MiC 4.0 Test Tool

August 2024

Contents

MiC 4.0 Test Tool (ver. 1.0)

Introduction

The use of the MiC 4.0 Test Tool is **reserved exclusively for machine manufacturers**. The creation of access authorisation requires personal registration, which is approved by the MiC 4.0 Office. Users of machines or even the public are not granted access or insight into the MiC 4.0 Test Tool at any time.

Use of the MiC 4.0 Test Tool is free of charge and the machines can run through the test cycle as often as required in order to be transferred to the MiC 4.0 database at the end.

By using the MiC 4.0 Test Tool free of charge, the user agrees to transfer his tested machines to the MiC 4.0 database at the end of the successful test run.

The exact use of the MiC 4.0 Test Tool is presented in the following short documentation.

The examples shown (screenshots) may differ in the real application, as the application is regularly updated.

However, the basic functionalities described here remain unaffected.

Regular enhancements to the functionalities of the MiC 4.0 Test Tool are made as part of the publication of MiC 4.0 results and serve the user (machine manufacturer/user).

MiC 4.0, September 2024

1. Registration

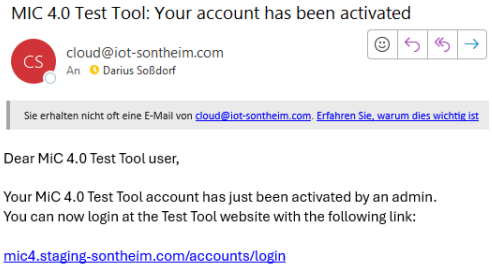
To be able to use the MiC 4.0 Test Tool and to gain access, the "Register" link on the start page must be used at the beginning.

After clicking the link, the input mask opens.

The information provided must be complete and truthful, otherwise the registration process cannot be completed.

In addition, the terms of use and the data protection regulations must be recognized by ticking the appropriate box.

Once the registration request has been sent, the registration request is checked and, if the check is positive, a corresponding message with an activation link is sent.


MIC 4.0 Test Tool: Your account has been activated

CS cloud@iot-sontheim.com
An Darius Soßdorf

Sie erhalten nicht oft eine E-Mail von cloud@iot-sontheim.com. Erfahren Sie, warum dies wichtig ist

Dear MiC 4.0 Test Tool user,

Your MiC 4.0 Test Tool account has just been activated by an admin.
You can now login at the Test Tool website with the following link:

mic4.staging-sontheim.com/accounts/login

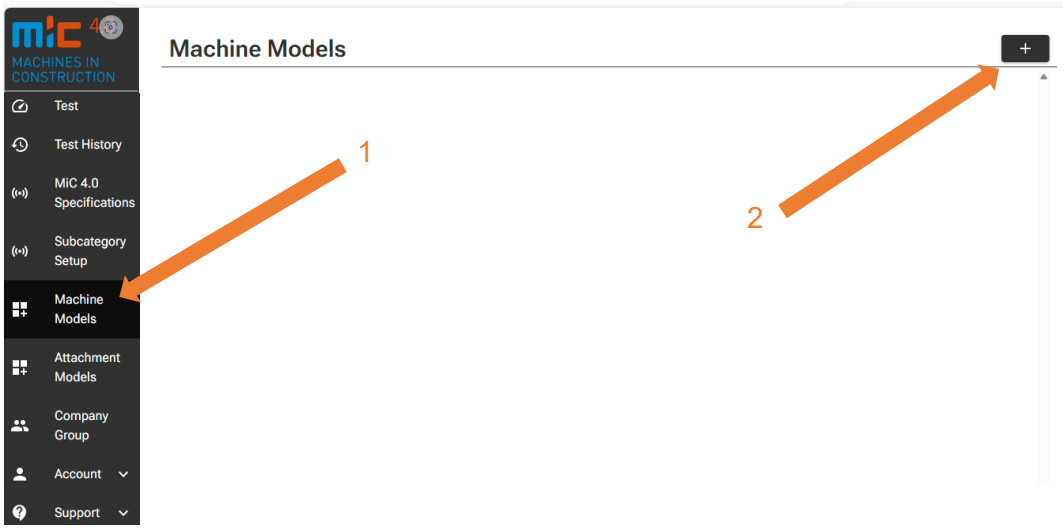
There is also a second option for registration by an already registered user
(see chapter 7 "Company Group")

ATTENTION: the entire review process is **NOT** carried out automatically, but the final approval is issued manually by the MiC 4.0 Office. For this reason, the release may take some time. This procedure is carried out for the security of all MiC 4.0 Test Tool users and serves to maximize the security of the use of this tool and the data contained therein.

2. Creating Machine Models

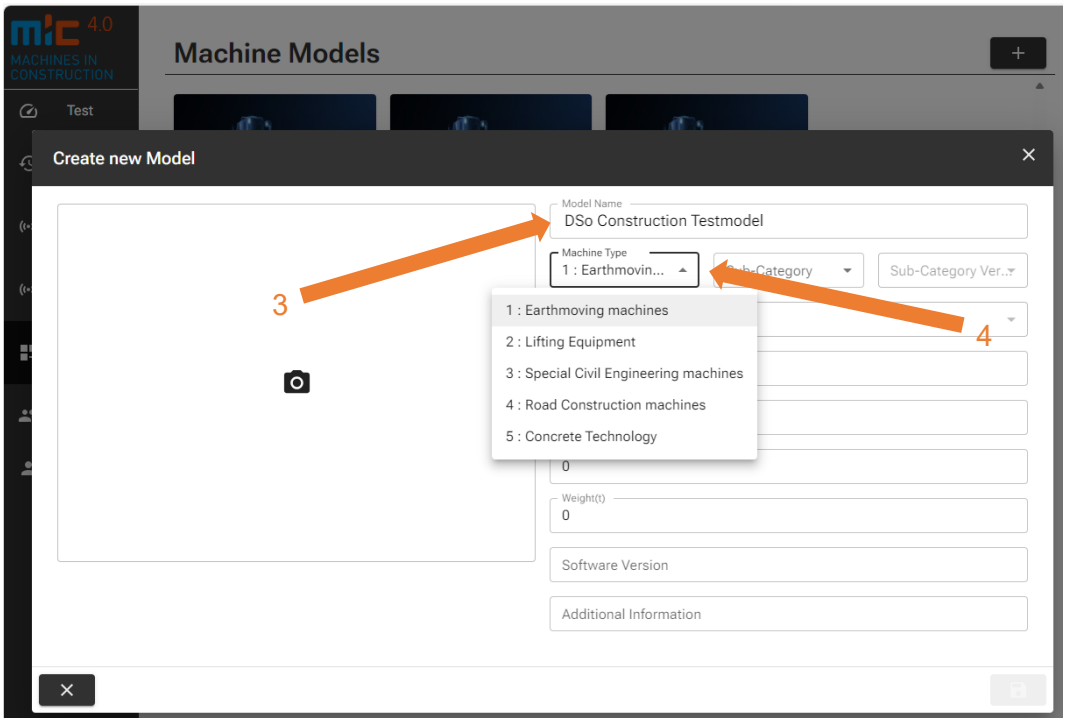
Step (1) "Machine Models" is the area in which the machines/machine types to be tested are created. The machines that can be created in the MiC 4.0 Test Tool are directly linked to the machines/machine types represented in MiC 4.0. New machines/machine types will be successively added by MiC 4.0 over time and added to the MiC 4.0 Test Tool.

Step (2) opens the input screen for creating a new machine.

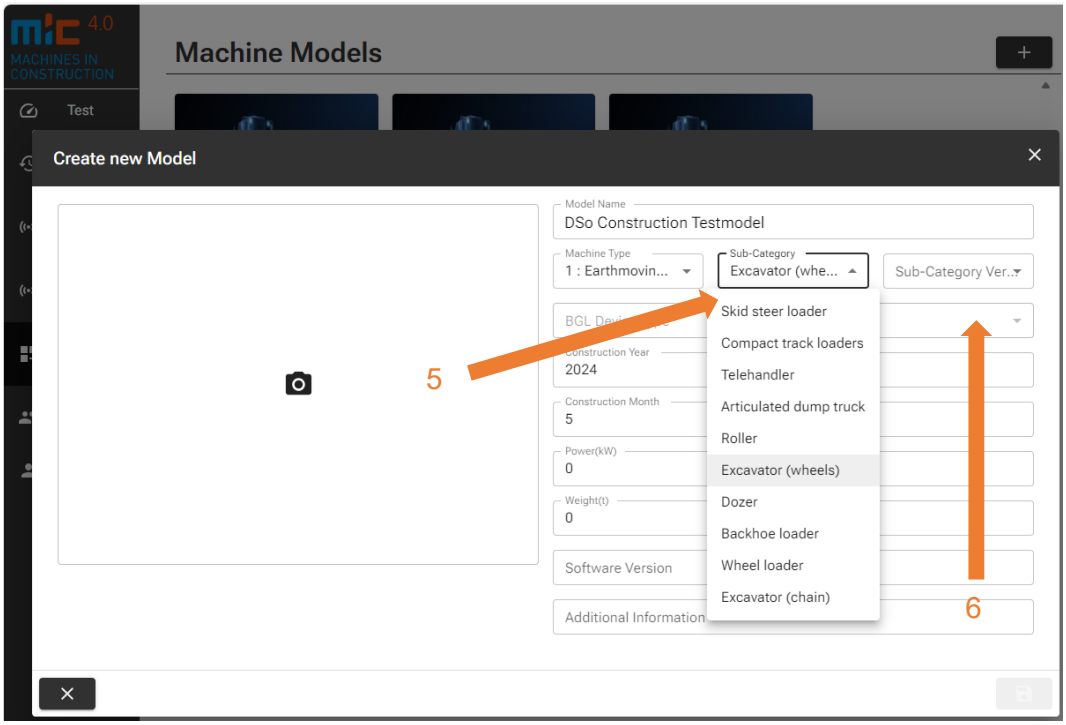


Step (3) specifies the exact model designation of the machines to be created. The model designation under which the machine is also designated/listed on the Internet/in the company's product catalogue must be used for this purpose.

In step (4), the overarching designation is first selected under "Machine type". The designation is based on the designation used in MiC 4.0 under the respective cluster designations under which the machine is managed. A corresponding selection menu specifies the selectable "Machine Type".



In step (5), the "Sub-Category" is selected, which describes the machine type in more detail (wheel loader, hydraulic excavator, telescopic handler, etc.).



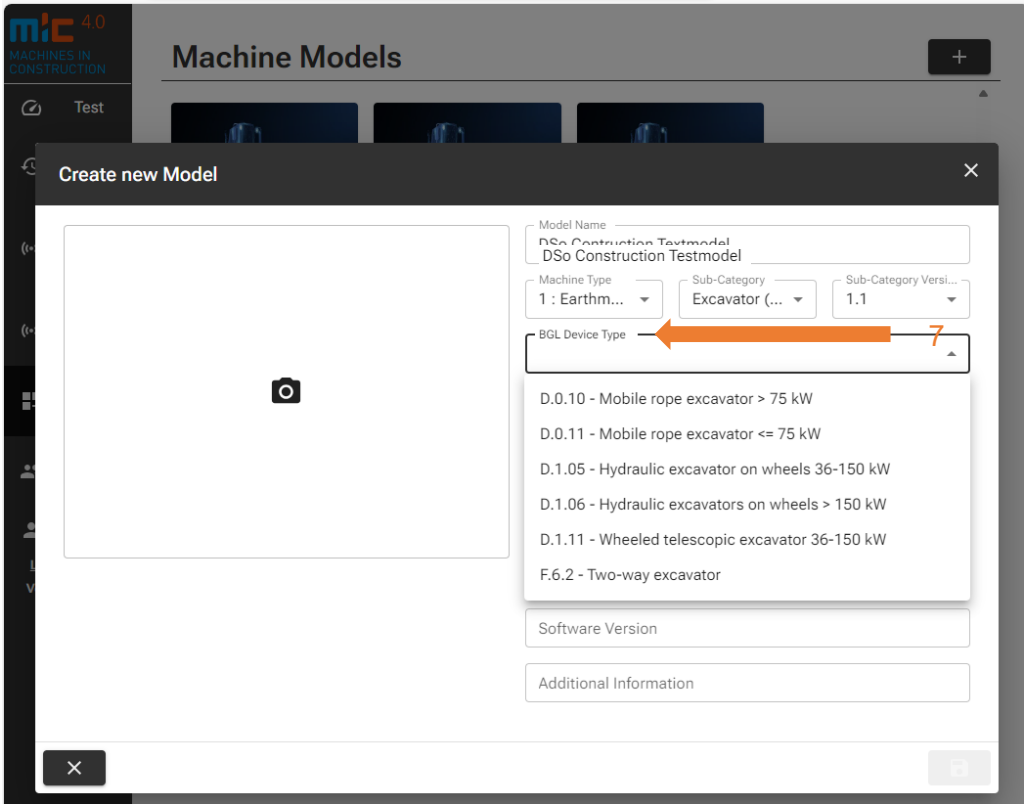
Step (6) "Sub-Category Version" specifies the relevant test file version that is linked to the created machine and is to be tested (e.g. in Cluster 1 Earthmoving Machines - 1.1, Cluster 2 Lifting Equipment - 2.1, etc.). The subcategory contains the corresponding test method or

which parameters are relevant for the created and classified machine and are tested. This list can also be found under "MiC Specifications" (Chapter 3) and "Sub-Category Setup" (Chapter 4).

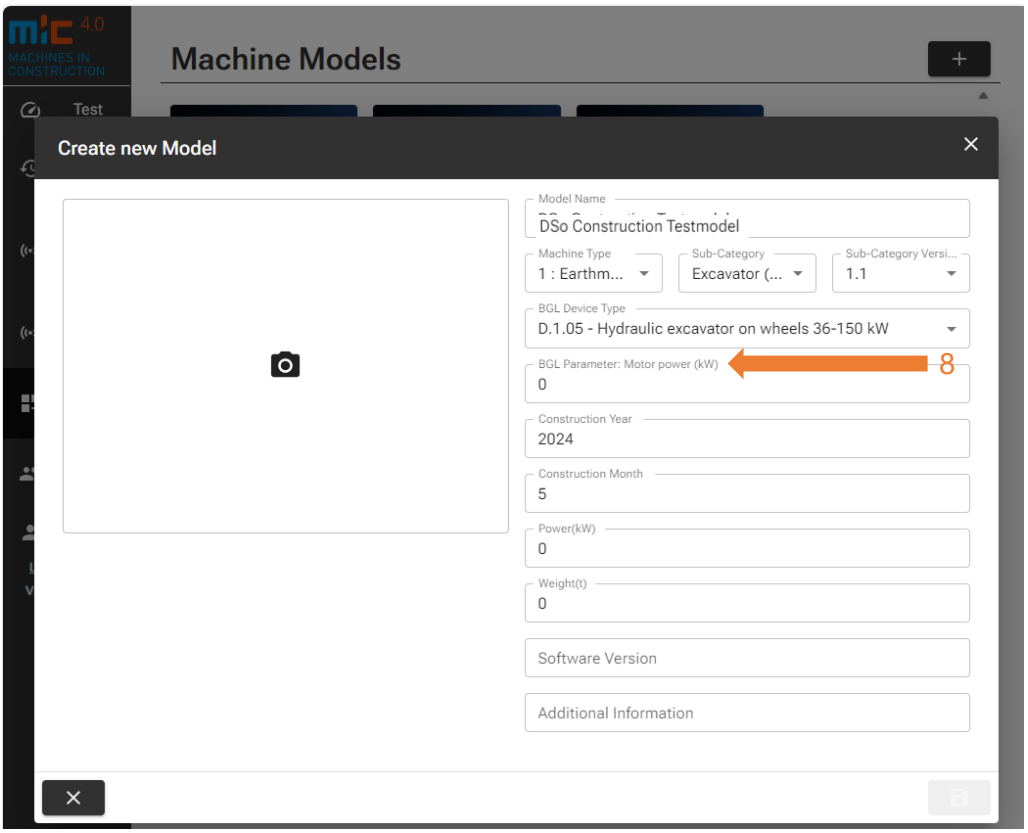
The "BGL Device Type" is selected in step 7. The selection menu that appears makes it easier to select and name the "BGL Device Type". This number clearly describes the machine, assigns it a description agreed in the construction area and makes it easier for the machine user to handle the machine information created here later. This field is not mandatory but should be filled in for the benefit of the user when the machine is created so that it can be transferred to the MiC 4.0 Database after the tests have been carried out and can be seen and used by the user.

Depending on the selection made on board, corresponding suggestions for machine classification according to "BGL Device Type" are offered, which makes the selection considerably easier.

If required, further information can be found at [BGL Baugeräteliste].



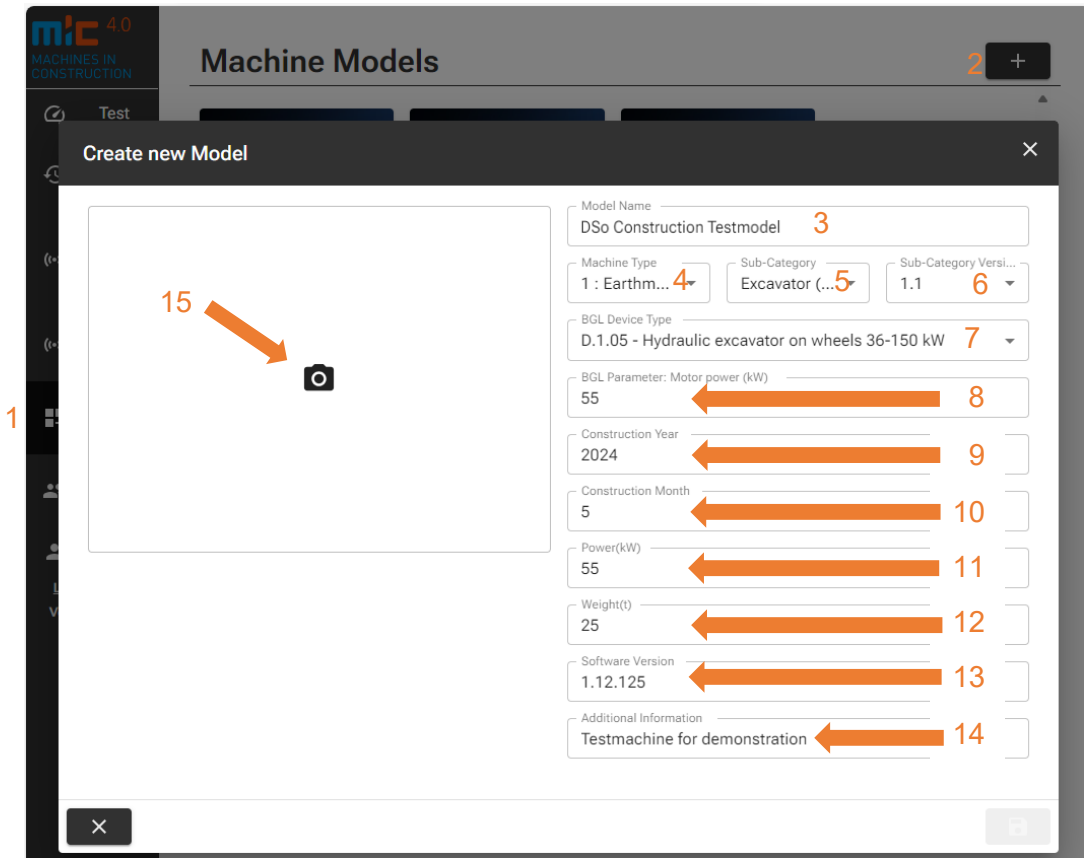
In the next step 8 ("BGL Parameter: ..."), the required parameter for the selected "BGL Device Type" must be entered in the field provided. This parameter depends on the respective "Machine Type" (4), the respective "Sub-Category" (5) and the selected "BGL Device Type" (7) and is offered depending on this.
This field must be filled with the corresponding value.



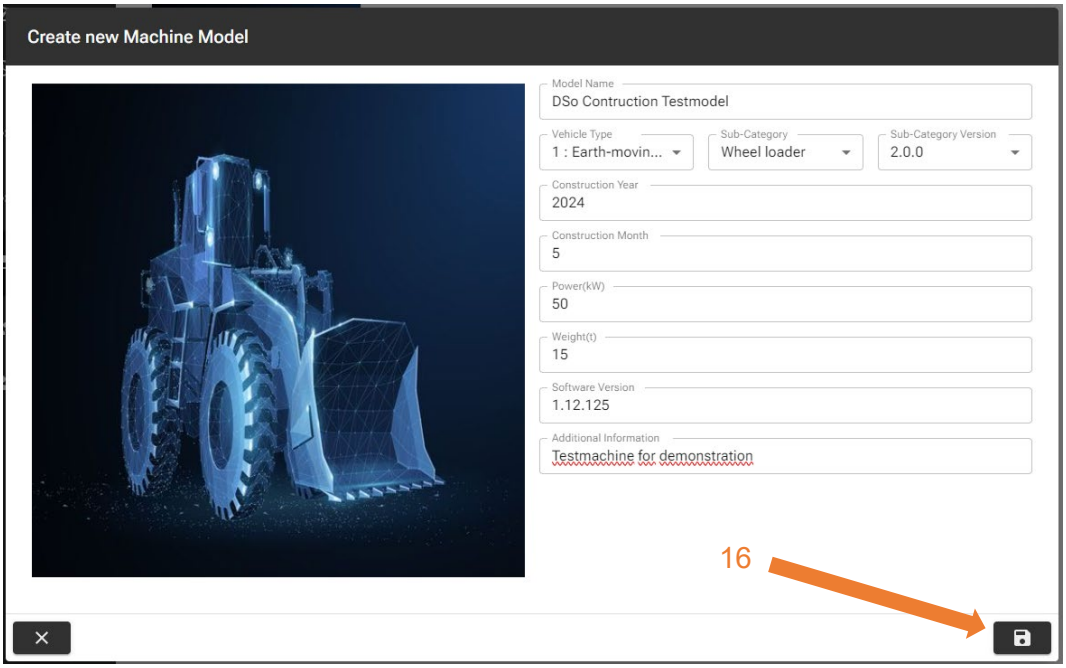
Steps 9 (year of manufacture), 10 (month of manufacture), 11 (power in KW), 12 (weight in tons) are used to enter the specific values for the machine to be created. Step 13 requires the current software version of the machine/telemetry. The corresponding version number/version status of the machine's telemetry software must be inserted here.

Step 14 is available for additional information about the machine and can be filled in freely. This entry is not mandatory.

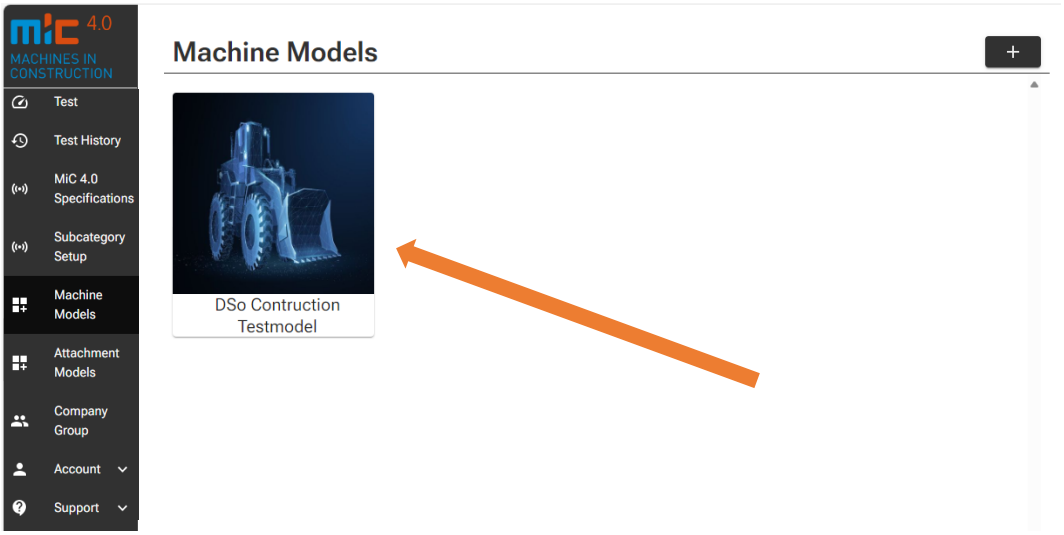
Step 15 requires a picture of the machine with a resolution of 640x480. It is recommended to use the image that is also in the product catalogue/internet. This makes it easier for the machine user to clearly find and identify the desired product/manufacturer during subsequent use and when viewing the machine in the MiC 4.0 Database.



Once all the required parameters and values have been completed, the machine can be created/saved in step 16.



ATTENTION: all steps marked with an "*" are mandatory entries, without which the machine cannot be created/saved (step 16).



The machine is now created/saved and can be used for MiC 4.0 test purposes.

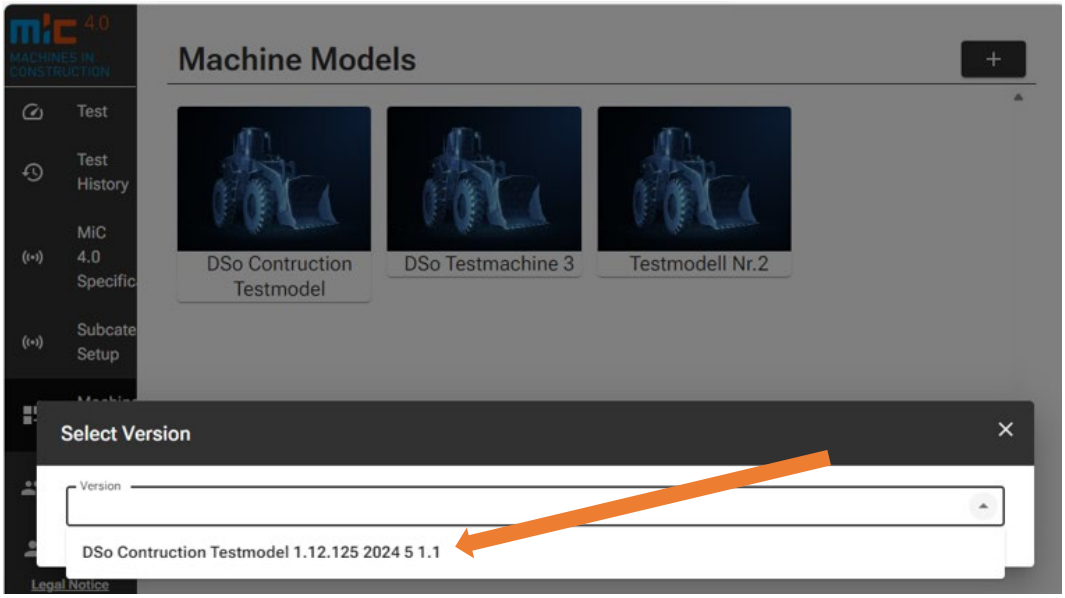
Selecting a created/saved machine takes you to the desired version of the machine via the selection menu. You can create different machines, but also identical machines of the same type, to map the entire product portfolio.

For each machine model whose test data is later transferred to the MiC 4.0 Database, the corresponding machine model must be created individually.

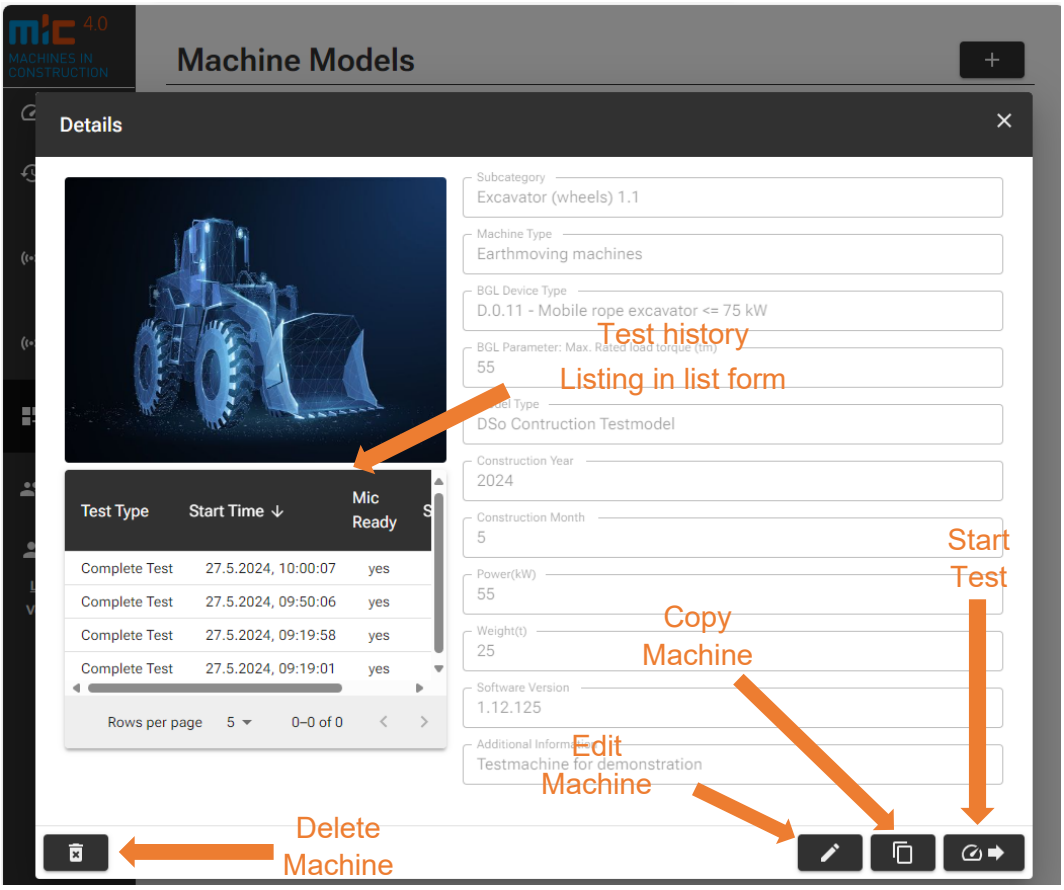
It is not possible to create/save a "machine fleet or an entire series". This means that each model type (NOT each individual machine) must have its own entry.

Machine 1 - 123-Compact	- correct -	Machine 1
Machine 2 - 123-Long	- correct -	(123-Compact, 123-Long, 123-Modern)
Machine 3 - 123-Modern	- correct -	- inadmissible –

This procedure is essential in view of the upcoming extensions to the MiC 4.0 Test Tool for later process data.



The created and selected machine model can be deleted, copied, saved, and corrected. It is also possible to start a test directly from here. In addition, the view of the selected machine model shows the history of the MiC 4.0 Test Tool runs carried out in a detailed list form.



3. Attachments

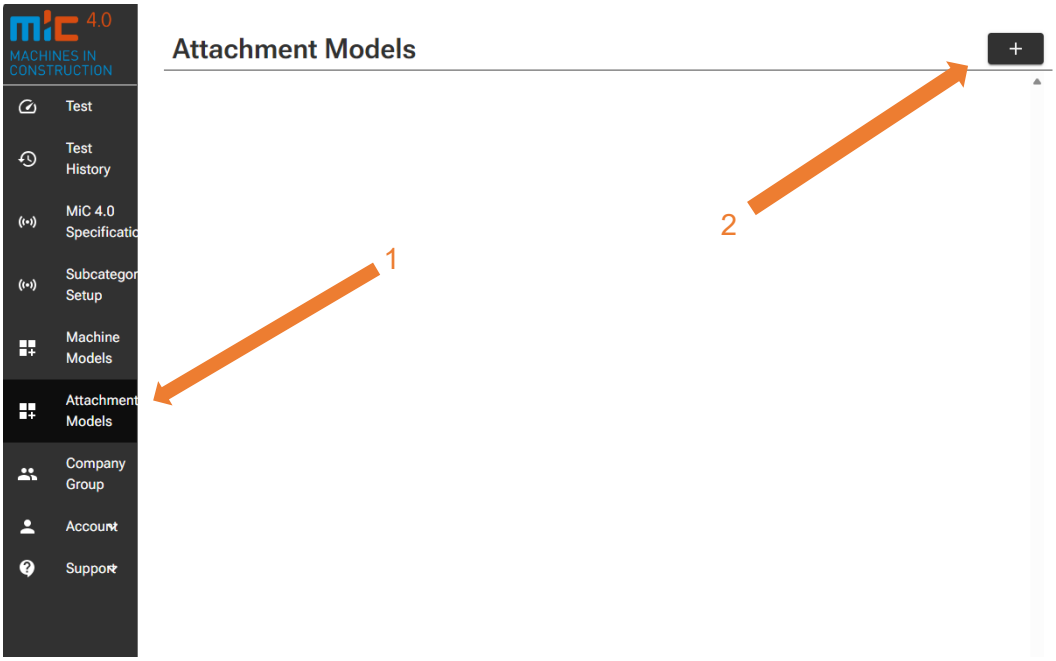
Attachments are currently not tested using the MiC 4.0 Test Tool, as a physical test by the relevant manufacturers is essential to ensure maximum functional safety.

A written report (pdf file) is created about this physical test, the test parameters on which it is based and the corresponding test result and signed by the testing companies.

The respective manufacturer transfers this test protocol to the MiC 4.0 Test Tool when creating its attachment and transfers the attachment information created together with the test protocol to the MiC 4.0 Database.

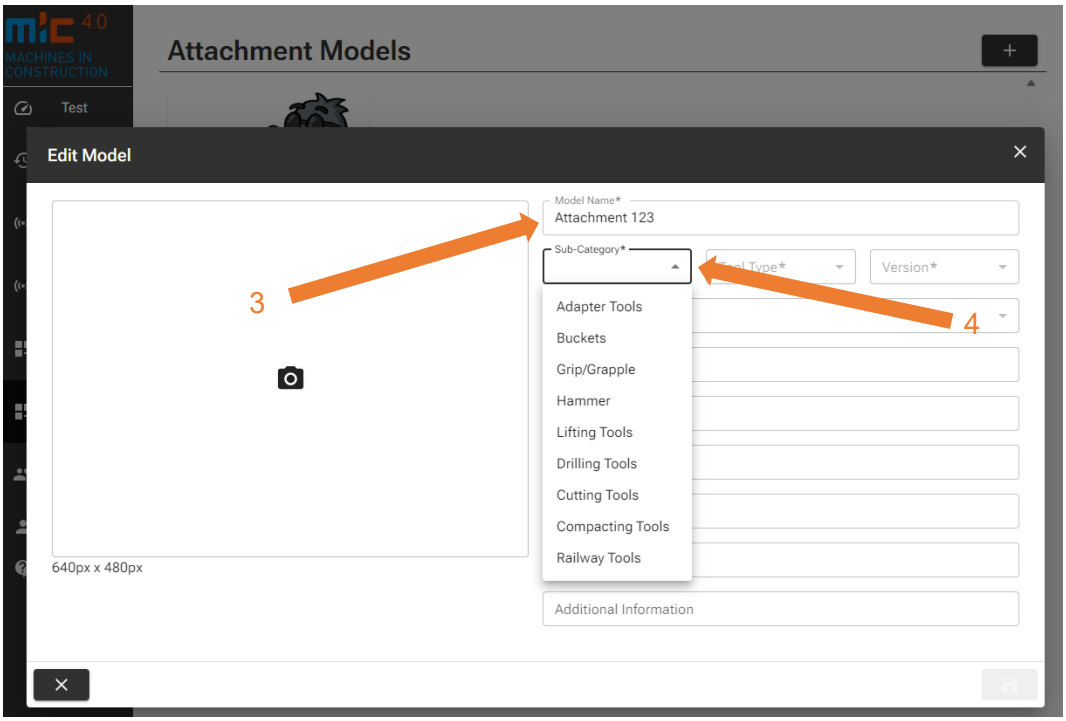
Step (1) "Attachment Models" is the area in which the attachments/attachment types to be tested are created. The attachment types that can be created in the MiC 4.0 Test Tool are directly linked to the attachment types represented and described in MiC 4.0. New attachments/attachment types will be successively added by MiC 4.0 over time and supplemented in the MiC 4.0 Test Tool.

Step (2) opens the input screen for creating a new attachment.

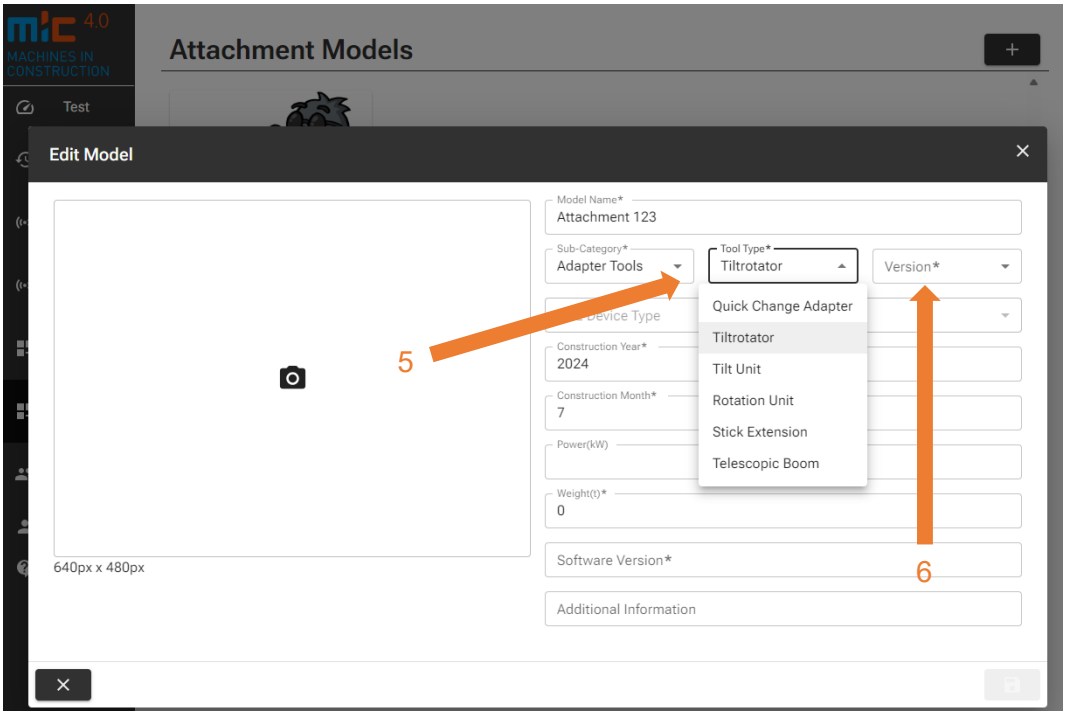


In step (3), the exact attachment designation of the attachment to be created is specified. Use the model designation under which the attachment is also designated/listed on the Inter-net/in the company's product catalogue.

In step (4) under "Sub-Category Type", the overarching designation is first selected. The designation is based on the designations used in the MiC 4.0 attachment protocol. A corresponding selection menu specifies the selectable "Attachment Type" (Adapter Tools, Buckets, Hammer, etc.).



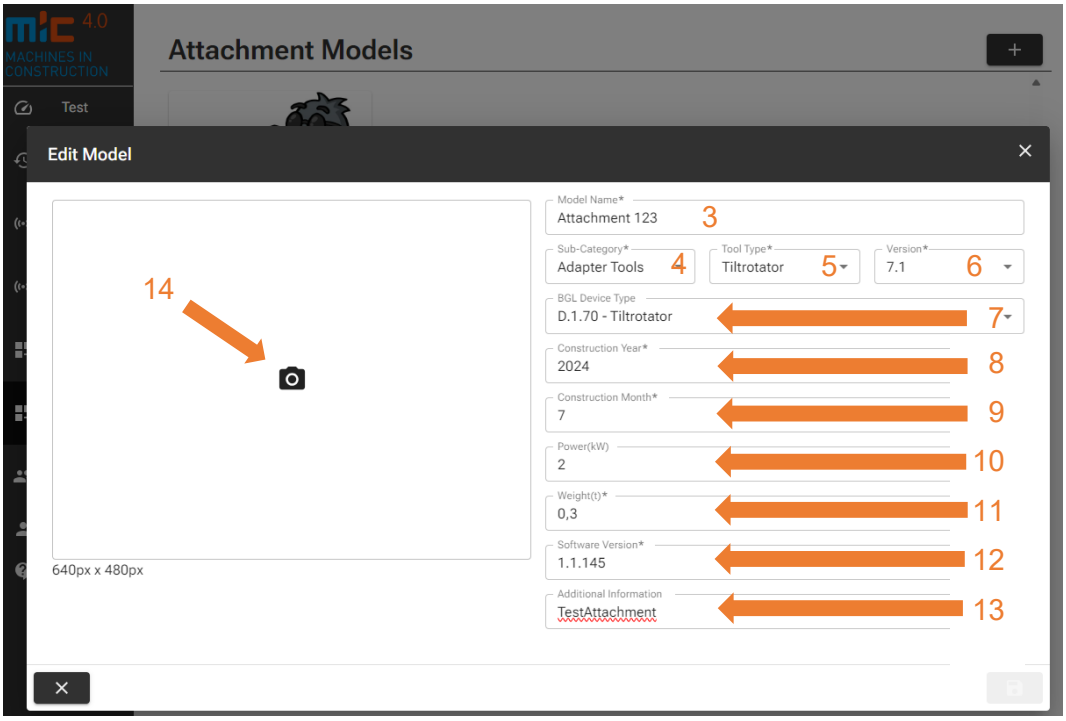
In step (5), the "Tool Type" is selected, which describes the attachment in more detail (Tiltrotator, Rotation Uni, Stick Extension, etc.).



Step (6) "Version" specifies the relevant test file version that is linked to the attachment created and is to be tested. Here, 7.1 is stored and selected in preparation. There is currently no test via the MiC 4.0 Test Tool. This function will follow during the experience gained from the physical tests.

The "BGL Device Type" is selected in step 7. The selection menu that appears makes it easier to select and name the "BGL Device Type". This number uniquely describes the attachment, assigns it a description agreed in the construction sector and makes it easier for the user to handle the information created here later. This field is not mandatory but should be filled in for the benefit of the user when creating the machine so that it can be transferred to the MiC 4.0 Database after the tests have been carried out and can be seen and used by the user. Depending on the previous selection, corresponding suggestions of the attachment classification according to "BGL Device Type" are offered, which makes the selection considerably easier. If no suggestion is entered, the field simply remains empty.

If required, further information can be found under [BGL Baugeräteliste].

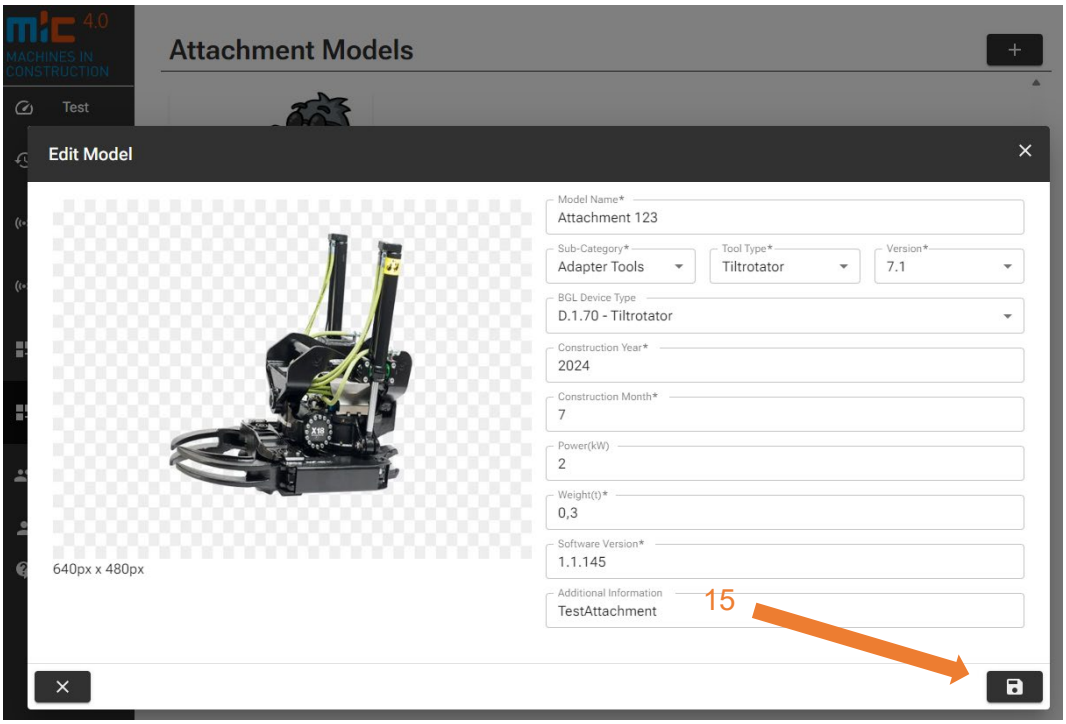


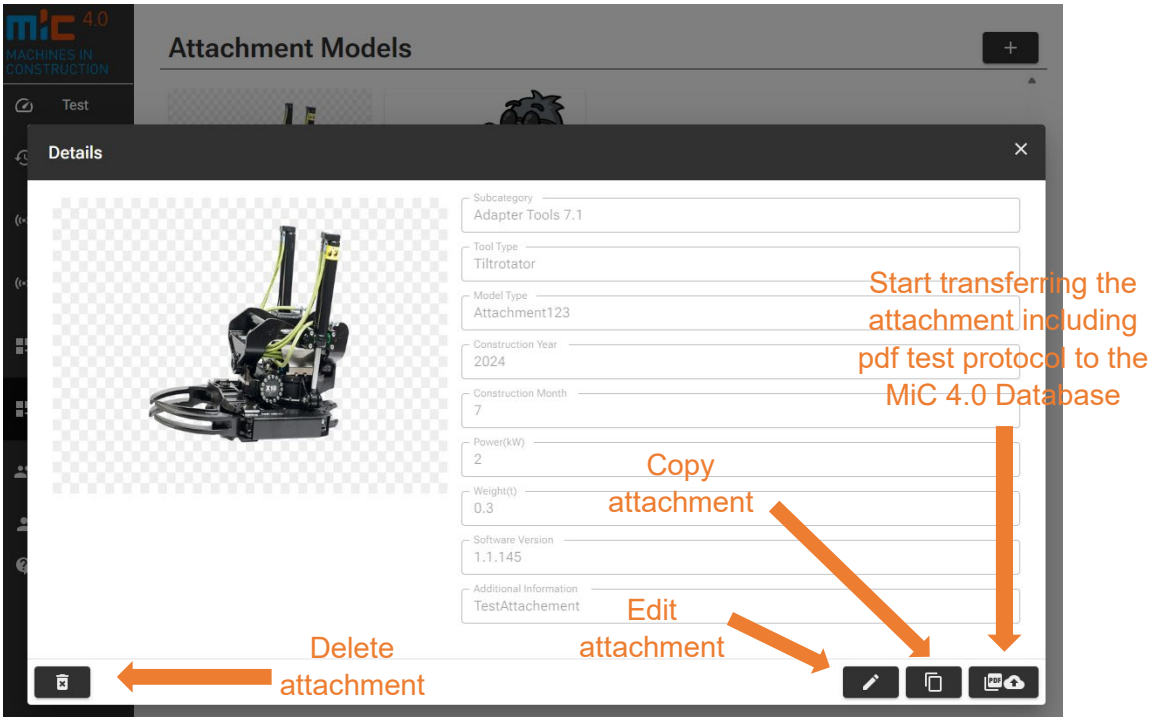
Steps 8 (year of manufacture), 9 (month of manufacture), 10 (power in KW), 11 (weight in tonnes) are used to enter the specific values for the attachment to be created (if possible). Step 12 requires the current software version of the attachment/telemetry. The corresponding version number/version status of the machine's telemetry software must be entered here. The value 1 is set for non-smart attachments.

Step 13 is available for additional information about the implement and can be filled in freely. This entry is not mandatory.

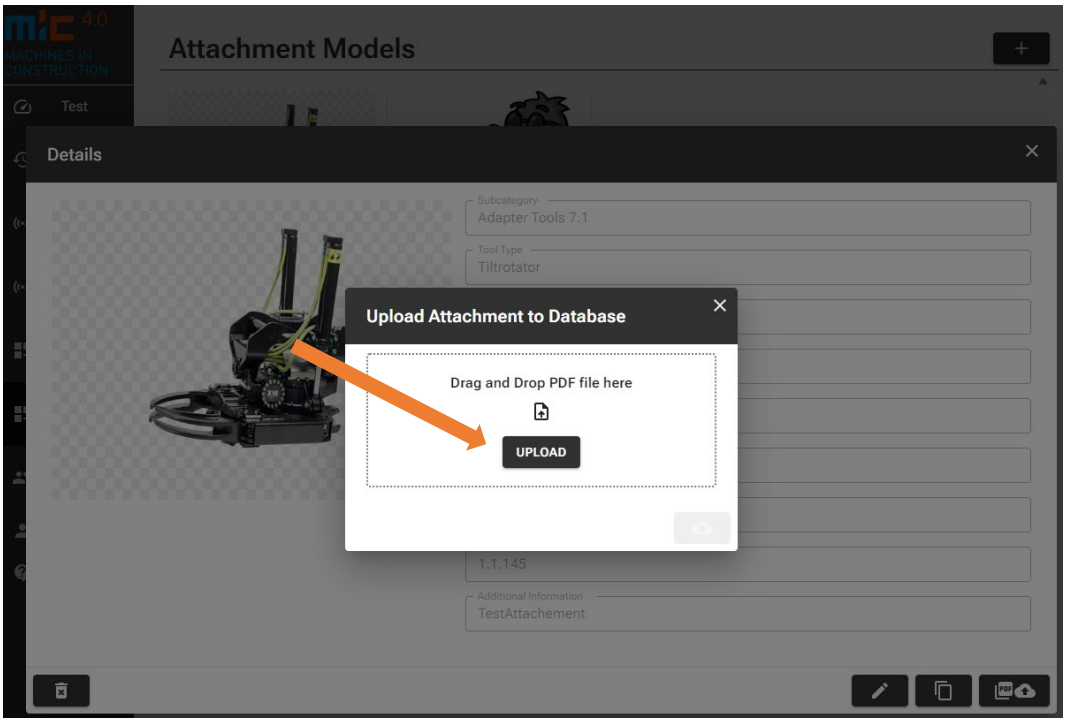
Step 14 requires an image of the implement with a resolution of 640x480 pixels. It is recommended to use the image that is also in the product catalogue/internet. This makes it easier for the user to clearly find and identify the desired product/manufacturer when using and viewing the attachments in the MiC 4.0 Database later.

Once all the required parameters and values have been completed, the implement can be created/saved in step 15.

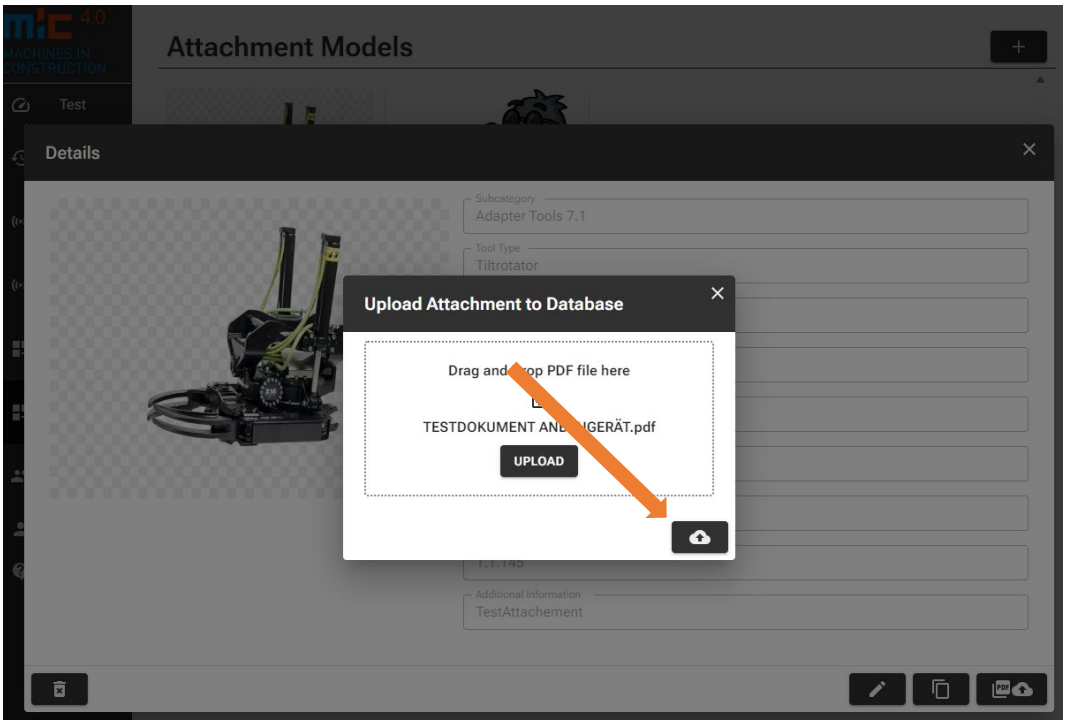




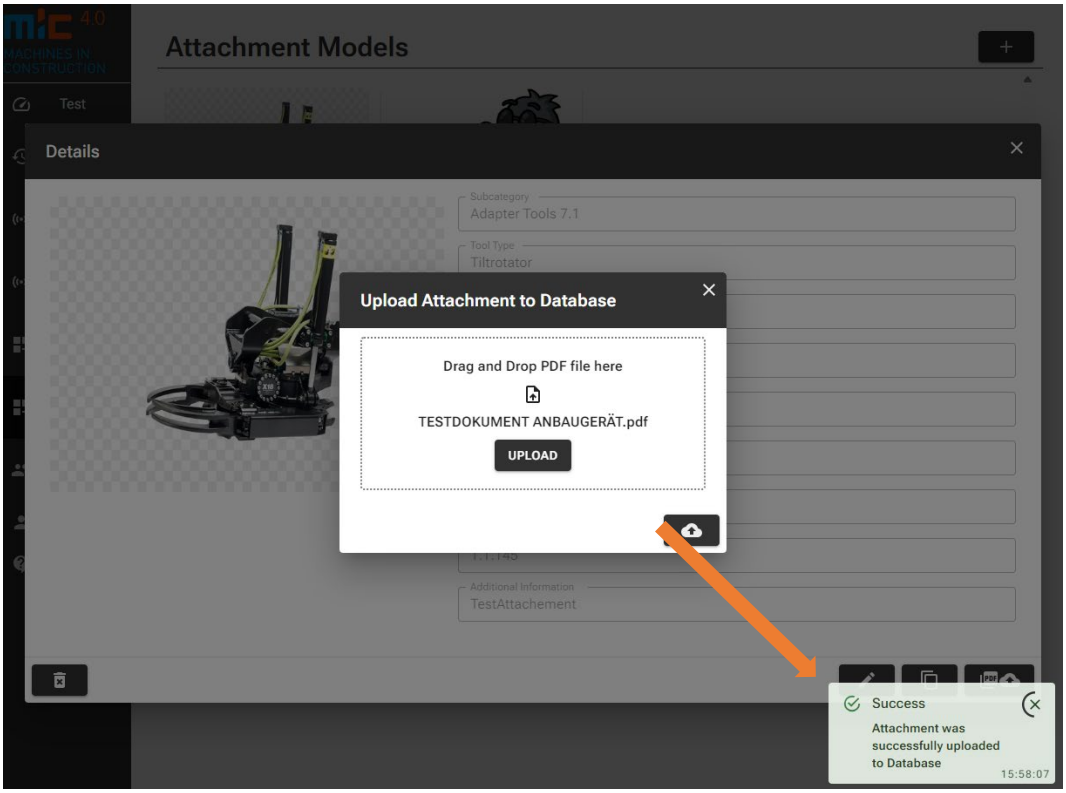
Click on the upload button at the bottom right to open a window into which the desired pdf-attachment test report file can be dragged and dropped.



Once the pdf attachment test log file has been successfully uploaded, the attachment can be transferred to the database using the upload button (bottom right).

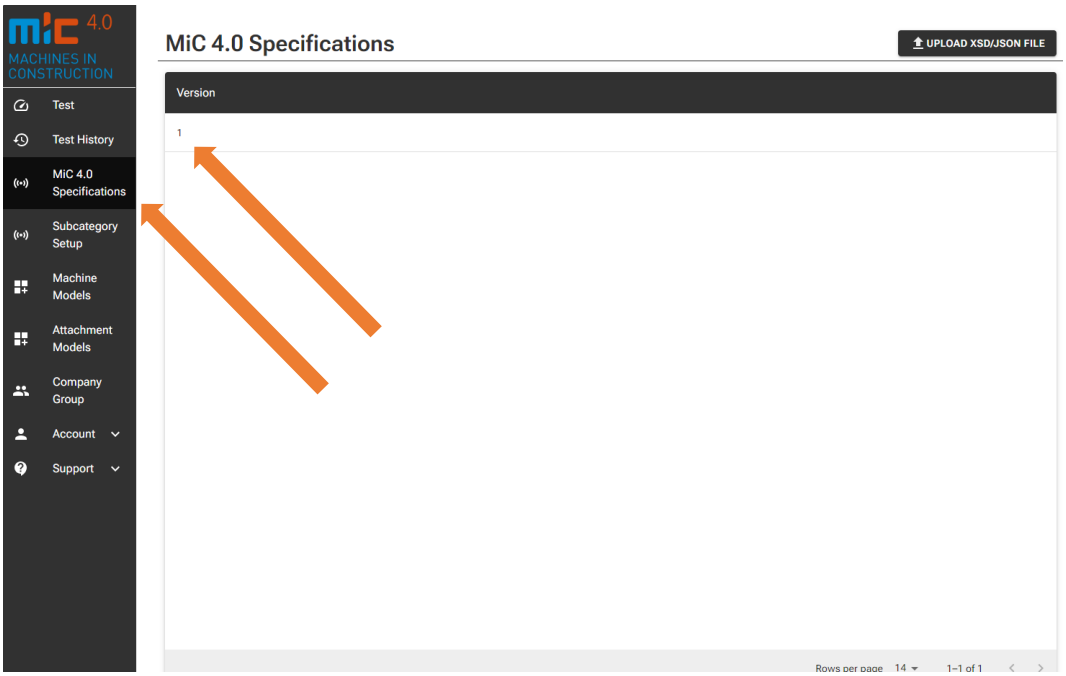


The successful upload to the MiC 4.0 database is displayed immediately:

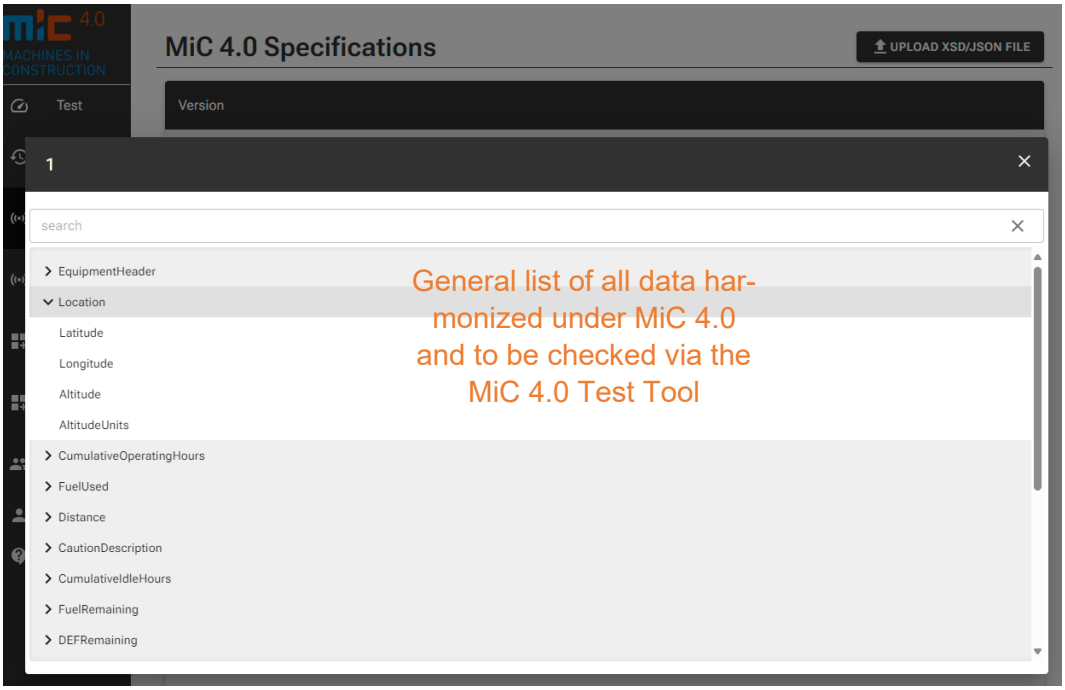


4. MiC Specifications

Under the "MiC Specifications" button, you will find a general list of all the data that is checked as part of the MiC 4.0 Test Tool (based on ISO 15143-3).

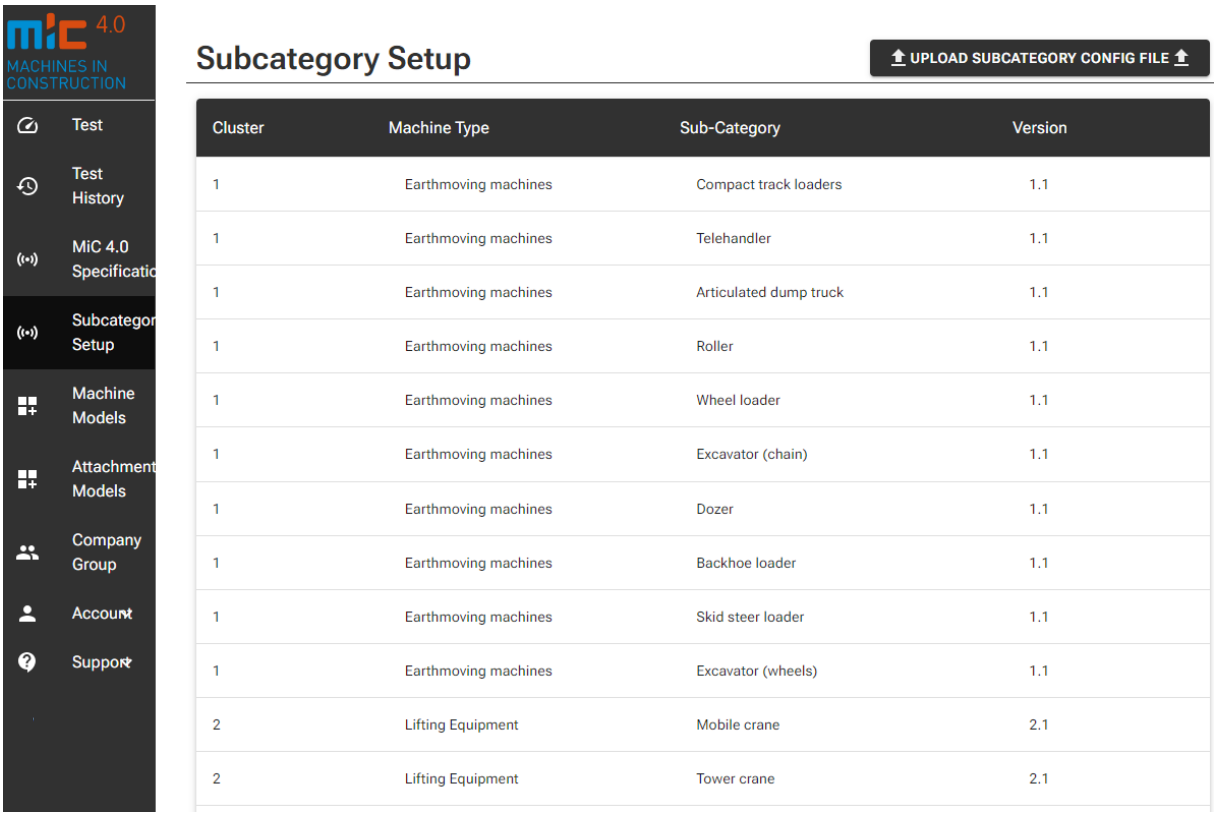


Partially expanded list with the general display of the data to be checked.



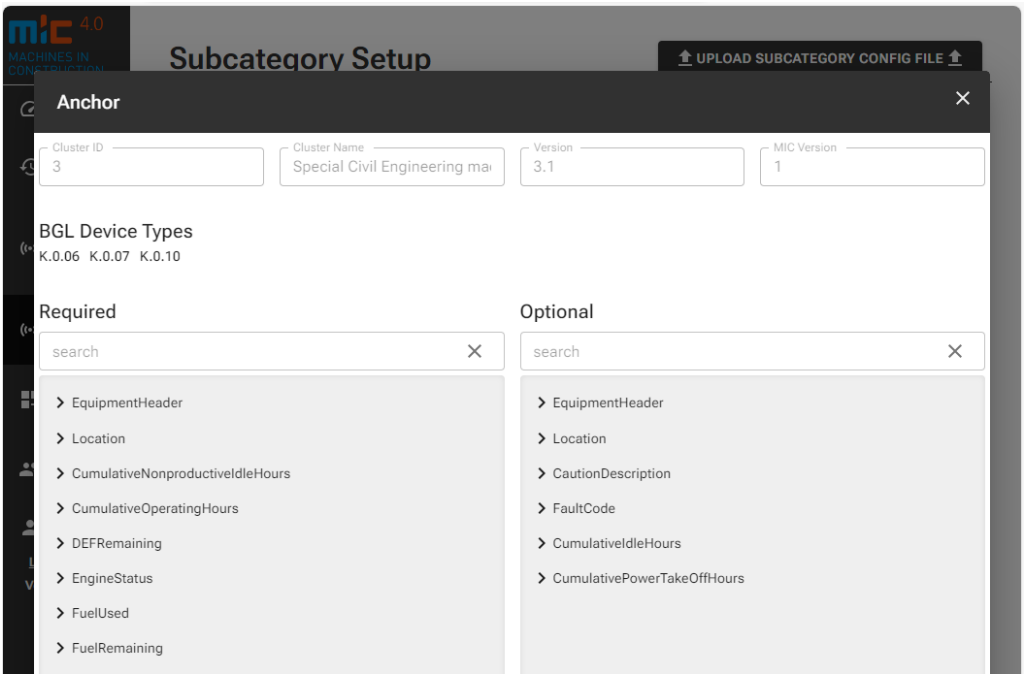
5. Subcategory Setup

The "Subcategory Setup" button shows all machines that can currently be tested under MiC 4.0, listed according to their machine type (MiC 4.0 cluster categorisation), "Sub-Category" and the relevant test version. This list will help to eliminate any ambiguities when creating a new machine model.



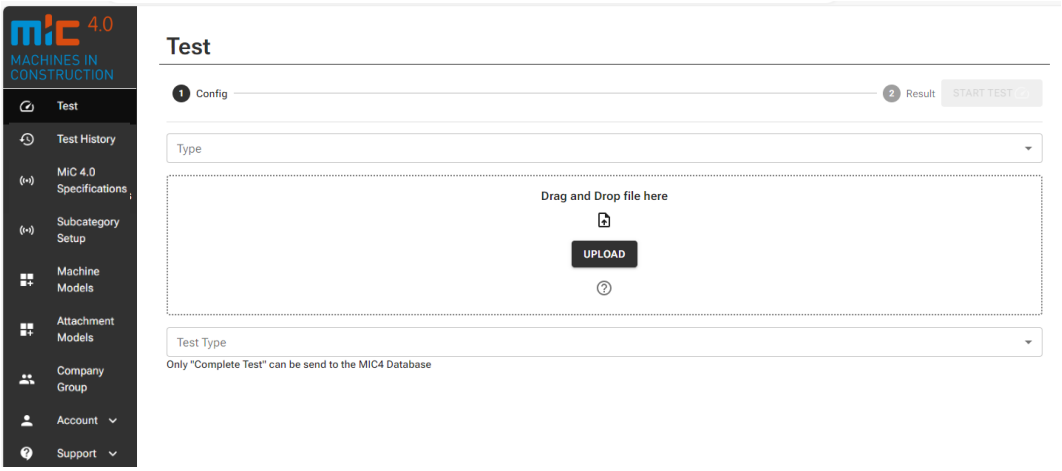
Cluster	Machine Type	Sub-Category	Version
1	Earthmoving machines	Compact track loaders	1.1
1	Earthmoving machines	Telehandler	1.1
1	Earthmoving machines	Articulated dump truck	1.1
1	Earthmoving machines	Roller	1.1
1	Earthmoving machines	Wheel loader	1.1
1	Earthmoving machines	Excavator (chain)	1.1
1	Earthmoving machines	Dozer	1.1
1	Earthmoving machines	Backhoe loader	1.1
1	Earthmoving machines	Skid steer loader	1.1
1	Earthmoving machines	Excavator (wheels)	1.1
2	Lifting Equipment	Mobile crane	2.1
2	Lifting Equipment	Tower crane	2.1

Clicking on a line opens a window with the test parameters listed for the relevant machine.

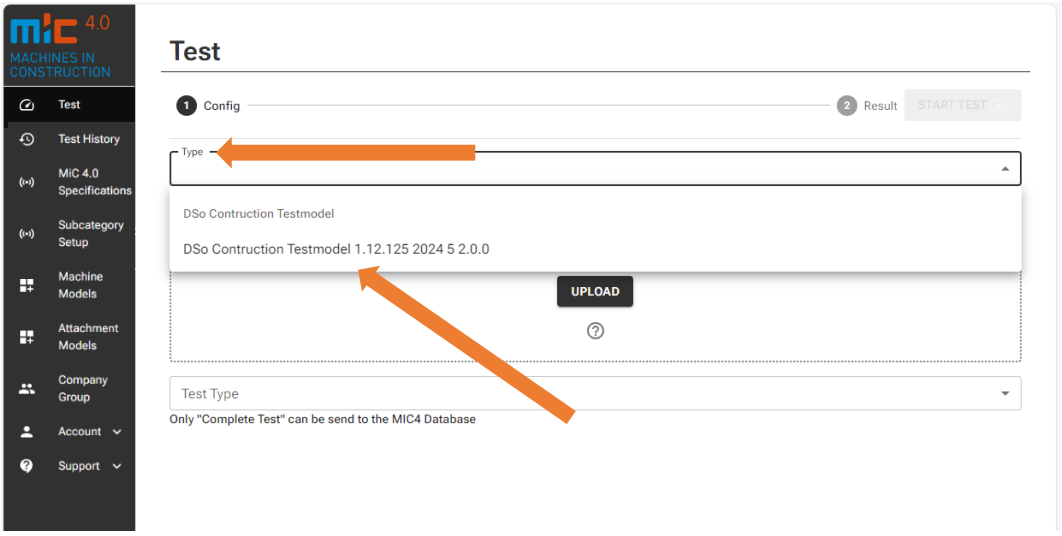


6. The MiC 4.0 „Test“

The "Test" button leads directly to the test of the data to be transmitted by you in accordance with the ISO 15143-3 specifications and the jointly agreed MiC 4.0 data understanding.

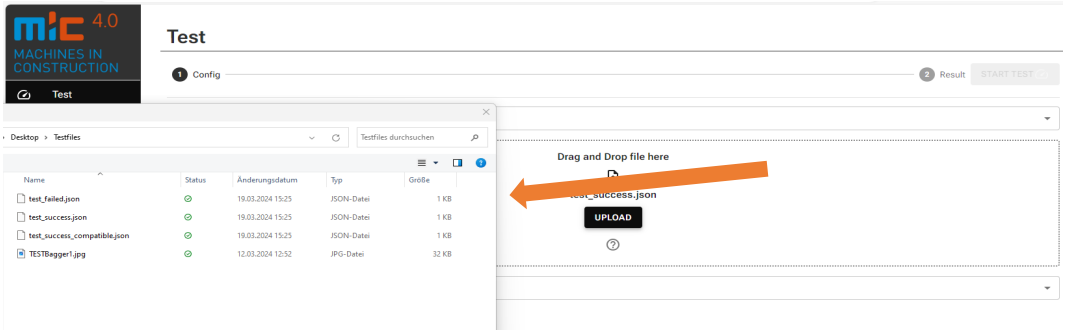


In the first step "Machine Type", the machine to be tested is selected for the test.

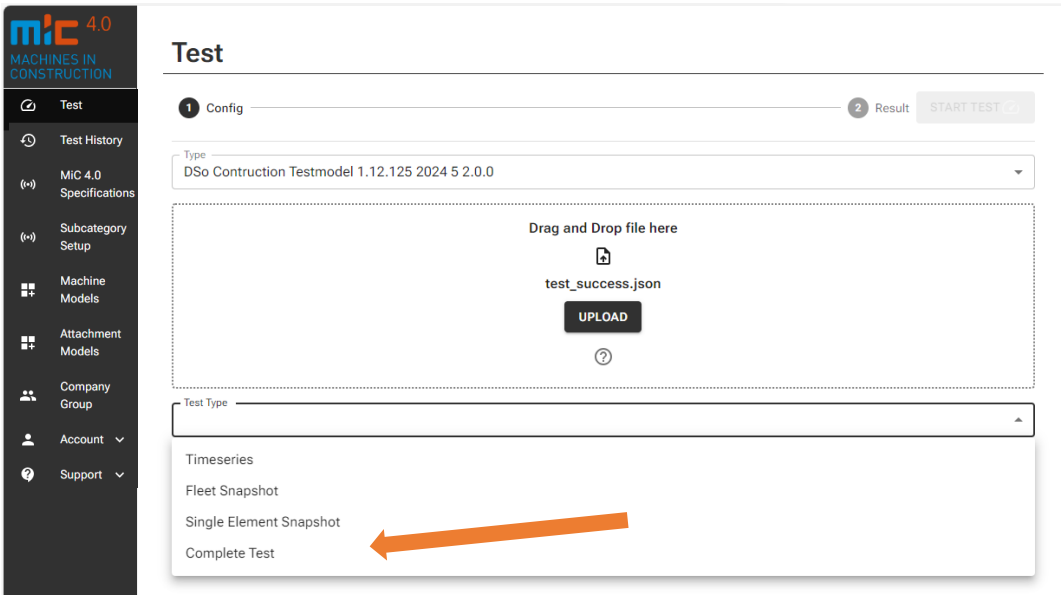


In the second step, the file (xml or json) that configures the test is selected and then transferred to the MiC 4.0 Test Tool.

What the test file must look like is described in detail in the appendix under "Test files".

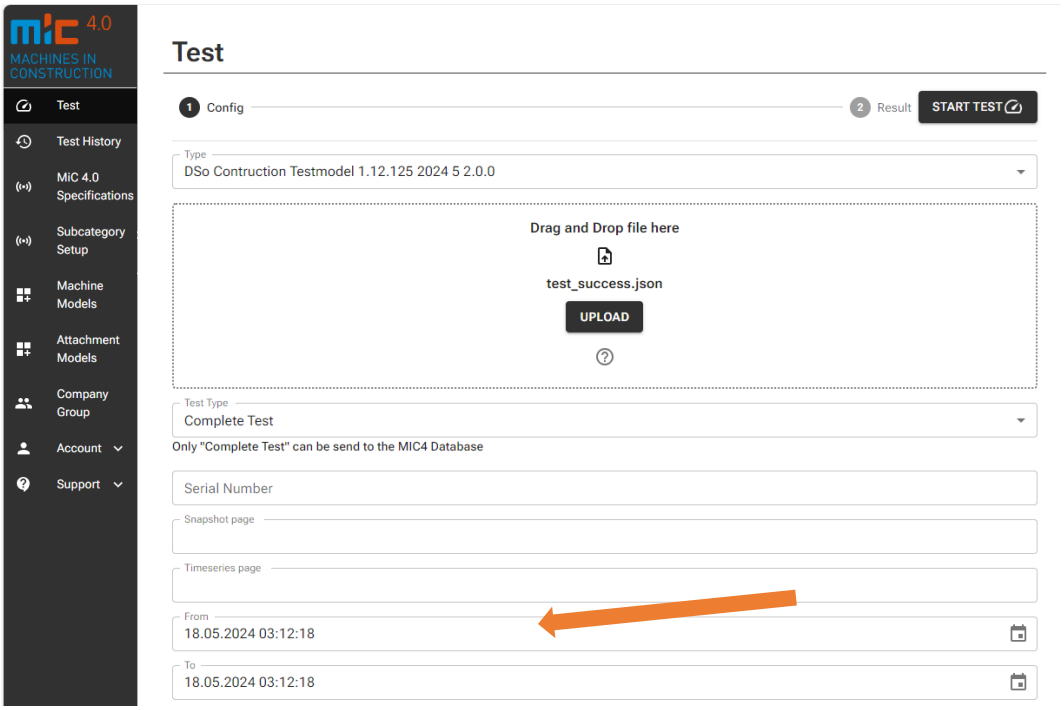


Once the data file has been successfully uploaded, the desired test can be freely selected. The individual test modes can be repeated at any time and as often as required.

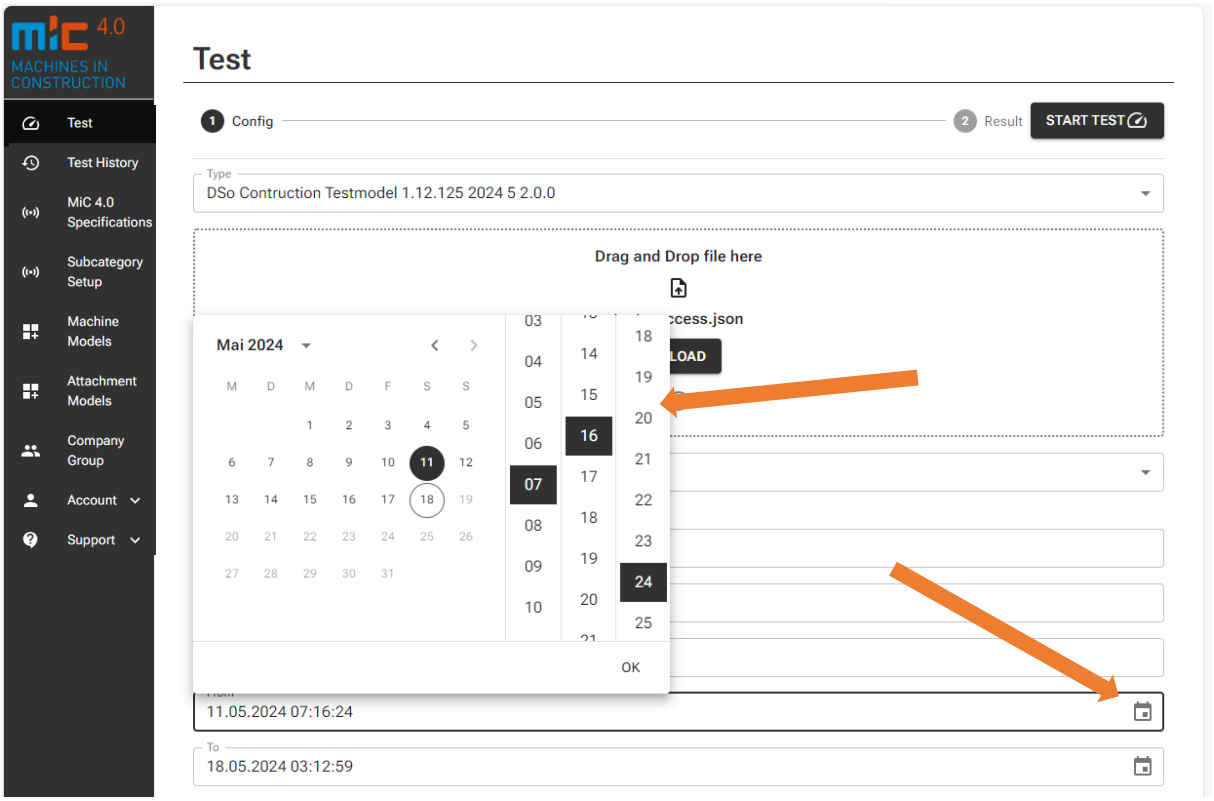


Selection of the desired test and display the selected parameters.

ATTENTION: only the "Complete Test" allows the results to be transferred to the MiC 4.0 Database later.

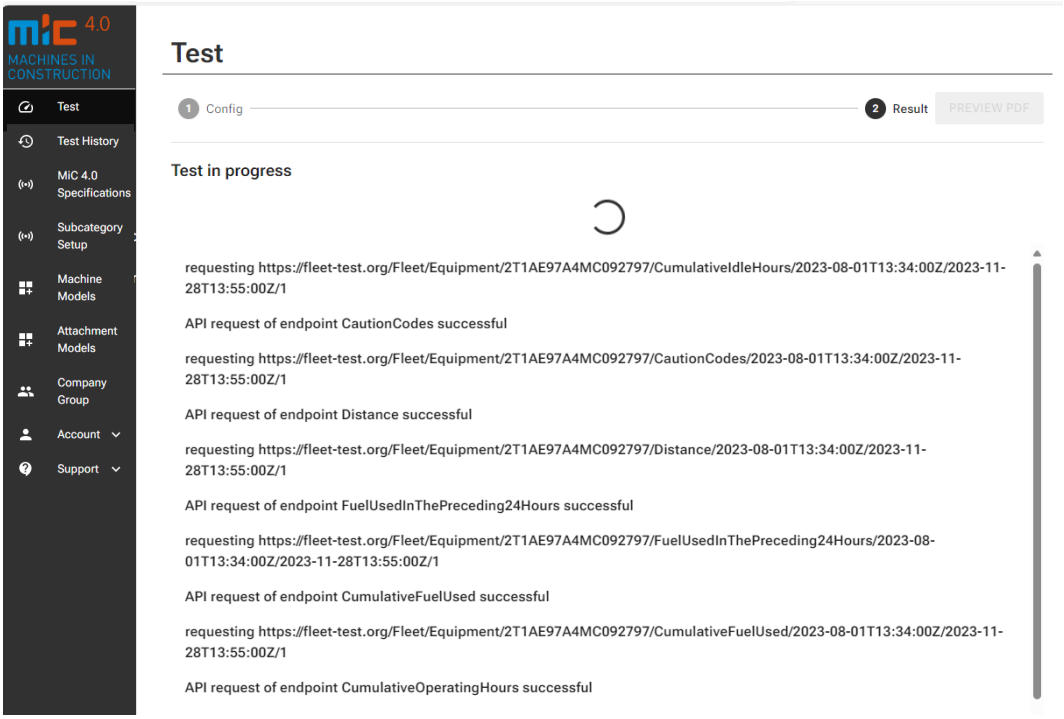


Clicking on the date button opens the time selection. This is necessary if a "Timeseries" test is to be carried out and the parameters are to be entered manually.

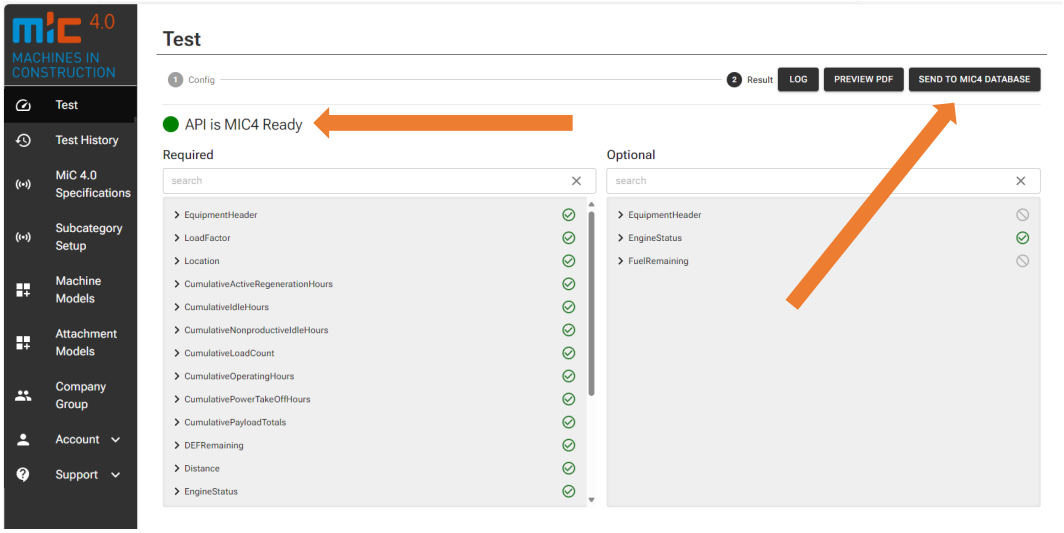


Once all fields have been filled in, the test is started by clicking the "Start test" button at the top right.

After starting the test, the check of the data specified in the "MiC 4.0 Specification" begins. The current test progress is displayed.



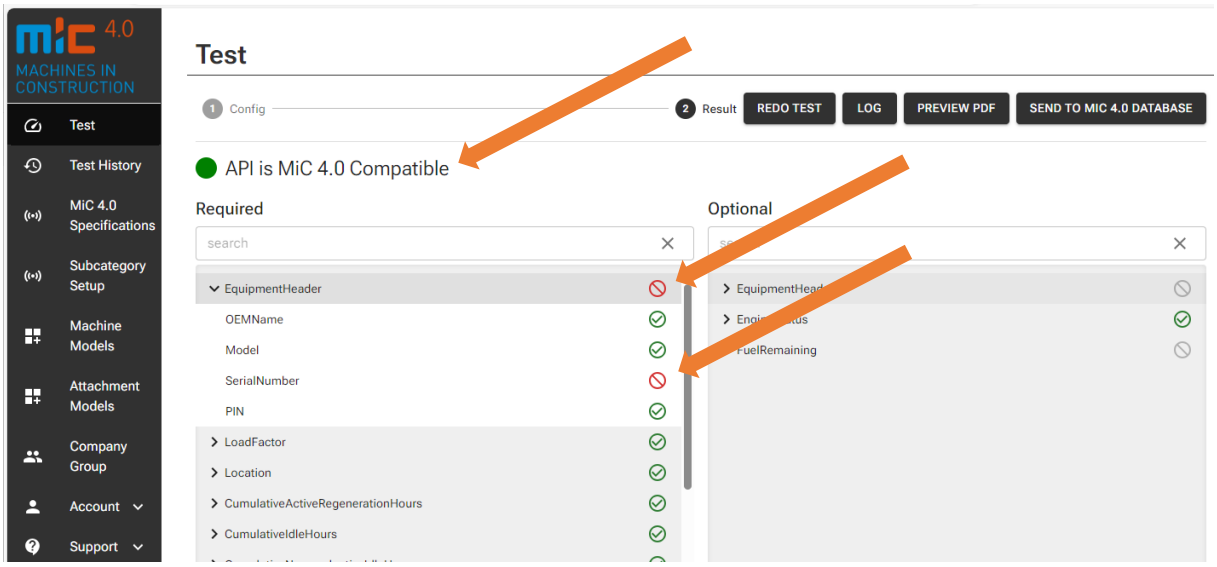
At the end of the test, the result of the checked data is displayed. Green ticks indicate that a data value has been successfully checked.



Once all "required" data values have been delivered and tested positively, the API is fully compliant with the MiC 4.0 agreements and is therefore "MiC 4.0 Ready".

The machines and their results can be transferred to the MiC 4.0 database using the "sent to MiC 4.0 Database" button at the top right and are therefore visible under MiC 4.0 with all the data values supplied in accordance with the agreements.

Red warning signals indicate that the respective data value has not been delivered.

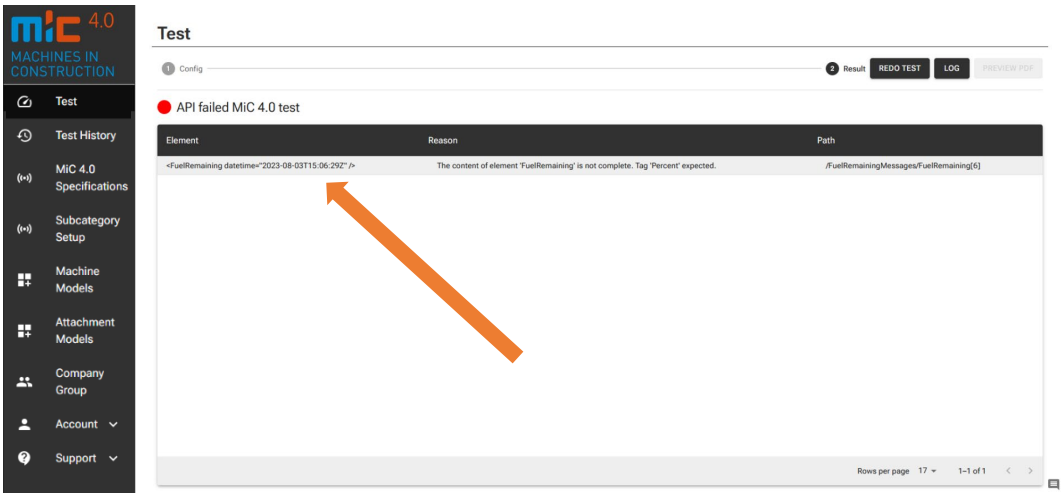


These data values may not even be sent by the machine (machine too small, the required sensors are not available, data value not supported, etc.).

In any case, the data values with the green tick have been sent correctly and checked correctly in accordance with the MiC 4.0 agreements, so that this result is output as "MiC 4.0 compatible".

If incorrect data values are supplied, the test is displayed as "API failed MiC 4.0 test". The underlying errors can be found in the list.

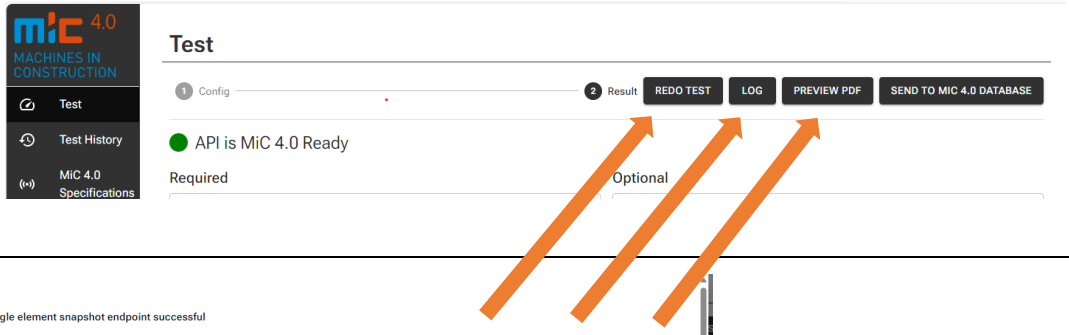
Every test of a machine that has not failed can be transferred to the MiC 4.0 Database and is therefore available to the user.

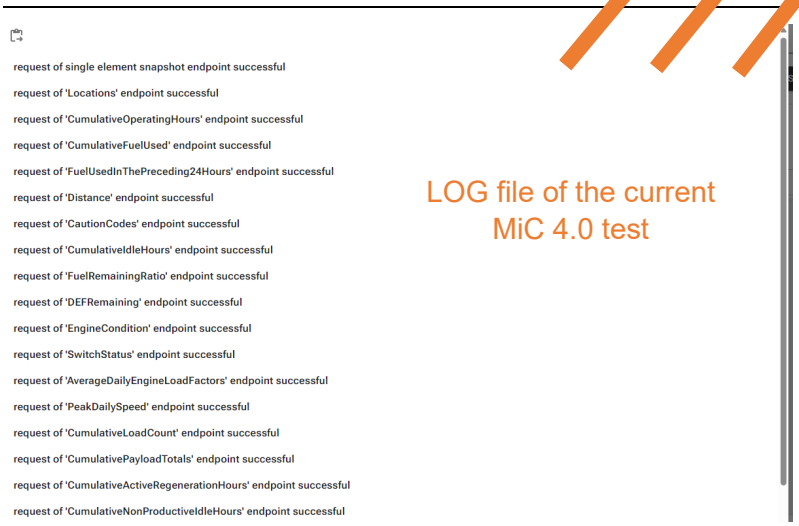


After completing a successful test, the log file of the test performed can be displayed by clicking the "LOG" button.

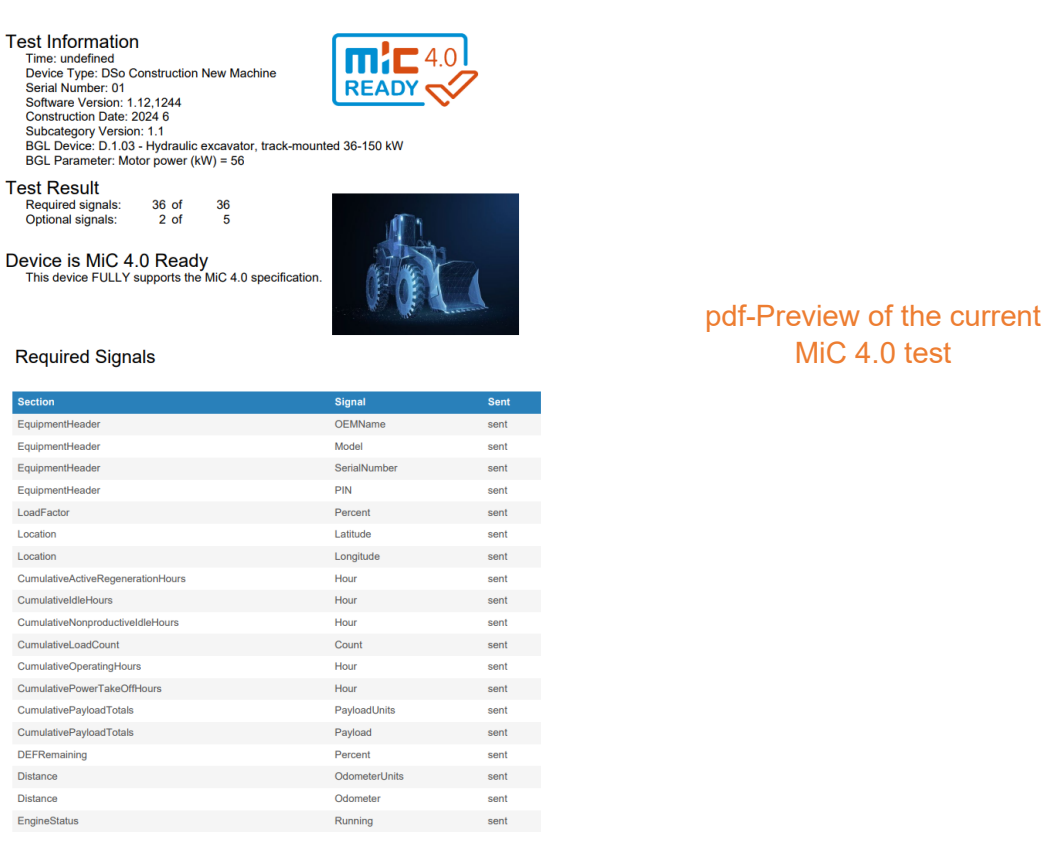
The same applies to a possible output as a PDF file for internal company documents.

In every case – test failed or not – the option “REDO TEST” can be used.



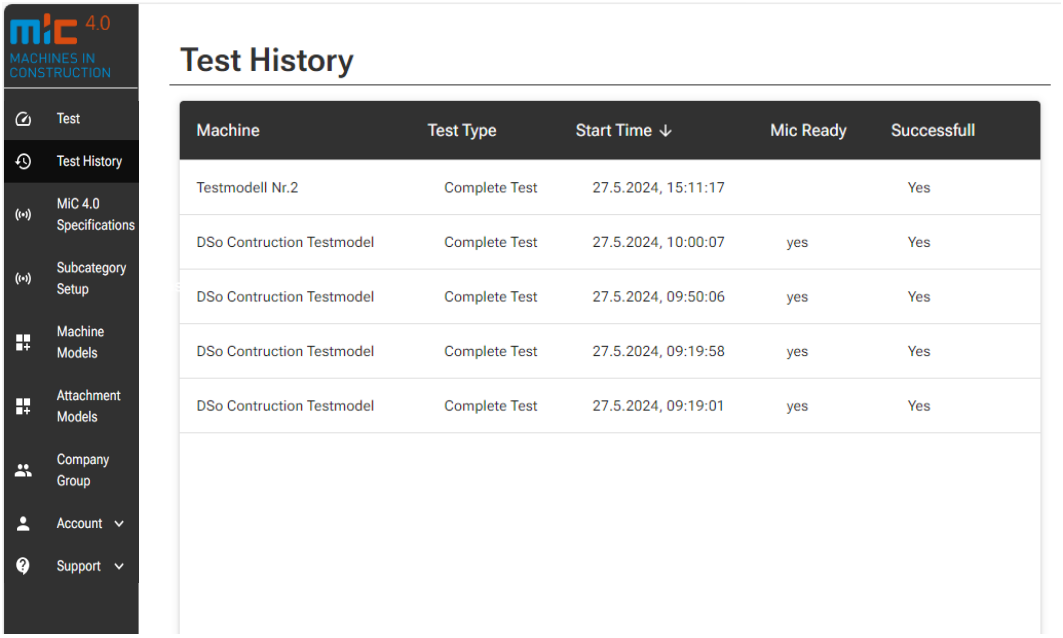


LOG file of the current MiC 4.0 test



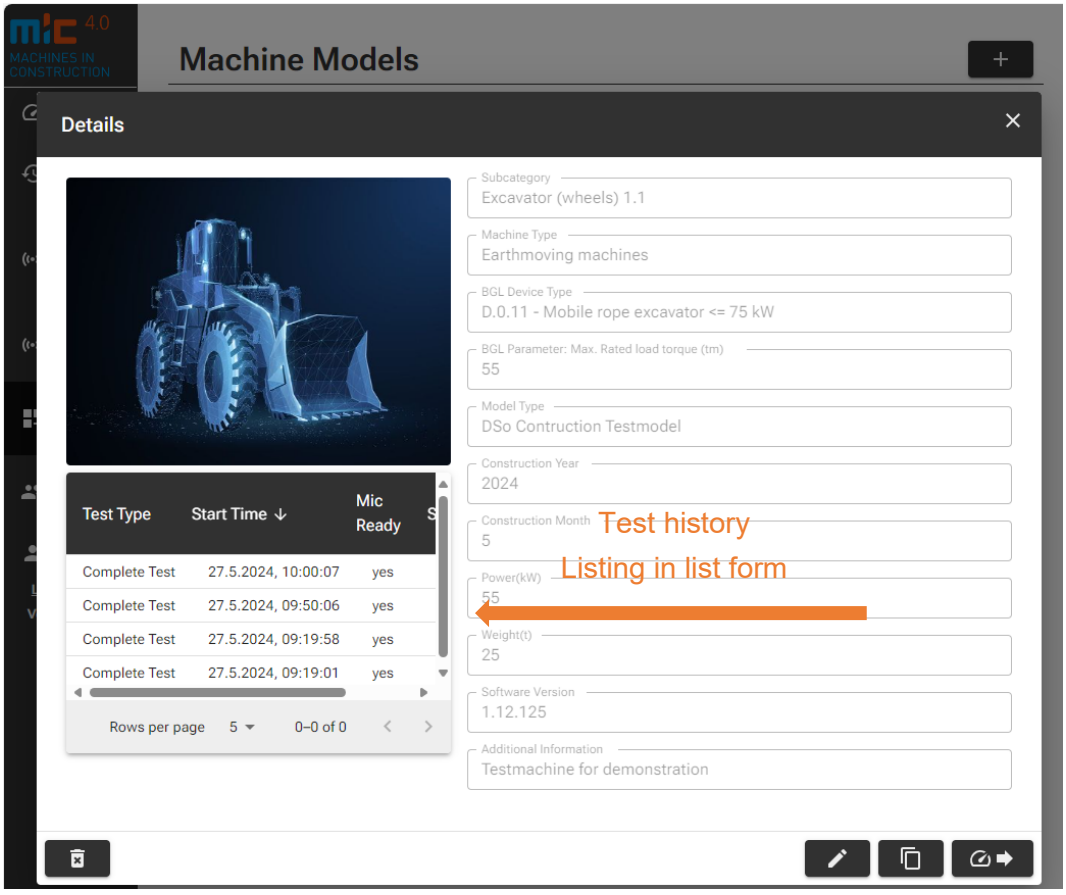
pdf-Preview of the current MiC 4.0 test

7. Test History



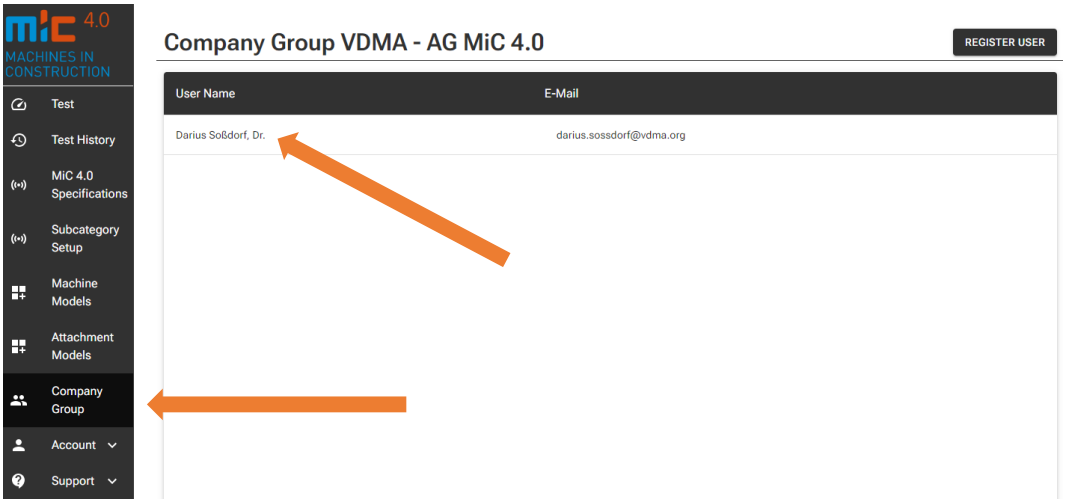
All tests carried out can be found in the "Test History". This ensures complete documentation of all machine tests and further test sequences, updates, etc..

The same can also be found under the stored machines. Once the test has been completed, the results are also stored in the history of the individual machines. This allows all tests and all development and update steps relating to the machines to be documented and managed on a machine-specific basis (see also Chapter 2 Creating a machine model).



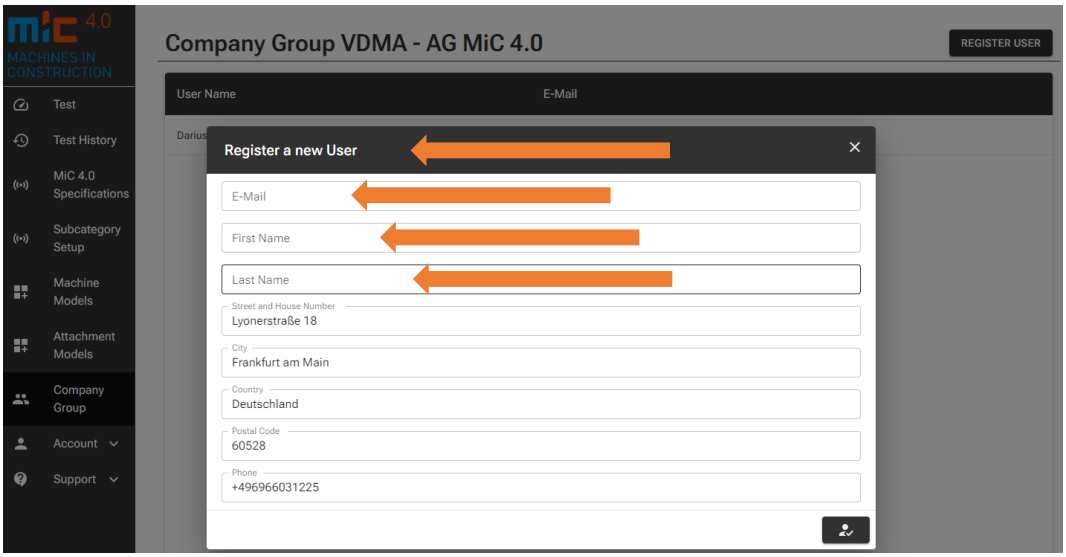
8. Company Group

Under the "Company Group" button, the registered accesses can be displayed (user name, e-mail) and viewed by clicking on the corresponding line.



Using the "REGISTER USER" button (top right), additional users of the company can be created.

Using the input mask that opens, additional users of the company can be entered and created, who can also use the MiC 4.0 Test Tool, create and test machines and upload the results to the MiC 4.0 Database.

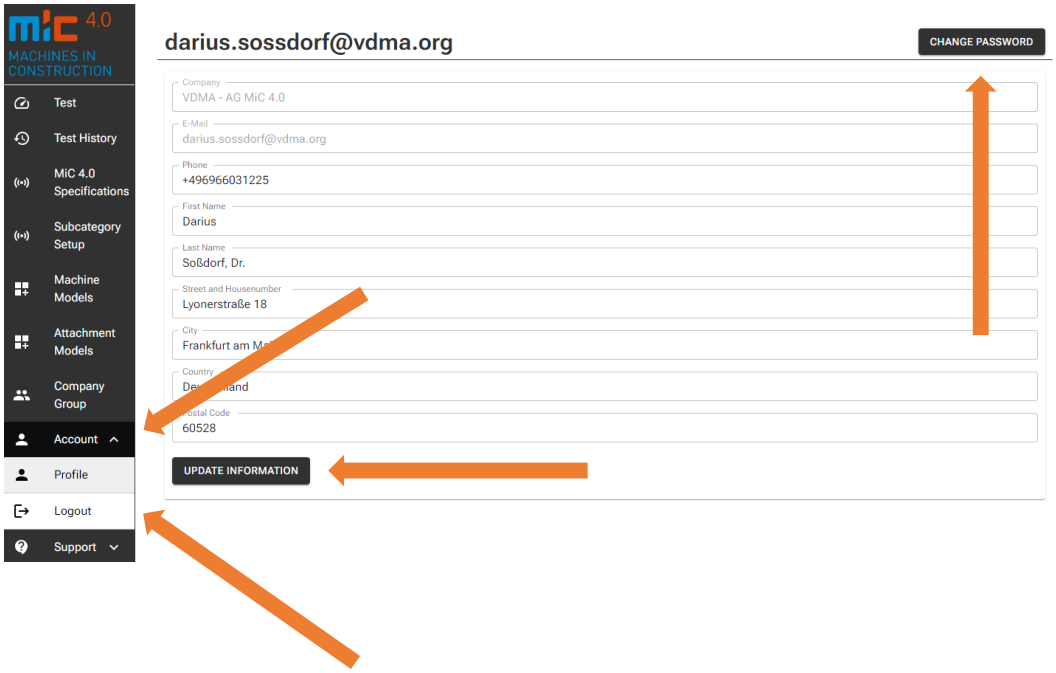

Company Group VDMA - AG MiC 4.0
REGISTER USER
User Name
E-Mail
Test
Test History
MiC 4.0 Specifications
Subcategory Setup
Machine Models
Attachment Models
Company Group
Account
Support
Register a new User
E-Mail
First Name
Last Name
Street and House Number
Lyonerstraße 18
City
Frankfurt am Main
Country
Deutschland
Postal Code
60528
Phone
+496966031225

9. Account

The "Account" button provides access to the stored registration data. These can be changed at any time. For programming reasons, however, "Company" and "E-mail" cannot be changed.

The CHANGE PASSWORD function (top right) can also be used if necessary.

The "Logout" button is also available here, which should always be used to exit the MiC 4.0 Test Tool.



10. Support

Three useful functions are hidden under the Support button:

contacting technical support by e-mail, useful FAQs with frequently asked questions and solutions that are regularly updated, and the link to this guide.

11. Annex

Test-files:

For every test, a test file needs to be provided by the user. This test file will be used for the test, but never be saved in the backend, because of security reasons. The browser can still cache the file so multiple tests can be done one after another without uploading the file every time. This can be achieved via the "Redo test" button or by going back to the test configuration page by clicking on the "1 Config" button after a test.

The test files contain information about the OEM API endpoint including credentials. Currently these three authentication methods are supported: **Basic authentication**, **OAuth 2.0 authentication** with the **Password grant** type and **OAuth 2.0 authentication** with the **Client Credentials grant** type.

For **basic authentication** the test file must follow the following structure (without comments):

```
{
    "baseUrl": "https://iso-api.oem-domain.com",  # the base path of the URL of the API to request, without a trailing slash
    "authentication": {
        "type": "basic",  # the authentication type used. This has to be "basic" for basic authentication
        "username": "MyUsername",  # the username used for basic authentication
        "password": "MyPassword"  # the password used for basic authentication
    },
    "acceptHeader": "application/x.iso15143-3.v20161201+xml"  # the accept header to be send to your API on each HTTP request. If you don't know what to provide here, start with "application/xml" and ask the developer of the API.
}
```

For **OAuth 2.0 password grant** authentication the test file must follow the following structure (without comments):

```
{
    "baseUrl": "https://iso-api.oem-domain.de",  # the base path of the URL of the
API to request, without a trailing slash
    "authentication": {
        "type": "oauth_password",  # the authentication type used. This has to be
"oauth_password" for OAuth 2.0 authentication with the password grant
        "clientID": "MyClientID",  # the client ID used for OAuth 2.0 authentication
        "clientSecret": "MyClientSecret",  # the client secret used for OAuth 2.0
authentication
        "scope": "MyScopes",  # the OAuth 2.0 scope for authentication. This may not
        be needed by your authentication service and can be just an empty string
        "tokenEndpoint": "https://oauth.oem-domain.com/token/endpoint",  # the URL of
the token authentication API of the OAuth provider
        "username": "MyUsername",  # the username used for OAuth 2.0 authentication
        "password": "MyPassword"  # the password used for OAuth 2.0 authentication
    },
    "acceptHeader": "application/x.iso15143-3.v20161201+xml"  # the accept header to
 be send to your API on each HTTP request. If you don't know what to provide here,
 start with "application/xml" and ask the developer of the API.
    }
```

For **OAuth 2.0 client credentials grant** authentication the test file must follow the following structure (without comments):

```
{
    "baseUrl": "https://iso-api.oem-domain.de",  # the base path of the URL of the
API to request, without a trailing slash
    "authentication": {
        "type": "oauth_client_credentials",  # the authentication type used. This has
to be "oauth_client_credentials" for OAuth 2.0 authentication with the client
        credentials grant
        "clientID": "MyClientID",  # the client ID used for OAuth 2.0 authentication
        "clientSecret": "MyClientSecret",  # the client secret used for OAuth 2.0
authentication
        "scope": "MyScopes",  # the OAuth 2.0 scope for authentication. This may not
be needed by your authentication service and can be just an empty string
        "tokenEndpoint": "https://oauth.oem-domain.com/token/endpoint"  # the URL of
the token authentication API of the OAuth provider
    },
    "acceptHeader": "application/x.iso15143-3.v20161201+xml"  the accept header to
be send to your API on each HTTP request. If you don't know what to provide here,
start with "application/xml" and ask the developer of the API.
}
```

With both OAuth 2.0 methods, it is also possible to specify additional request parameters. These must be specified within the "authentication" object. This also supports identity providers that define additional parameters, such as Auth0 with the "audience" parameter. This can then be specified as "audience": "myAudience" within the "authentication" object and is then sent as an additional parameter.

Remarks

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