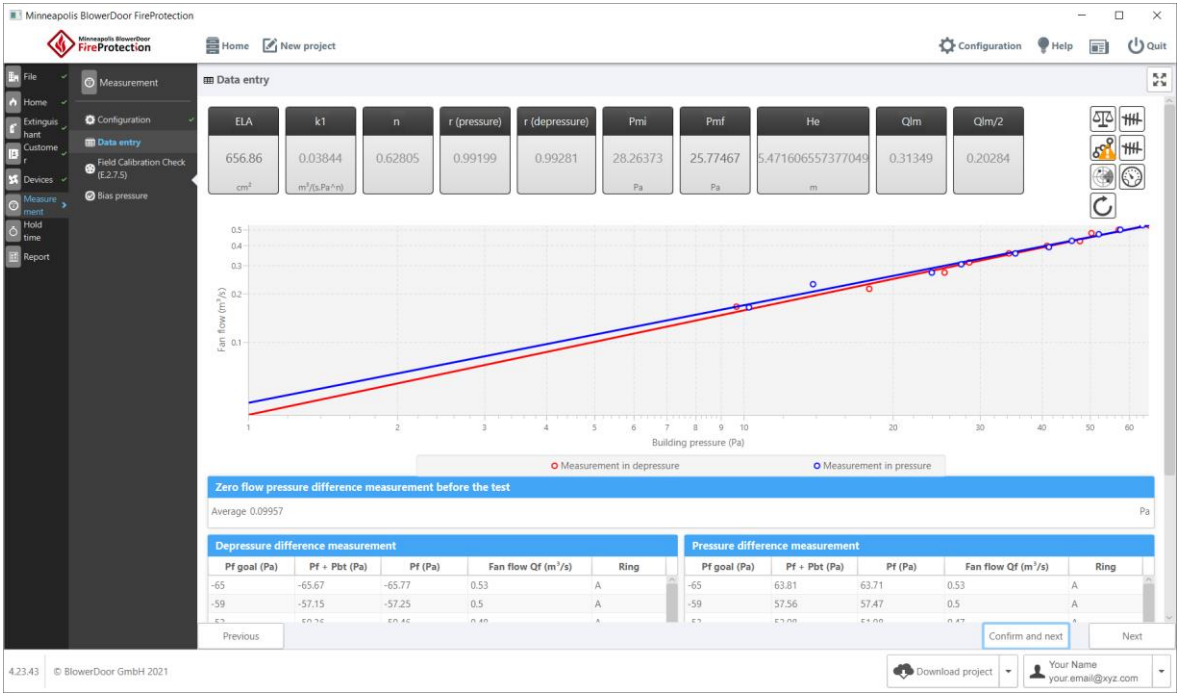


Fig. 6.31: Measurement screen, sub-section Data entry

On the upper part of the screen, you can see real-time indicators calculated from imported measurement data, including the

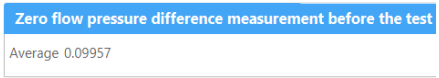
- Equivalent leakage area ELA of the tested enclosure
- leakage characteristic k_1
- leakage characteristic n,
- correlation coefficients r (pressure) and r (depressure) for the pressurization test curve and for the depressurization test curve,
- initial extinguishant/air column pressure P_{mi},
- height of equivalent sharp interface H_e and
- the results of intermediate calculations Q_{lm} and $Q_{lm/2}$.

On the top right of the screen, icons warn you if some standard rules are not respected. If an exclamation point is displayed, hover your cursor above the icon to view the problem.

Fig. 6.32

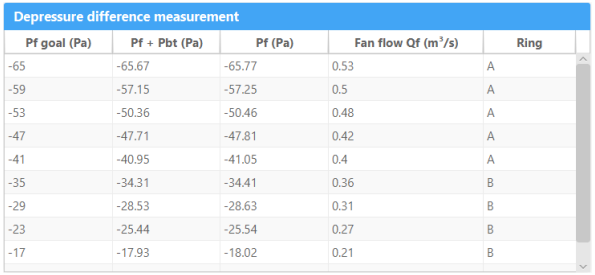
In the center, you can see the fan flow curves for the depressurization/pressurization measurement of the tested enclosure. The curve for the pressurization measurement is colored blue and the one for the depressurization measurement is red.

Below are the data details:



Zero flow pressure difference measurement before the test
Average 0.09957

Fig. 6.33



Depressure difference measurement				
Pf goal (Pa)	Pf + Pbt (Pa)	Pf (Pa)	Fan flow Qf (m^3/s)	Ring
-65	-65.67	-65.77	0.53	A
-59	-57.15	-57.25	0.5	A
-53	-50.36	-50.46	0.48	A
-47	-47.71	-47.81	0.42	A
-41	-40.95	-41.05	0.4	A
-35	-34.31	-34.41	0.36	B
-29	-28.53	-28.63	0.31	B
-23	-25.44	-25.54	0.27	B
-17	-17.93	-18.02	0.21	B

Fig. 6.34

Zero flow pressure difference measurement before the test:

Pressure difference between the interior and the exterior of the enclosure while the fan is not working yet.

Depressurization testing:

In this test, the enclosure is depressurized, and the measurements are taken at different stages of pressure in compliance with the test configuration. By default, there are as many measurements as numbers of entered points. The target pressure stages are spread into higher and lower pressure stages so that they are equidistant.

For each of these ranges, you can see the pressure difference actually reached (which must be as close as possible to the target pressure difference), the fan flow and the fan ring.

Pressure difference measurement				
Pf goal (Pa)	Pf + Pbt (Pa)	Pf (Pa)	Fan flow Qf (m^3/s)	Ring
-65	63.81	63.71	0.53	A
-59	57.56	57.47	0.5	A
-53	52.08	51.98	0.47	A
-47	45.95	45.85	0.43	A
-41	41.31	41.21	0.39	A
-35	35.34	35.25	0.36	B
-29	27.48	27.38	0.3	B
-23	23.97	23.87	0.27	B
-17	13.81	13.71	0.23	B

Fig. 6.35

Pressurization testing:

In this test, the enclosure is pressurized, and the measurements are taken at different stages of pressure in compliance with the test configuration.

Zero flow pressure difference measurement after the test
Average -0.09657

Fig. 6.36

Zero flow pressure difference measurement after the test:

Pressure difference between the interior and the exterior of the enclosure while the fan is off.

6.8.3 Field calibration check

This first series of measurements was used to determine the Effective Leakage Area (ELA).
A second series aims validating the fan calibration.

Fig. 6.37

To perform a field calibration check, it is necessary:

- to “artificially” increase the measured ELA by adding a hole to the enclosure equivalent to around 50% of the measured ELA (for example: a 50 cm² hole added for a 100 cm² ELA),
- For this purpose, all measurement series of the previous test are repeated with the added opening. The aim is to verify that the new calculated ELA is consistent with the one, which is logically expected (ELA calculated during the previous test plus the area of the added orifice), with a maximum tolerance of 15%.

You can do that by performing a second test by installing a BlowerDoor panel with two openings. In one opening, the Minneapolis BlowerDoor fan is installed and in the other one, the field-check-ring with sealing plugs is fixed. This field-check-ring includes four different openings/orifices (530 cm², 200 cm², 100 cm² and 50 cm²).

BlowerDoor panels with two openings and the field-check-ring are offered, among others, as optional accessories by BlowerDoor GmbH.

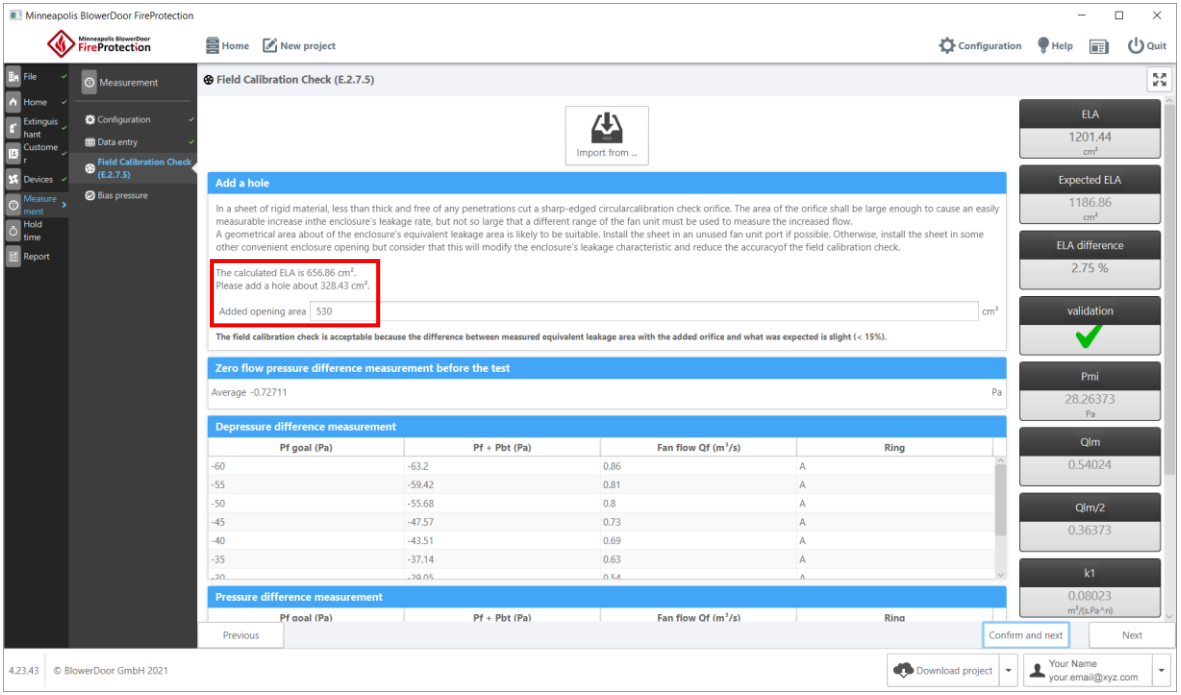


Fig. 6.38: Measurement screen, sub-section Field Calibration Check

The screen displays the **Field Calibration Check** sub-section. The ELA of the previous test is remembered, and the size of the opening/orifice to be added is suggested. Below, you can enter a slightly different area, equivalent to the actual added opening area.

Fig. 6.39

Import of the TECTITE Express file is done in the same way as for the door fan test (→ Chap.6.8.1).

Note:

Only BLD files from TECTITE Express 5.1, TECTITE Express 4.1 can be imported. The exported data from TECLOG 4 or TECLOG 3 must first read into TECTITE Software and must be saved there.

Fig. 6.40:

At the top right, in addition to the ELA, three additional indicators are displayed:

- the expected ELA,
- the ELA difference: percentage difference between the calculated ELA and the expected ELA,
- the validation or non-validation of this calibration phase.
  In case of non-validation, recalibrating devices is required, and it is necessary to repeat the test later to comply with the standard.

6.8.4 Pressure differential measurement during hold time (Pbh)

Pbh is the pressure differential in retention conditions used for calculating hold time. Enter the Pbh measured at the lower leakage in the left column and the Pbh at the upper leakage in the right one.

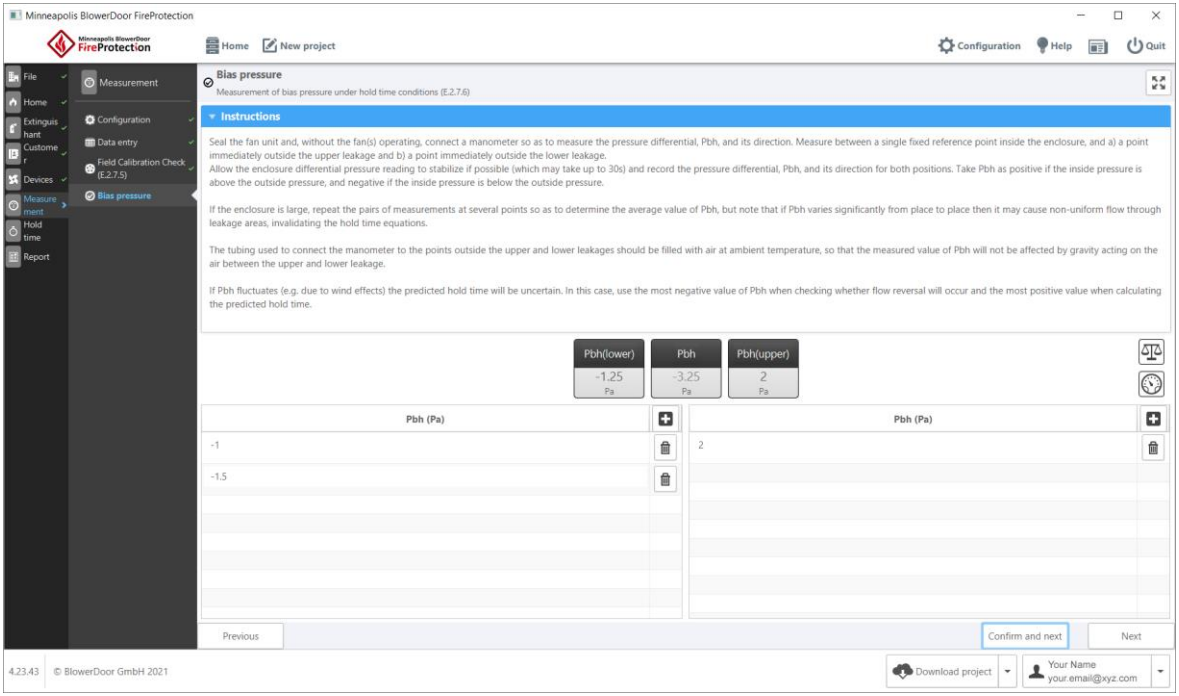


Fig. 6.41: Measurement screen, sub-section Bias pressure

The measurement is taken between a fixed reference point inside the test chamber and a point immediately adjacent to the lower leakage (Pbh (lower)) and a point immediately adjacent to the upper leakage (Pbh (upper)). If the enclosure is large, repeat the two measurements at several points. Add measurements to columns by clicking the button.

You can delete a measurement by clicking the button next to the measurement.

Fig. 6.42

In the center of the screen you will see the average of the lower Pbh (left), higher Pbh (right) and the result Pbh (center).

Fig. 6.43

As before, two icons on the right show you, if a test standard is not met.
Hover your cursor over the icon for details.

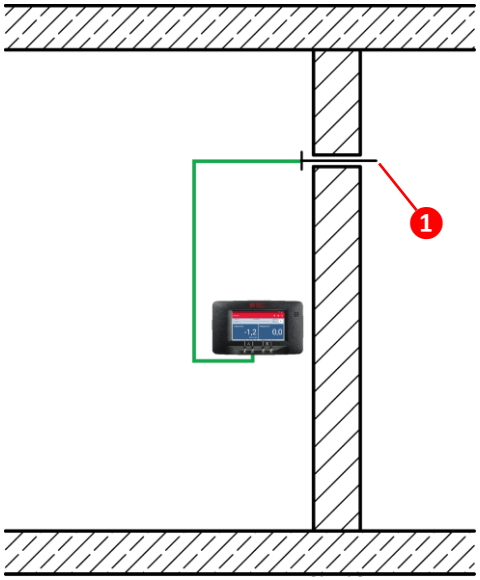


Fig. 6.44

Pbh measurement

The figure at the left shows how to measure the bias pressure under hold time conditions using a pressure gauge DG-1000 or DG-700, a piece of tube and a capillary tube (indicated with 1).

Capillary tubes consist of the capillary 2 and the connecting piece for the pressure line 3 (→ Fig. 6.45 below).

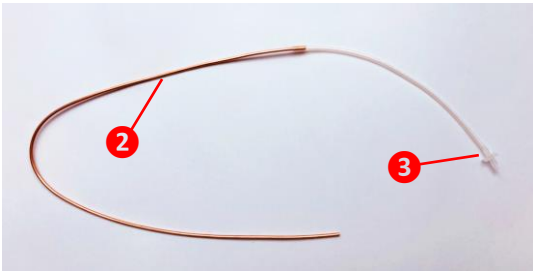


Fig. 6.45

This capillary tube and a 10 m tube are offered, among others, as required accessories by BlowerDoor GmbH.

6.9 Hold time

In the **Hold Time** section, the expected hold time for this measurement is displayed: the numerical display in the upper right corner of the screen, below the graphical display.

Depending on the condition of the extinguishant used, either the estimated Protected Height H or the Minimum Concentration (Cmin) is given in addition to the holding time.

If the extinguishant used is heavier than air and is not force mixed:

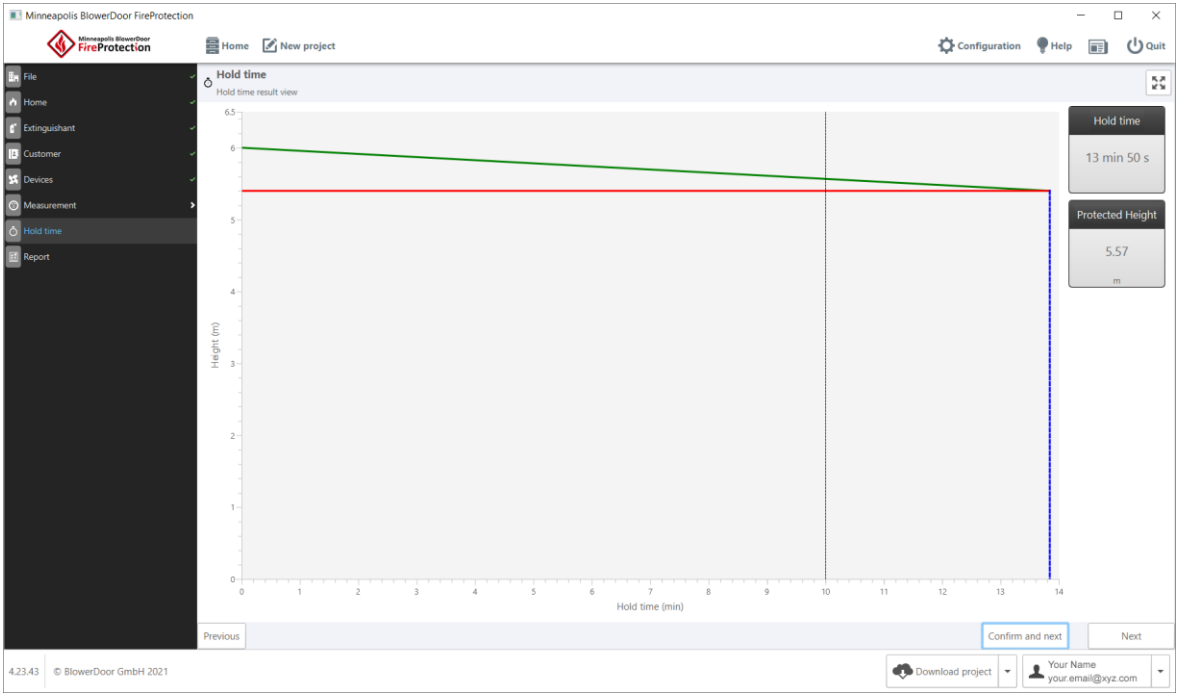


Fig. 6.46: Display of the hold time for extinguishants heavier than air (not mixed)

The x-axis shows the time in minutes and the y-axis the protected height in meter. At the start of the retention time, the enclosure is completely filled with gas. Then over time, due to leakages in the enclosure, gas slowly escapes. Because the extinguishing gas is heavier than air, the protected height will gradually decrease. The expected hold time is when the height of extinguishant exactly matches the risk height entered by the user.

The red line represents this risk height. When the green line indicating the protected height over time meets the red one, a blue dotted line is vertically drawn which specifies the hold time. The vertical black dotted line indicates the minimum hold time.

If the extinguishant used has the same density as air or it is mixed:

Fig. 6.47: Display of the hold time for extinguishants with the same density as air or force mixed

The x-axis shows the time in minutes, the y-axis indicates the gas concentration in the enclosure in percent. At the start of the retention time, the enclosure is completely filled with gas to a concentration equal to the initial concentration entered by the user. Then over time, due to leakages in the enclosure, gas slowly escapes. Because the gas is as dense as air, the global concentration of extinguishant will slowly decrease. The expected hold time is when this concentration exactly matches the minimum extinguishing concentration entered by the user.

The red line represents this minimum extinguishing concentration. When the green – line indicating the extinguishing concentration over time – meets the red one, a blue dotted line is vertically drawn which specifies the hold time. The vertical black dotted line indicates the minimum hold time.

6.10 Report

In the **Report section**, it is possible to generate a report containing all the information of the operation. A report template by default is included in the FireProtection software.

For creating and using your own templates → Chap. 6.11.

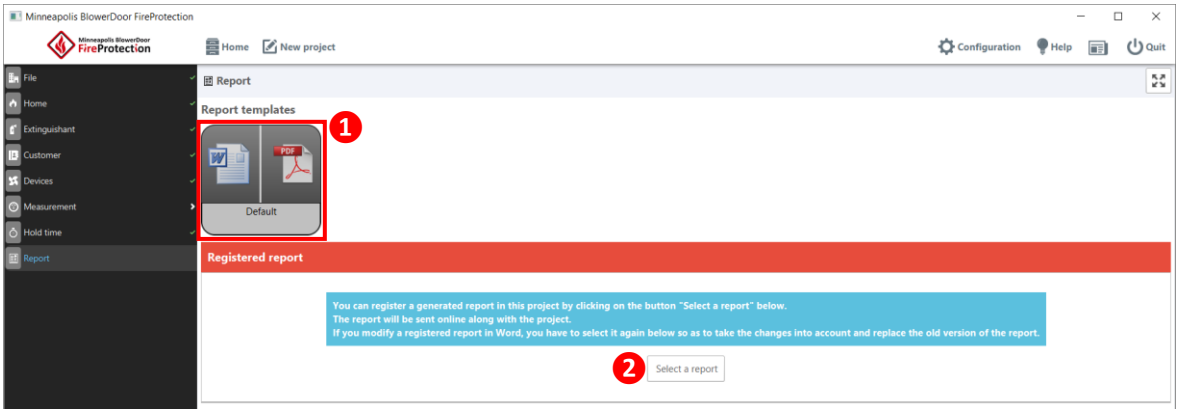


Fig. 6.48: Report screen

Fig. 6.49

Select a report

Fig. 6.50

1 a) To generate a report as DOCX file, click the Word icon on the left. A dialog window will open to specify a location and to enter a name for the created file. It is possible to modify the report in Microsoft Word.

1 b) To generate a report as a PDF file, click the PDF icon on the right. A dialog window will open to specify a location and to enter a name for the created file.

Afterwards, the generated report can be integrated into the project e.g. to share it with colleagues.

2) To add your report click on the "Select a report" button and select it in the dialog window that opens. The report will be sent along with the project.

If you have changed the report in the meantime or want to attach another report, click the "Select a report" button again to add the current report and replace the old version.

6.11 Customizing report templates and using them

Report templates can be customized with Microsoft Word. Open **Configuration** menu (1)and the subsection **Templates** (2).

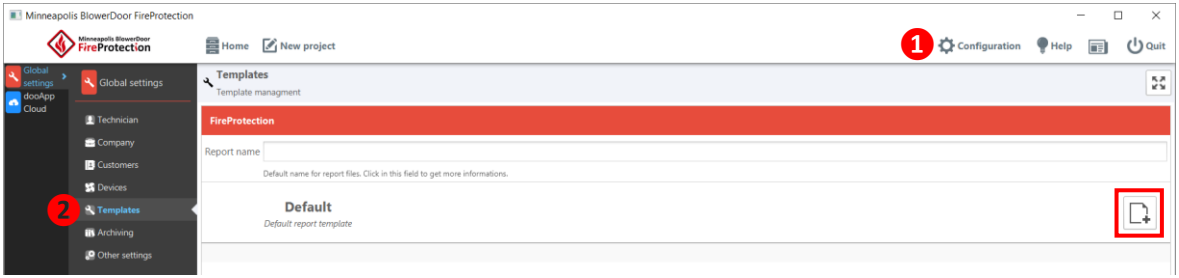


Fig. 6.51

Fig. 6.52

The "Add new template" button opens a dialog box where you can:

- either specify a location and file name for a duplicate of the default template file to edit later
- or import a template file previously created by you or another user of your team. Select the desired file.

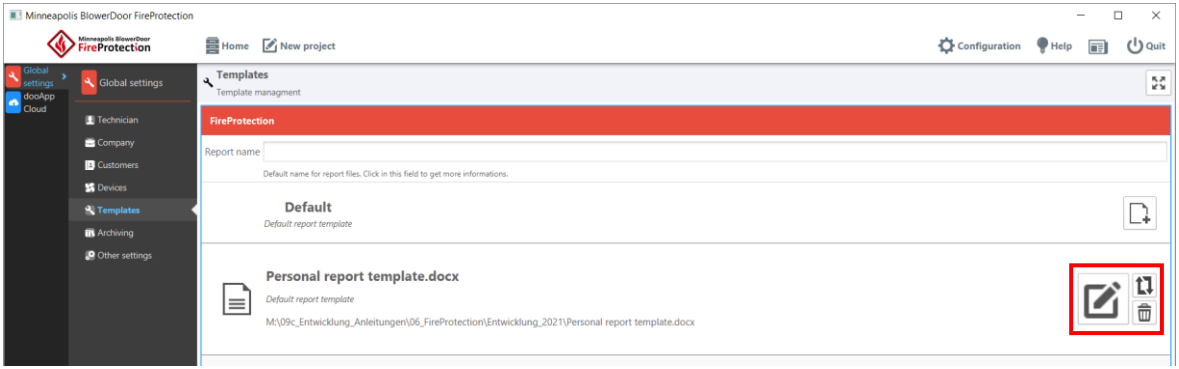


Fig. 6.53

Fig. 6.54

Click on the "Edit template" button of the newly created template. This will open your custom template within Microsoft Word. There you can apply your own corporate identity charter.

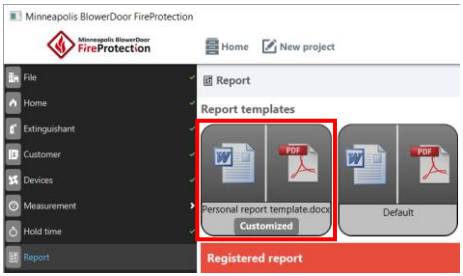


Fig. 6.55

To select your own report template, click on the Word or PDF icon in the **Report** menu and use it to create the test report based on your template.

Several different report templates can be stored.

7 dooApp cloud services

The dooApp cloud services allow to save FireProtection data online in the company's own cloud storage space. This allows:

- Online management of account and company information (→ Chap. 4.1.1) to share it among users of a team working on different computers
- Online management of contacts and equipment provides access to customer data and device information for all users (→ Chap. 7.2 and 7.3)
- Automatic saving of projects in the dooApp cloud (→ Chap. 6.1)
- Sharing of projects and reports between different users/workstations (→ Chap. 6.2)

7.1 Log in to dooApp cloud account

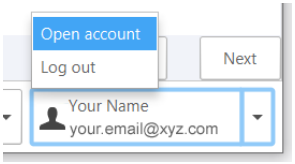


Fig. 7.1

To open your personal account in dooApp cloud click in the FireProtection software at the bottom right on your login name or go directly to the website https://cloud.dooapp.com/#/login.

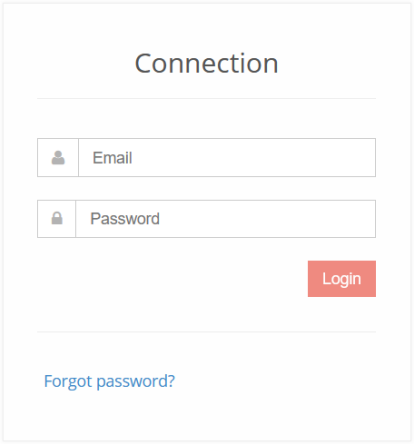


Fig. 7.2

Log in with your e-mail address and your password.

7.2 Managing contacts for all users of your team

Contacts that you create and edit online in the **Contacts** section are available to you and all users in your team after downloading them to your/their FireProtection software (→ Chap. 5.1.3 → Fig. 5.4), where they can be selected as **Customer** in your projects (→ Chap. 6.6).

All users with admin rights can "Add a new contact", they can "Edit" and delete (🗑) existing contacts.

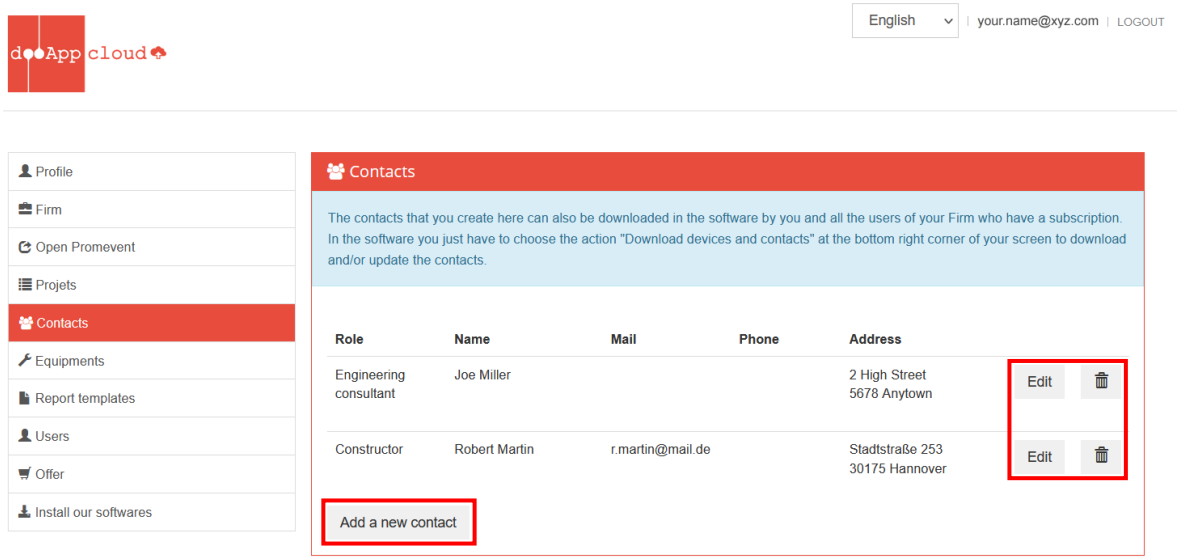


Fig. 7.3

7.3 Managing devices

Devices can be created and edited online in the **Equipment** section. This database can then be downloaded in your FireProtection software and that of all users in your team (→ Chap. 5.1.4 → Fig. 5.6), and then selected as the project device (→ Chap. 6.7).

All users with admin rights can "Add a new device", they can "Edit" and delete (🗑) existing devices.

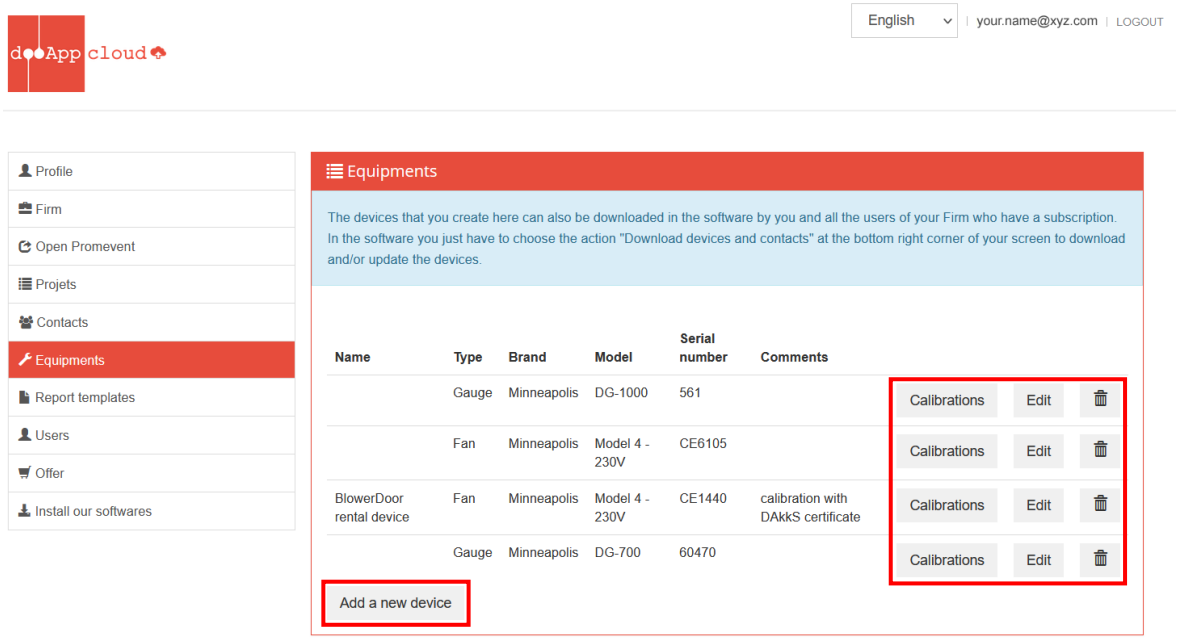


Fig. 7.4

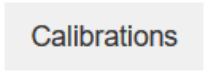


Fig. 7.5

Define your calibration certificates online and receive warning e-mails when your device calibration is running out.

Clicking on "Calibrations" button to open the following window:

Fig. 7.6

First click on "+ Add a calibration certificate", then click on the newly created "Calibration" button below. The following window opens, where you can set calibration details and add documents (e.g. calibration certificate).

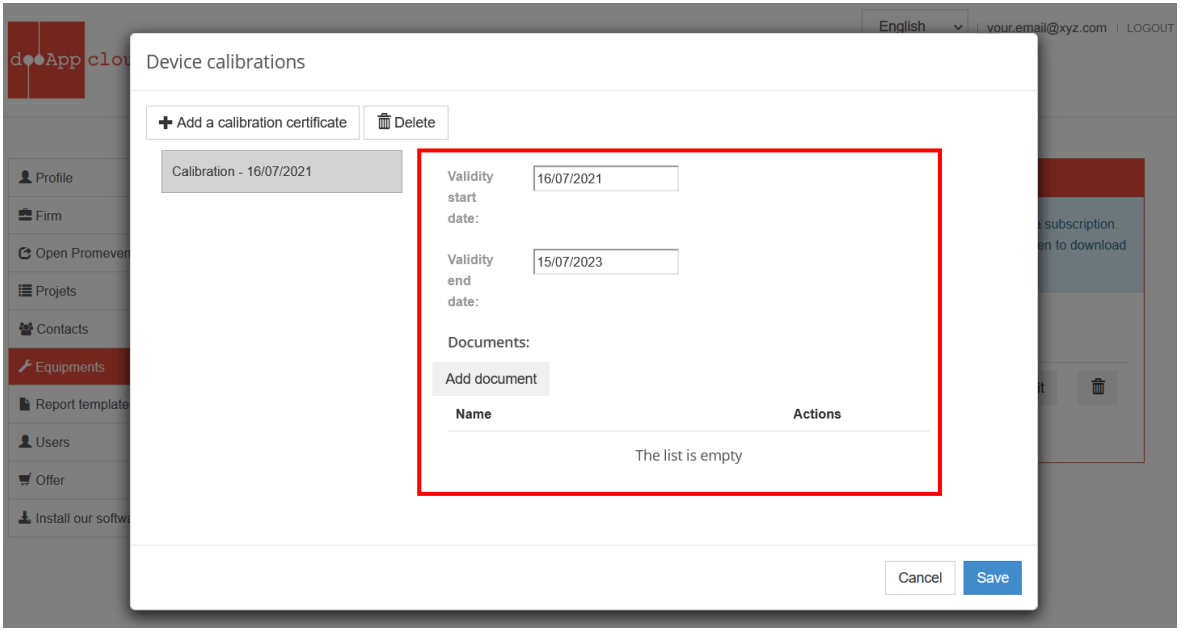
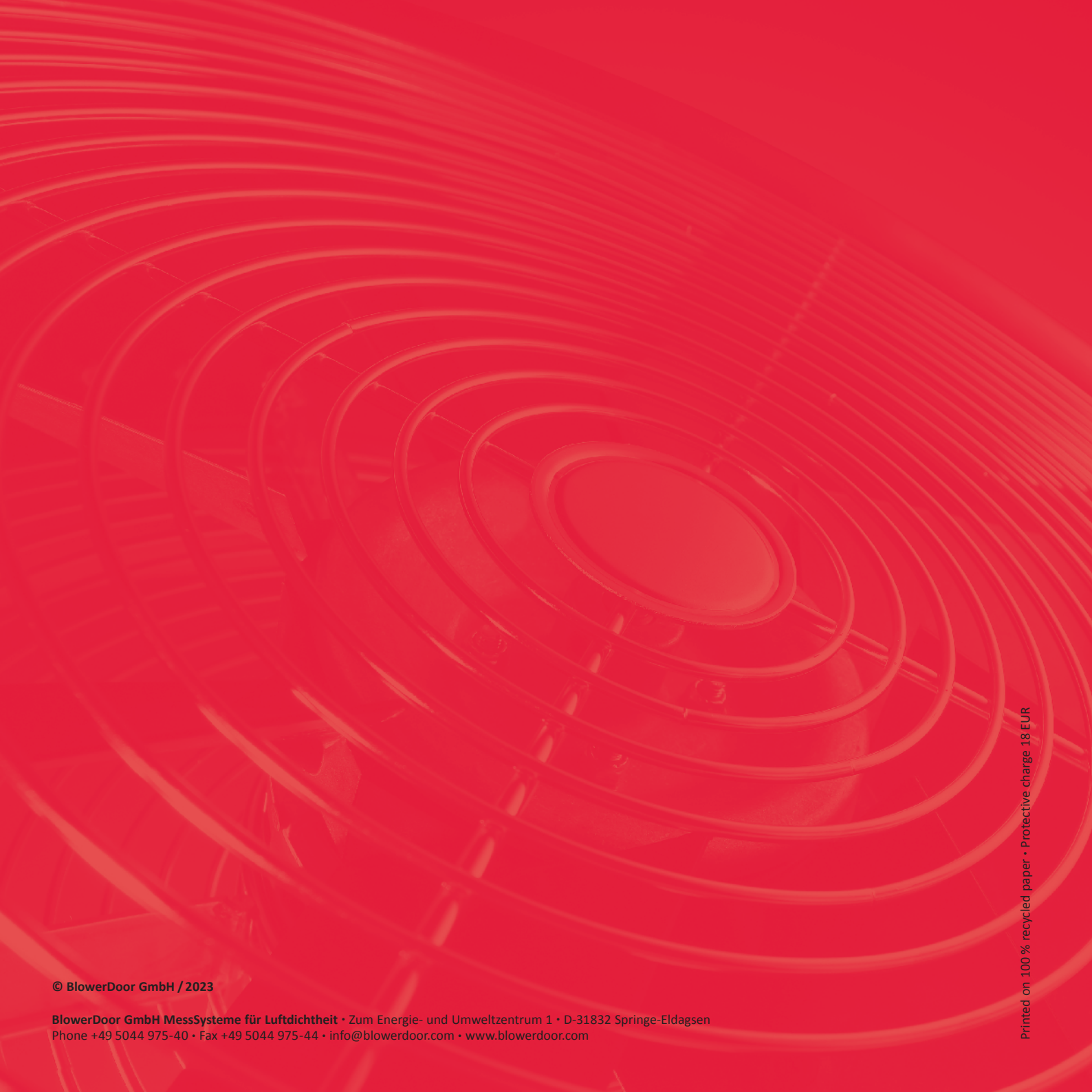


Fig. 7.7



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