User manual

Madaster Platform

Versie 2020-1

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1. Getting started.

1.1 What is Madaster?

Madaster is the brand name of the Madaster Foundation. The aim of the Madaster Foundation is to keep materials available in all economic cycles, by registering these materials and thus facilitating their availability at the highest possible level. The Madaster Foundation wants to realize this goal by offering a digital platform in which the built environment can be fully documented. Madaster is an independent Platform that is accessible to everyone: individuals, companies, governments and the scientific community.
Madaster is the "land register of materials".

In our closed system, the earth, raw materials are limited and scarce. In order to keep materials available indefinitely, they need to be documented/registered in use. With the help of a Materials Passport, materials retain their identity, so that they are not lost anonymously, as waste. Madaster thus acts as a library of materials in the built environment: it links the material identity to the location and records this in a Materials Passport.

1.2 What is a Materials passport?

A Materials Passport is based on the entered materials and products of a building or building section, as created from one or more source files. In this Materials Passport, the quantities of the materials used are made transparent within the so-called 'building framework'. The materials in the various layers of the building are shown on the basis of the NL/SfB classification coding applied in the Netherlands, and these can be classified according to seven 'material families' or according to the NL/SfB table 3 categorisation.

1.3 Hoe werkt het?

In order to register a new or existing building in Madaster, information (data) of this building is needed. The more extensive and complete this data is available (input), the more detailed and complete the report (output) is displayed in the Madaster Platform and specifically in the Materials Passport.
The Madaster Platform can process two types of source files; namely:

1. IFC files (based on a 3D/BIM model);
2. a Madaster Excel template (if no 3D/BIM model of the building is available).

The various 3D CAD applications in which buildings are currently modelled digitally use their own file format, but communicate with each other using the universal IFC file format. This IFC format can therefore be exported by all 3D CAD applications. For more information about the export possibilities of the 3D CAD application you are using, please contact your software supplier.

If a building is not modelled in 3D or certain elements are not worked out in the 3D model, an Excel template can be used in Madaster. On the basis of this secondary source of information, a building can still be registered in Madaster (without a 3D/BIM model), where the materials and products used in the building are recorded in a Materials Passport.

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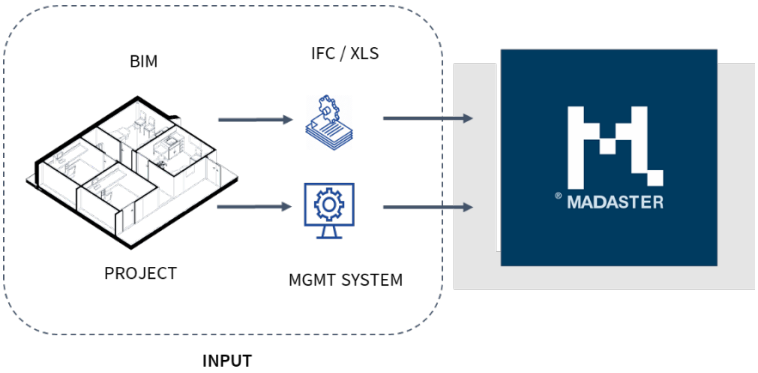


Madaster then categorizes and summarizes the information contained in the source files, so that for a building or for each building section it is possible to see where and how much of which material is in the building. Madaster does not calculate quantities itself; all geometric information and quantities are imported directly from the IFC model.
The quality (completeness) of the source files is validated by Madaster and displayed in the system after the source file has been read. All calculations within Madaster take place within these frameworks. Missing or incomplete information in the source files leads directly to inaccuracies of the result compared to 100% accuracy.

1.4 What do you need?

A Materials Passport is created based on the available information (data) that the user uploads into so-called 'source files' in the Madaster Platform. These source files (in IFC and/or Excel file format) are automatically validated for completeness when imported into Madaster in terms of: material description, classification code and geometric data.
Madaster focuses on the use of IFC files as source files as they can be exported in 3D CAD applications such as Autodesk Revit, Archicad, etc. This usually happens in the design phase of a building or during its renovation. If this type of source file is not available (e.g. for an existing building), the Materials Passport can be created in Madaster based on an Excel template.
More information about collecting and preparing the required building information (source data) is described in the Manual '[Madaster Stappenplan](#)' (see Step 2).

1.5 Workflow Madaster Materials passport

Basically, using the steps below, you can get started with the Madaster Platform to create a Materials Passport for your building(s):

1. Determine the level of detail of the building passport to be created.
2. Collect and prepare the required building information (source data).
3. Uploading the source data into the Madaster Platform*.
4. Check and enrich the source data in the Madaster Platform.

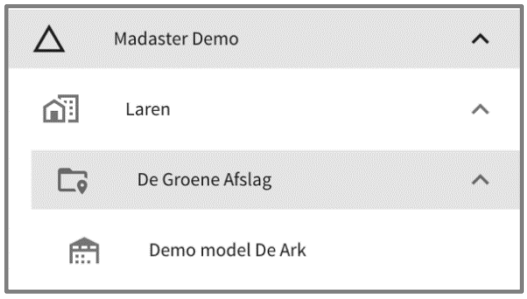
5. Complete the building file (including building passport) in the Madaster Platform.
6. Transfer building file to owner in the Madaster Platform (optional)

The 'Madaster Steps Guide' describes these necessary process steps in more detail and, for additional information, refers to other specific Madaster manuals or reference books.
* The registration of your Madaster account can be completed via the Madaster website.

2 Workflow

2.1 Flexible folderstructure

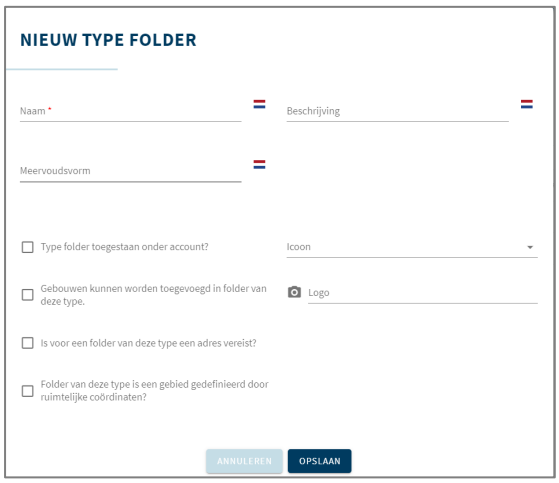
The Madaster platform works from "Accounts" - usually the owner of the property or the primary, leading party in a particular phase (e.g. the architect in the design phase, the contractor in the execution phase, or a designated building manager in the use phase). You can set up your account in Madaster completely as you wish. In an account, "Leaflets" can be created containing buildings or other folders (e.g. a region, department or subsidiary). A folder contains the "Buildings", the existing real estate properties or projects or those under development. This structure is flexible and allows you to configure your Madaster environment according to your needs.



"Users" can be assigned different roles in Madaster with specific management, write & read or read-only rights. These rights can be granted by an account manager to other users who have access to one or more folders, folders and/or buildings in the Madaster Platform.

2.1.1 Type of folders

In the "Type Folders" tab, different types of folders can be created. Think of the above examples of regions, subsidiaries or another definition of your desired organizational structure.



A few examples:

- A large construction company has several companies and subsidiaries. The projects for the different clients can now be organized per company/subsidiary;
- A nationally operating developer has divided his company into regions, with a department for "residential construction" and "non-residential construction" for each region. Various projects or area developments are underway in which the buildings are registered.
- An architectural firm wants to organise the projects per year and per sector (care, education, offices). Within the sectors there are projects with several buildings.

Each account is completely free to decide what the structure of leaflets will look like. By means of the different rights and roles of users, it is possible to determine per level who sees what and who can do what.

2.1.2 Users

On account level, different users can be invited with different roles and permissions. Madaster has three types of users:

1. Administrator: the account holder who is the owner of one or more portfolios and the buildings located within them; the owner can also delete them and has all the features of the role Manager and Reader;
2. Manager: a person who is enabled by an owner to manage his portfolios and buildings. In addition, the Manager has all the features of a Reader;
3. Reader: a person who can upload (source) files, use information and generate Material passports.

AVAILABLE ROLES AND PERMISSIONS AT ACCOUNT LEVEL:

Account niveau	Beheerder	Manager	Lezer
Folders types aanmaken en wijzigen	Ja	Nee	Nee
Folders aanmaken	Ja	Ja	Nee

AVAILABLE ROLES AND PERMISSIONS AT FOLDER LEVEL:

Gebouwniveau	Beheerder	Manager	Lezer
Folders en subfolders aanmaken	Ja	Nee	Nee
Folder en onderliggende gebouwen bekijken	Ja	Ja	Ja
Folder en onderliggende gebouwen aanpassen	Ja	Ja	Nee
Folder en onderliggende gebouwen verwijderen	Ja	Nee	Nee
Gebouw toevoegen aan een folder	Ja	Ja	Nee
Gebruikers toevoegen en verwijderen	Ja	Nee	Nee
Materialen en producten toevoegen en aanpassen	Ja	Ja	Nee
Materialenpaspoort exporteren	Ja	Ja	Nee
Materialenpaspoort downloaden naar PDF-bestand	Ja	Ja	Ja

2.2 Types of files

Within the Madaster Platform a distinction is made between two types of files, namely :

1. **Source files**: the files with which the materials and products and the quantities of a building are delivered to be registered in Madaster. These include the IFC files and the Excel template of Madaster.
2. **General files**: static files that contain information about the building and can be added to the building file in Madaster, but which cannot be used to serve as a source file.

2.2.1 Source files

The Madaster Platform primarily uses IFC files (4 or 2x3) of the buildings to provide insight into the quantities of materials used. As an alternative, Madaster offers an Excel template. This template is made available on the Madaster Platform.
The elements in these two types of source files should, as far as possible, include:

- **Geometric properties** (so-called 'base quantities') of the CAD objects; information about the quantities in volume and weight.
- A **material** description, on the basis of which the Madaster system can provide insight into the materials used in the building.
- A **classification** coding (in the Netherlands the NL/SfB code is common) on the basis of which the Madaster Platform can assign the elements to the building envelope in which the element is located (location).

Multiple source files can be uploaded in Madaster per building. For example construction, installation and architecture. You decide which file is made active. If multiple source files are active, they will be added together in the different tabs of Madaster (e.g. 'Building'-tab, 'Financial').
Attention: duplications can occur! This can be displayed in specialized 3D-viewers, such as Solibri, BIMcolllabZoom, etc. The latter functionality is not available in the Madaster system.
A source file can be made active or inactive at any time (depending on user rights).

IFC-source file manuals

- The manual “Madaster BIM-IFC guidelines UK_v20-1 UK” outlines the Madaster guidelines for setting up the BIM model and exporting the IFC file..
- The manual “Madaster BIM - IFC import UK_v20-1” describes in detail how to prepare an IFC file for processing within Madaster. It explains, among other things, how the geometric properties, classification coding, construction phase and material use is determined.
- The manual “Madaster BIM - IFC export UK_v20-1” describes in more detail how to export an IFC file (from Archicad and Revit).

2.2.2 General files

This includes files that provide information about the building or its design, e.g. digital drawings of the building in 2D CAD formats (e.g. .dwg, .dxf), PDFs, photographs and scans of building drawings (in JPG, PNG, TIFF formats).

2.2.3 Data and information

Because the Information Delivery Manual (IDM) is already widely used in the Netherlands, we recommend using it. For more information see the BIM desk. Here you will also find very extensive manuals to comply with the ILS with your specific BIM software. In the IFC check section, you can also see whether your files comply with the IDM standards.
This manual discusses what is specifically required for Madaster. This is less extensive than the full IDM standard and is mainly focused on materials and NL/Sfb coding.

2.2.4 Geometric data

Madaster obtains all geometric data from the IFC files that are uploaded. This means that Madaster does not perform any calculations itself, only the summation of the different quantities of the obtained information.

2.2.5 Materials information

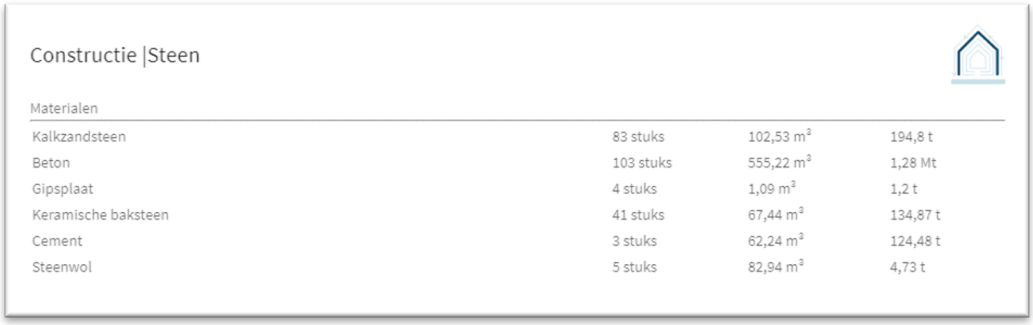
Madaster obtains the material data from the active IFC files that have been read and compares them with the Madaster Platform materials database. Madaster uses six material group codes and a group into which the unknown materials end up. In addition, it is possible to choose to display the materials on the basis of NL-SfB table 3.

Via the Materials & Products tab you can view available materials in the Madaster database and if desired add your own materials to a certain category. To do so, click on 'Add material' and assign it to a material group code. By adding search criteria (word components) the Madaster Platform can find these materials and link them automatically.

Madaster currently contains databases of materials and products that are linked to the material/product with the same designation as in your IFC file. These databases will be expanded in the future.

For example, by clicking on a specific material within a specific shell of the building, you can see the quantities of the specific materials in detail.

See the image below for the material 'stone' in the 'Construction' shell of the building.:

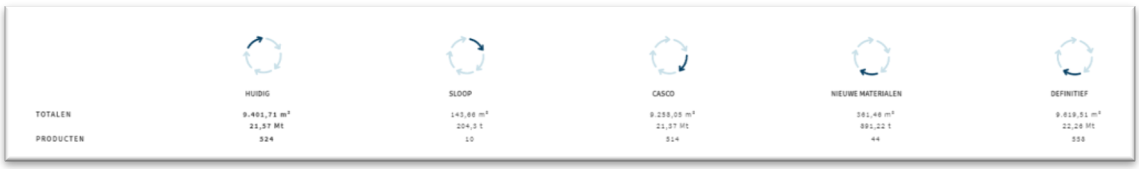


2.2.6 Standard Classification (NL/SfB)

In the construction sector, the NL/SfB code indicates the building section in which a building section or material is located. This coding is given to objects in the IFC file. This allows Madaster to categorize the materials. In this way it is made clear how many materials are located where in the building. Preferably use the NL/SfB code with 4 digits. Madaster then assigns these to the building envelope (e.g. Construction, Enclosure, etc.).

2.2.7 Building process – renovation phases

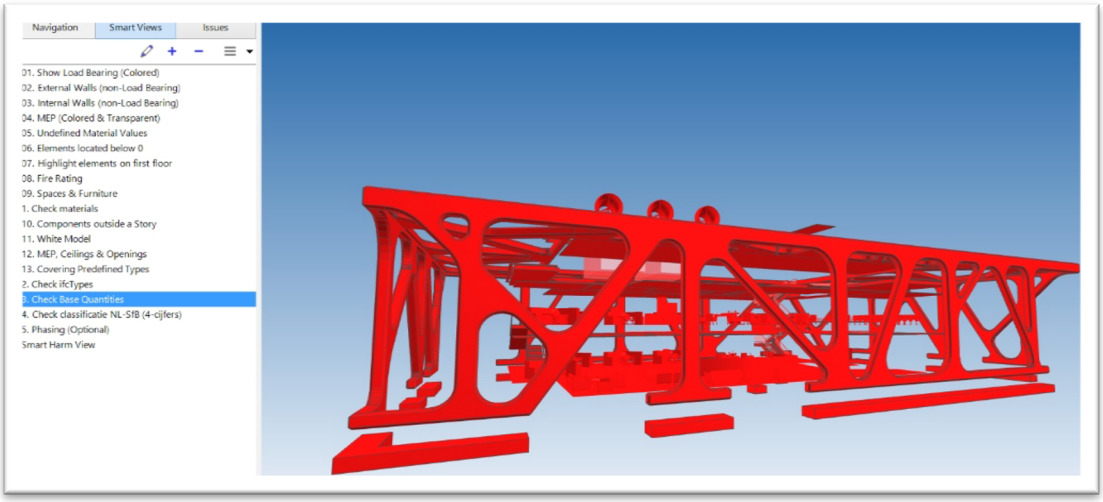
Many building projects consist of the renovation of existing buildings. Part of an existing building is demolished, a shell remains and is built in and attached with new materials. This construction phase (Current Demolition-Casco-New Materials-Definitive) is supported by Madaster from the information that can be provided in a source file (IFC and/or Excel template).



This tab will only become available as the “Building phase” is marked as: “Renovation”.

3 IFC check, BIMcollab zoom

Before reading an IFC file into the Madaster system, you can perform a validation to determine whether the basic settings, such as materials and NL/SFB classification, are correct and complete. For this purpose a Madaster smart view is available, which can be used with the free version of the "view" program BIMcollab ZOOM. BIMcollab ZOOM Public Viewer and the Madaster smart view can be downloaded for free via this link.
If you want to check directly to what extent your file complies with IDM, there is also an IDM checker available via BIMcollab Zoom.



3.1 Uploading Madaster SmartView in BIMcollab Zoom

After loading your IFC model in BIMcollab Zoom, you can load the Madaster smart views under smart views. Now a number of 5 pre-programmed views are loaded with which you can quickly scan elements that are missing a NL/SFB coding or do not yet have a material allocation. After this check and any adjustments in Archicad, the IFC models can be uploaded into the Madaster Platform. Quick start BIMcollab.

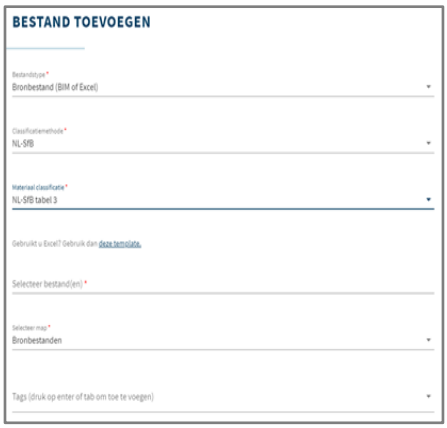
4 Upload files & enrichment process

4.1 Upload

In the tab file of your building you can add source files, etc. During the import process in Madaster, source files are automatically validated for completeness in terms of completeness:

1. material description;
2. classification code;
3. geometric data.

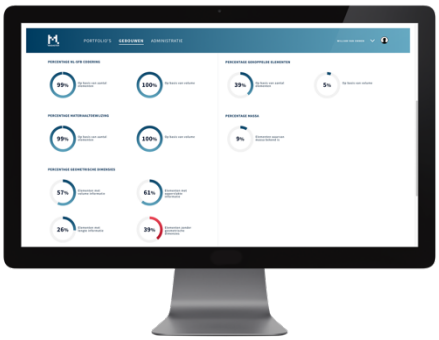
In addition, based on the material description, the platform will try to link each element in the source file to a corresponding material or product registered in the Madaster database.

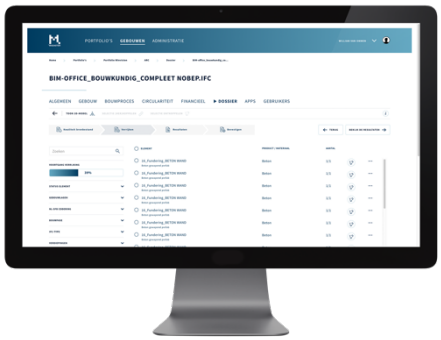


If the material description of an element is recognised, the Madaster system will automatically link the element. If no automatic coupling takes place, it is possible to manually link the element in Madaster at a later stage ("Enrich"). Alternatively, the source file can be modified and a new version of the IFC file can be read and processed in Madaster.

In order to make this automated 'matching process' as effective as possible, prior to processing the source files, a selection can be made of and priority given to relevant data sources in the Madaster platform. The selected sources are used during the automated matching process.

Make sure that after uploading the file is set to active (in the Process tab). This ensures that the source file actually contributes to the building tab. After uploading, you will immediately see how complete the information of the building is. If certain elements have not yet been provided with a material, this can still be added manually in the enrich tab.





4.2 Enrichment process

It is recommended to pair the products with the most volume in any case. To do this, use the sorting function. Then press pairing to assign the correct material. You can then actually activate the file in the Process tab.

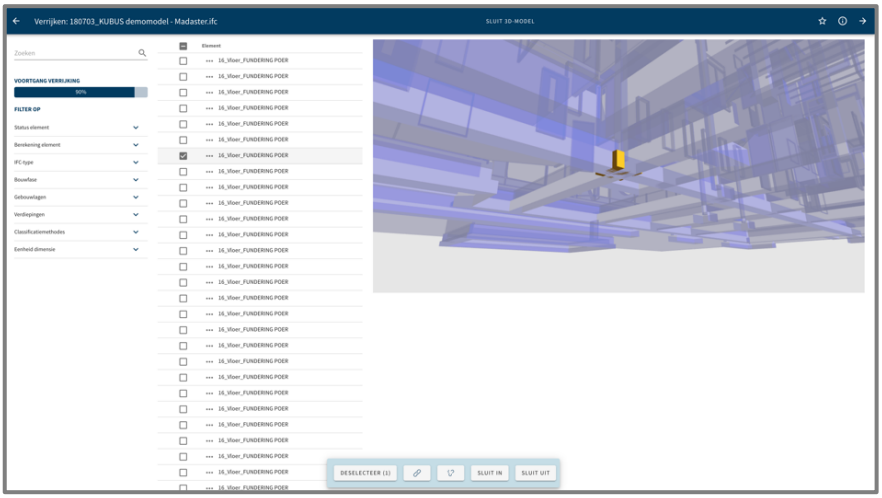
In Madaster it is only possible to manually create or modify a link between element and material or product. There is no possibility in Madaster to manually enrich elements of which the NL-SfB code or geometric data is incomplete or missing with the desired data. This data can only be added by uploading a modified source file (IFC or Excel) in Madaster.

4.3 3D-model viewer

After uploading your file you can also view it in the 3D viewer. This allows you to see which IFC file contains which parts of the building. See for example the structural elements below.

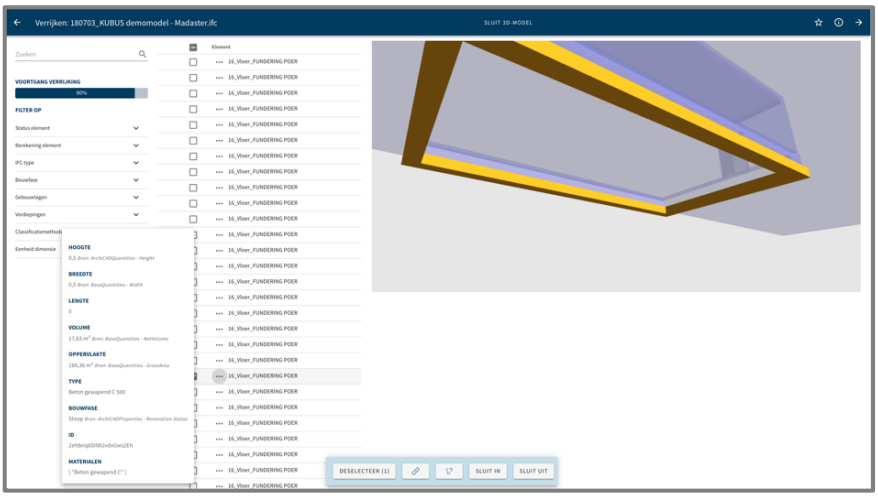
4.3.1 3D selection of ifc elements

After selecting one or more elements, those elements can be displayed in 3D, in the screen itself (and no longer on a separate screen). Because of this, it is also possible to use the functionalities of the "candybar" after visual feedback about the element in question.



4.3.2 Selecting elements in viewer: possibility to connect/disconnect

After clicking on one or more elements in the 3D window itself, where they will then be displayed, these elements are also selected in the list. This makes it also possible to use the functionalities of the "candybar", after information about the element in question via the "three dots".



5 Materials passport

5.1 A Materials Passport

A Building Materials Passport displays the building's information as shown in the 'building tab' on the Madaster Platform. The Materials Passport consists of the selected source files uploaded into the Madaster Platform of which the user has indicated to use the results with the building information.

5.2 Generating a Materials Passport

Go to the tab "General" in the Building. By clicking on the "Create Materials Passport" button, the user can create a Materials Passport based on the active source files. This Materials Passport will be created in a PDF and Excel format and saved directly in the 'File' tab, under the 'Passports' folder. Each time a new Materials Passport is generated it will be added as a new file. The previous Materials Passports will remain available and accessible..

5.3 Download a Materials Passport

Materials passports can be downloaded from the 'File' tab. All generated Materials passports can be downloaded under the category 'General File'. By clicking on the download icon, the PDF file will be downloaded to the computer. When the PDF file is opened the Materials Passport can be printed.

6 Circularity

6.1 Circularity indication

The value of the data stored in the Madaster Platform increases as the value of the products and materials in the building is better preserved. The Madaster Circularity Indicator has been developed in order to gain an idea of how a building scores in the field of circular construction. This Madaster CI gives an indication of the degree of circularity of the building. A fully circular building achieves a score of 100%.

The Circularity Indicator assesses the building during 3 life phases: (1) the materials used to construct the building (ratio of new materials to materials used), (2) the life span (in relation to average life) and (3) how products and materials are processed at the end of the life span (ratio of re-use/recycling and waste to landfill or incineration).
The Madaster Circularity Indicator is based on the international open source Material Circularity Indicator (MCI) of the Ellen MacArthur Foundation.

CONCEPT PHASE; The Circularity Indicator is in a development phase and has a low to moderate reliability due to the limited availability of the information currently available in

the source files being uploaded. In addition, most of the qualitative information has been pre-set at a fixed quantity and now mainly concerns the quantitative addition.

6.2 Current state

The information shown with the Madaster Circularity Indicator is based on the active source files that have been read in this building. The table shows how much is scored on circularity and is vertically subdivided into the three phases of circularity, with the Circularity score at the top. Next to this subdivision a horizontal subdivision is made in the six different shells of the building.
The circularity process is still under development within the Madaster Platform. At this moment the results shown here have a low reliability. As soon as the Circularity results are reliable, this will be communicated here.

6.3 Future development

Circularity is still under development within the Madaster Platform. On the basis of the current Madaster Circularity Index (MCI), further work is being done to realise a complete circular indication.
The quality of the source information made available by users will continue to determine the reliability of the Circularity Indicator. The provision of a source file with a high level of detail has a major influence on the quality of the indicator.

7 Financial

7.1 Financial value and residual value

The Financial module shows what the residual value of a building is at the end of the various lifetimes of products expressed in terms of material value. In addition, it shows the financial material value at this moment (current value) and the predicted development in the future.
The residual value of the different building layers at the different end functional lifetimes is calculated net present value back to today in the level 'building layers'. This means that this is the net present value of the residual value based on the expected functional life of materials. This functional life differs per building layer. If you assume that a building remains completely intact during the use phase, the net present value of a building depends on the end of the life of the building. This net present value calculation can be viewed for the different years in the future via the material groups tab. The current value of the materials within a building can be found in the materials groups tab.

7.2 Financial - Materials

7.2.1 Method of calculation

The material value is preferably imported from commodity prices of common commodity exchanges. The historical price increase of materials is first corrected with the inflation of the year in question and the corresponding exchange rate in case the commodity is in a different currency. The data points in the history of commodity prices with this deduction is the basis for a linear trend line determined on the basis of a regression analysis, i.e. the least-squares method.

7.2.2 Correction factors

Subsequently, the material values were corrected for demolition costs, processing costs, a correction for the size of the raw material flow and transport costs per kg. Demolition costs are indexed with the average BDB index of the last 18 years. Processing and processing costs are material-dependent and determined on the basis of interviews and desk research. For the transport costs, a distance to the processor of 150 km per freight transport has been assumed for all materials except stone materials (20 km) and wood (40 km).

7.2.3 What influence do inflation, BDB index (building cost index) and the discount rate have on my calculation?

The influence of this can be well tested in the sensitivity analysis on the detail pages. Here the inflation, BDB index and discount rate can be adjusted. The values for inflation and the BDB-index are standard on the average of the past 18 years. For the discount rate, the 10-year government interest rate (0.7%) is taken with a number of risk (2%) and profit (0.3%) surcharges.

7.3 Financial - Building layers

7.3.1 Method of calculation

The different building layers have a functional lifespan as specified by default by Madaster or building-specific adjusted in the general tab. In the Building Layers tab, the value of materials is determined at the end of their functional life. The materials are thus allocated to a specific year. The value in t = end of life is converted back to t = 0 in net present value by means of the discount rate. The sum of the net present values (NPV) of the different building layers is the NPV of the total.

7.3.2 Trend line determination

According to the trend line of the material value, the expected value at that year is determined. The material value is preferably imported from commodity prices of common commodity exchanges. The increase in the price of materials is first corrected by the inflation of the year in question and the corresponding exchange rate if the commodity is in a different currency. The data points in the history of commodity prices with this deduction is the basis for a linear trend line determined on the basis of a regression analysis, i.e. the least-squares method.

7.3.3 Correction factors

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8 Administration

Administration is the place where you find Information about “globally” available subjects.

8.1 Materials & products

Here you will find the databases of materials and products, which are platform-wide available for the Madaster users. You can consult various sources here, such as databases with product or material information, or supplier data.

8.2 Classification methods

A detailed overview of the classification structures (e.g. NL-SfB, eBKP and Omniclass) that are known for countries within Madaster. For this method all codes of the classification and to which ‘Layer of Brand’ it is linked are shown.

8.3 Partners

As a Platform for the Registration of Buildings, Madaster is part of an entire ecosystem of companies. The companies with which Madaster has entered into a partnership can be found under this tab. They are arranged by "Solution, Data, Service partners". The Madaster Partner Apps are designed to create additional value for you within the Madaster Platform. Madaster distinguishes three types of partners: Solution Partners, Data Partners and Service Partners. Each with their own knowledge, expertise and tools from which you (as a Madaster user) can benefit. Below you will find a further explanation of the different types of partners.

8.3.1 Solution partners

Solution Partners provide software solutions that are integrated within the Platform by means of a link. The data present in the Platform is used directly in the various links.

8.3.2 Data partners

Data Partners offer services to enrich the Madaster Platform and increase data reliability. Examples of data provided by Data Partners are financial, circular and material related data.

8.3.3 Service partners

Service Partners provide their expertise to a large group of customers through Madaster. Examples are training courses, BIM modelling services, data certification or consultancy work.

9 Support

On the Support page you will find general information about Madaster, including the phone number where you can reach us for platform support.
In addition, you will find a number of useful links to:

- Frequently Asked Questions;

- Release notes (Platform updates);
- News;
- Madaster manuals);
- the privacy policy.