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# 1 INTRODUCTION

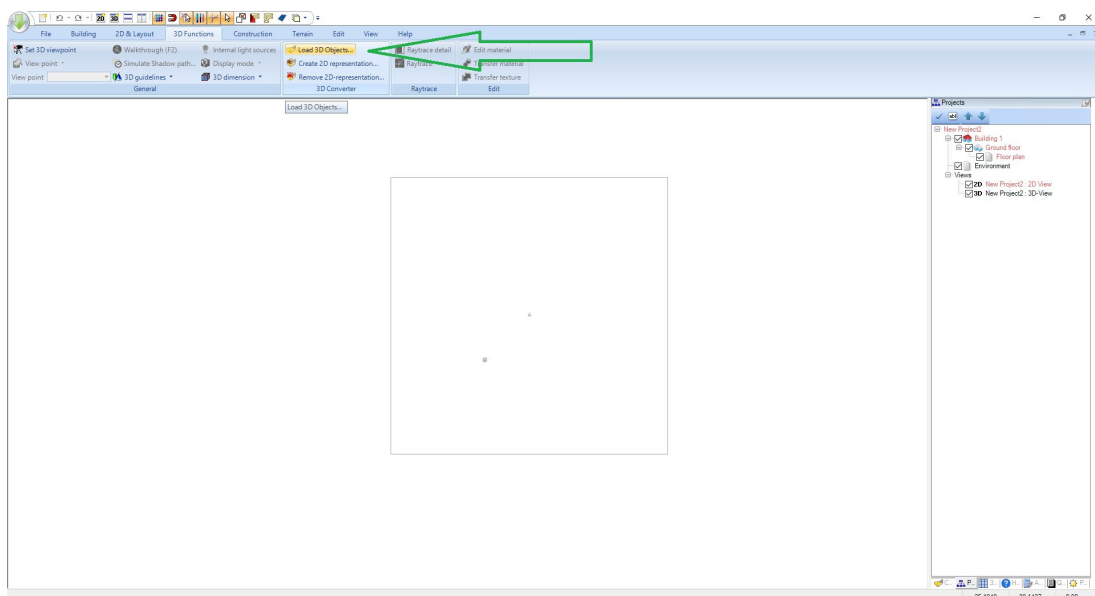
## 1.1 GENERAL


The 3D converter basically provides functions to facilitate the use of 3D models from other software products.. Further, existing models can be loaded, edited, and stored in other formats.

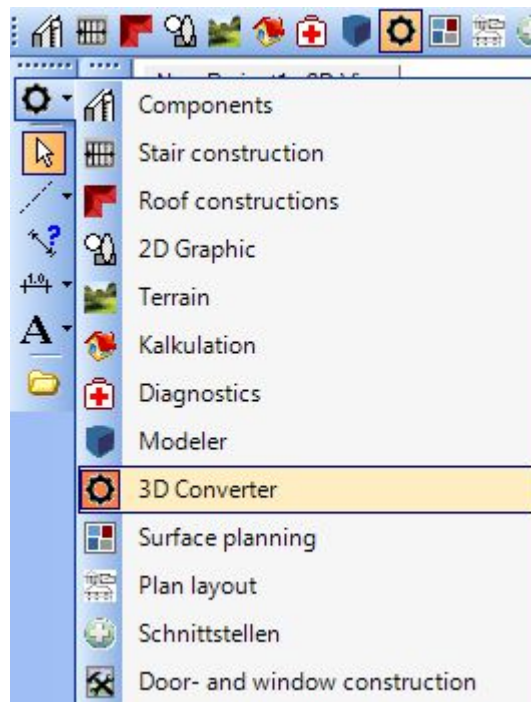
It is aimed therefore, at all users who possess models, are able to create or obtain them, and at those users who wish to use this software in addition to the other 3D visualisation applications they generally work with.

## 1.2 ACTIVATING THE 3D CONVERTER

In a ribbon version you start our 3D converter via the ribbon 3D Functions - Load 3D object.



Being a plug-in, the 3D converter is integrated in the plug-in toolbar in the software, from which it can be selected with the  button. Unlike most other plug-ins the converter does not require that a project is open.



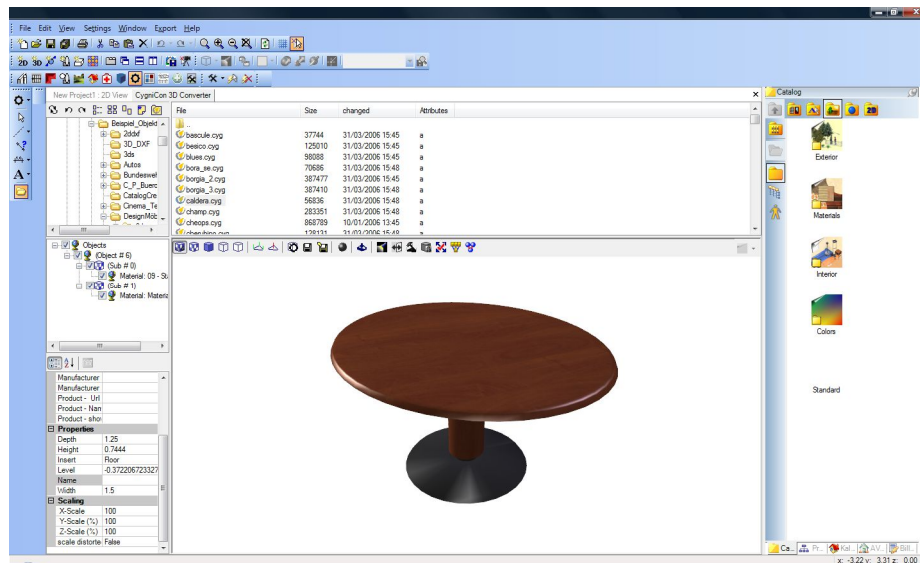
After the plug-in has been selected, a button with a folder icon appears in the vertical toolbar below the general functions. A click on the folder button activates the converter.



## 2 THE USER INTERFACE

The work area of the 3D converter is divided into four basic areas.

- An area to select a file
- A tree view of sub-objects, materials and light sources
- An area for properties
- A 3D preview with buttons for editing functions



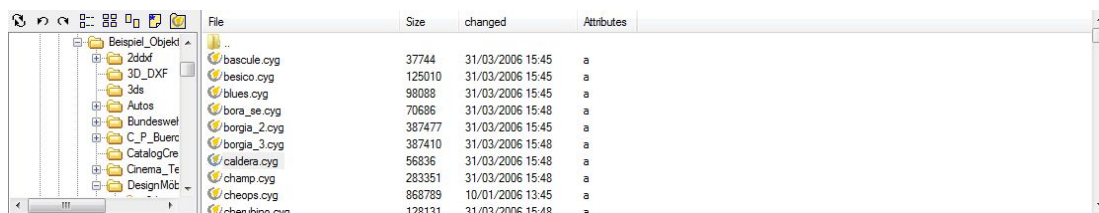
The standard catalog remains visible in the right-hand margin, since textures and materials from the catalog can be added using drag and drop to sub-objects in the 3D preview of the converter.

It is not possible to select 3D objects from the catalog.

All areas are separated by so-called splitters, and can be individually made larger or smaller by positioning the cursor on a border and then adjusting the size of the area when the cursor function changes.

## 2.1 THE FILE SELECTION AREA

This area allows you to navigate through the directory structure of the supported 3D files in order to select a file. The buttons in the top margin provide the usual functions for displaying directories and for switching between previously used directories. The button with the logo can be used to switch directly to the default directory for objects in the catalog.



## 2.2 THE TREE VIEW OF SUB-OBJECTS, MATERIALS AND LIGHT SOURCES

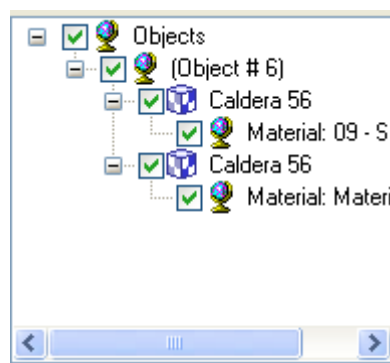
3D objects can be made up of several sub-objects, each of which forms an separate entity. For example a table can be created from a table-top and a base. The number of sub-objects and their arrangement is defined when the 3D object is created and cannot be changed in the 3D converter.

However, it is possible to set sub-objects as invisible using the check boxes in the view. When the object is saved, invisible sub-objects are automatically removed. It is therefore possible to create different versions of objects which consist of sub-objects, by removing individual sub-objects.

Sub-objects can have their own names, under which they are listed in the tree view. If sub-objects do not have their own names they are allocated the name of the object and numbered sequentially. If you click on a sub-object in the tree view it is highlighted not only in the tree view but also in the 3D preview.

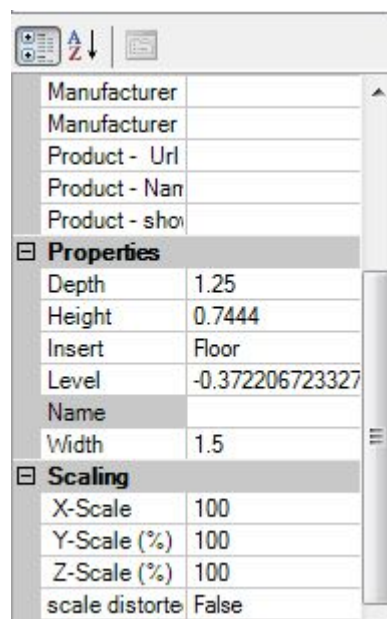
Each sub-object is automatically allocated a material, which is also shown in the tree view. A double-click on the entry for the material opens the materials dialog.

Light sources are shown in the tree view in exactly the same way as sub-objects, irrespective of whether they were already a part of the object or were created using the 3D converter.



## 2.3 THE PROPERTIES AREA

The properties area provides numerous settings for the complete object and is divided into sections for specifying documents, properties, information and scaling.



### ***2.3.1 The Document Section***

In this section PDF files, which are stored as part of the \*.cyg file, can be assigned to an 3D object and thus remain a part of the object should it be passed on to customers or other users. The PDF files can be used, for example, to incorporate pictures, catalog pages, technical data or installation or assembly instructions for the object. The PDF files can be displayed in various places in the CAD software. This provides the user or recipient of the file with additional information concerning the object

To add a document simply click on the field next to 'Document' and load the PDF file using the 'Open File' dialog.

If a document is already contained in the object the 'Available' property changes to 'True'.

### ***2.3.2 The Properties and Scaling Sections***

In the properties section the current dimensions of the object are shown and can be changed here. The settings in the 'Scaling' section also apply here. If 'Distorted Scaling' is set to 'False', then all dimensions of the object are altered proportionally.

For example: You load an object with the dimensions 100x100x100 (height, width, depth). The 'Distorted Scaling' property is set to 'False' i.e. is not allowed. You change the height from 100 to 1 meter. All other values are also changed automatically to 1 meter. If The 'Distorted Scaling' property were set to 'True', then the object would be 1 meter high and 100 meters wide and deep. Scaling functions in the same way in the associated section, except that here scaling is specified as a percentage and not in absolute values.

Objects need to be scaled relatively often. Frequently data is received from systems which export 3D objects with different scaling factors. It is not uncommon for 3D objects to be several 100 meters in size when loaded from the original data. You should always pay attention to scaling and adjust it accordingly.

The other properties are:

- Name: Specifies the logical name which, if present, is displayed in the CAD Software instead of the file name.
- Position: Defaults, which are used when positioning objects in the CAD Software. 'None' specifies at any height, 'Floor' on the floor, 'Ceiling' on the ceiling' and 'Fixed' at a fixed height.
- Level: A predefined height for the object when it is positioned in the CAD software.

### ***2.3.3 The Information Section***

In this section article and manufacturer's data can be allocated to the object, and can be shown in the CAD Software in the properties dialog for the object.

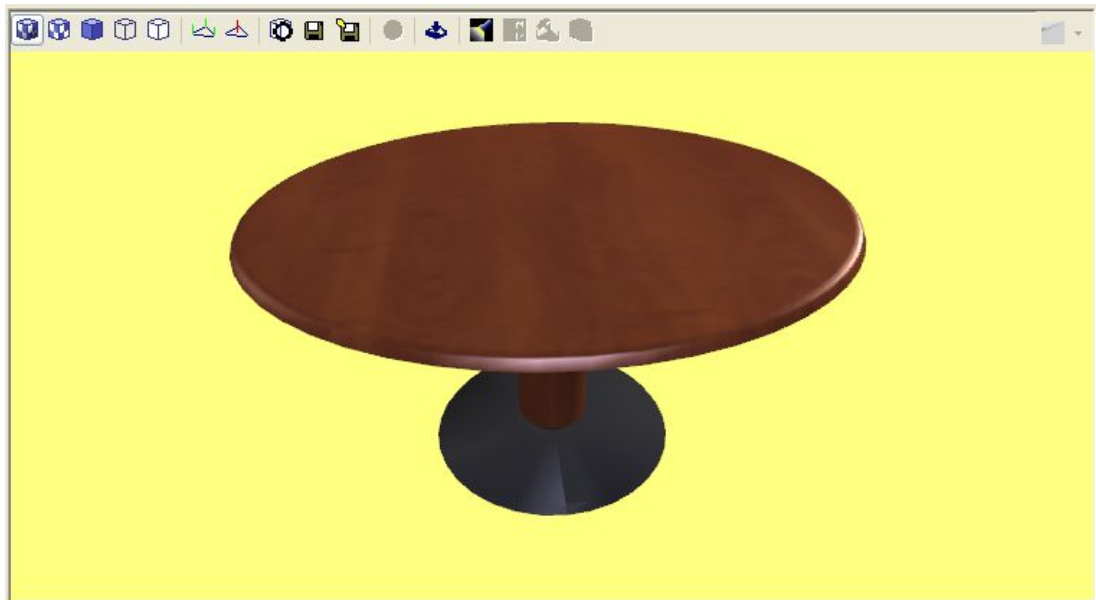
This data corresponds to that of the 'Chunk' editor in the CAD Software and is described in the documentation for the basic software.

## **2.4 THE 3D PREVIEW WITH EDITING FUNCTIONS.**

Various buttons are located in the top margin of the 3D preview The buttons are grouped together for:

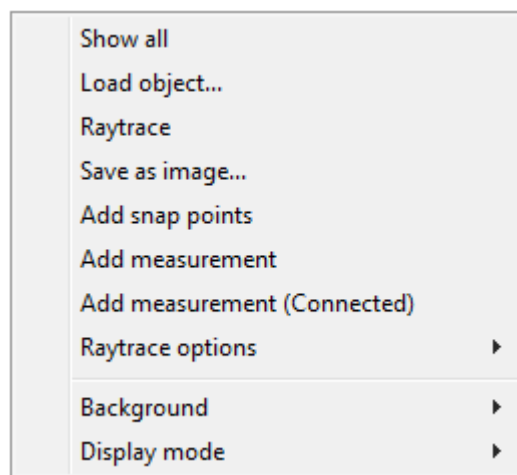
- Display mode

- Displaying perpendiculars from points and surfaces.
- Saving an object
- Editing functions



## 2.5 THE 3D PREVIEW CONTEXT MENU


A right mouse click in the 3D preview activates the standard context menu of the CAD Software.




## 3 EDITING AND CONVERTING OBJECTS

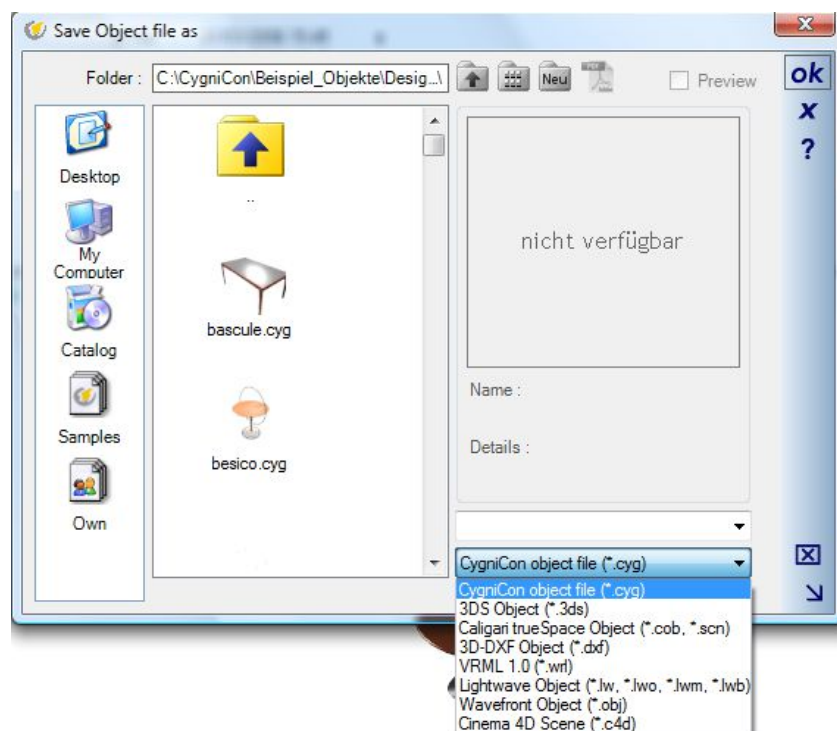
### 3.1 SAVING OBJECTS

#### 3.1.1 Saving as an CAD Software Object (\*.cyg)

With the  button the object is stored as an CAD Software object without any further processing. The file for the CAD Software object is created in the same directory from which the original file was loaded. The filename also remains unchanged, simply the filename extension is changed to '.cyg'.


#### 3.1.2 Saving in other Formats

The  button activates the dialog for 'Save object file as', which allows the choice of a target directory, the specification of a filename, and the selection of a target format from a list in the bottom right margin. The appropriate extension is automatically appended to the filename according to the file format selected.

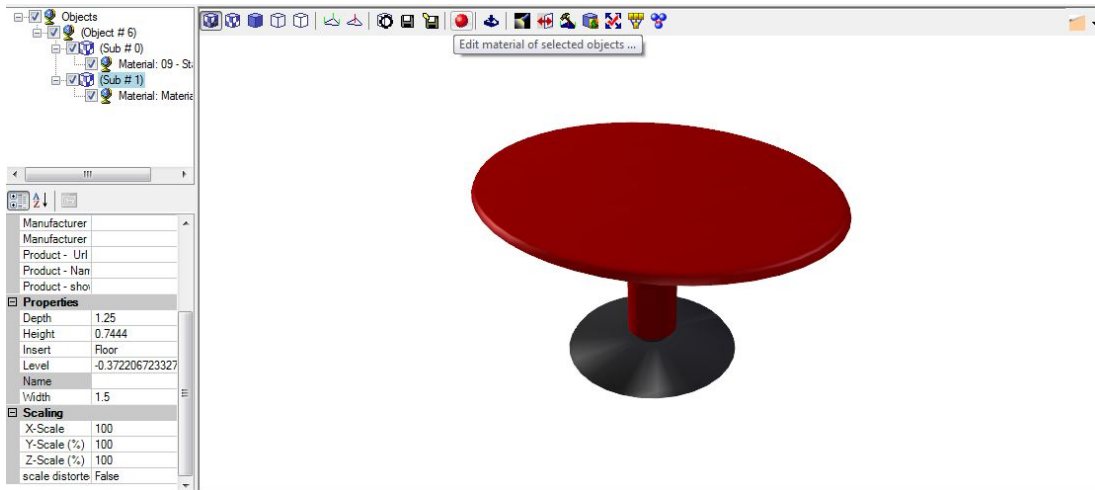




### 3.2 CHANGING THE MATERIAL OF SUB-OBJECTS

The  button is only active when an object or a sub-object has been selected in the 3D preview. An object is selected with a left mouse-click in the preview. Selected objects are shown in red.


Alternatively, the material editor can be activated with a double-click on the material entry for the sub-object in the tree view on the left of the preview.

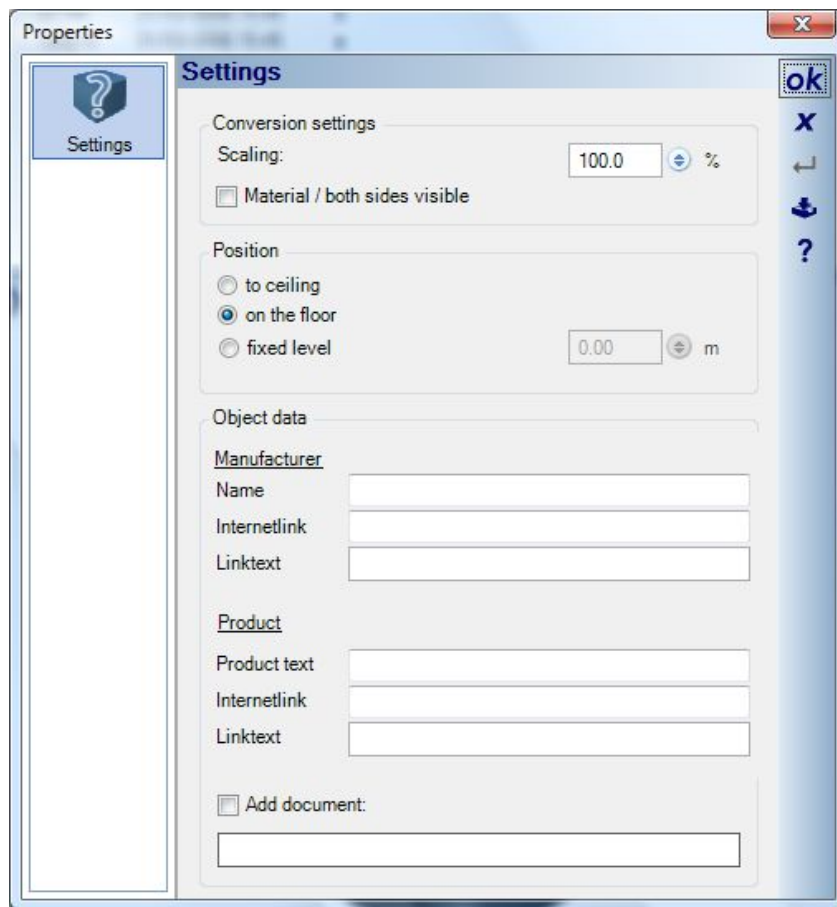


Materials and textures provided in the CAD Software catalog can be moved to the selected sub-object using drag and drop.

### 3.3 DEFAULT SETTINGS

To avoid having to re-enter the same settings for each object which is to be converted, certain default values can be specified in the 'Settings' dialog. The default values defined here also apply in the case of batch conversion.

The  button activates the dialog for 'Settings'.




If you generally receive or use objects which need to have their scale adjusted by a certain factor for use in the CAD Software, then this value can be specified here under 'Scaling'. The same applies for the option for the placement of the object when it is used in the CAD Software.

'Object Data' provides details of the manufacturer of the product, and of the article itself.

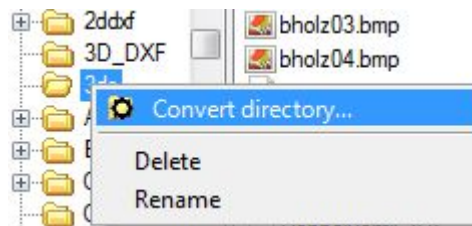
All values specified here can also be entered individually in the properties area of the converter. The default values basically help to simplify use of the converter.

**Note:** In order to save these values permanently, i.e they are still available after a restart of the Software, you

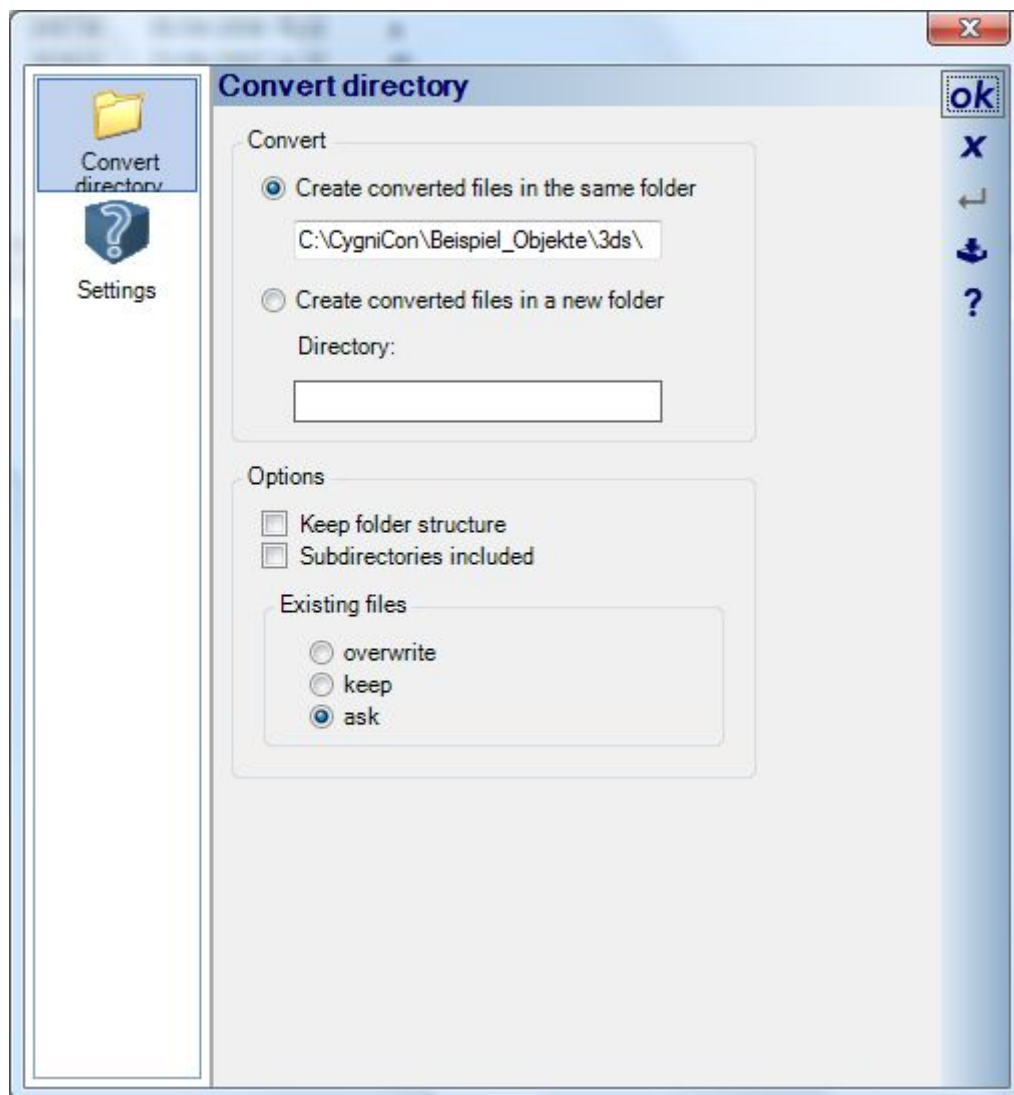
must click on the  button for 'Save as default' before exiting the dialog.

### 3.4 CONVERTING COMPLETE DIRECTORIES

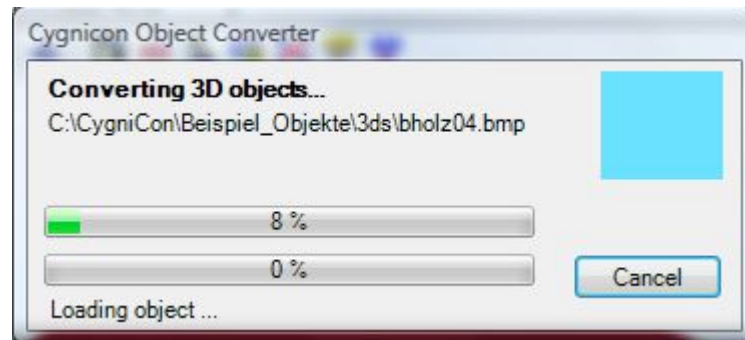
If you have a large number of objects in one format, which generally can be converted with the 3D converter into the CAD Software format without any further editing (e.g. \*.3DS), it is possible to convert automatically the entire contents of the directory. Select the directory entry in the explorer area of the converter and click on the right mouse button.



A click on the context menu entry for 'Convert Directory...' activates the following dialog.



You can specify here whether the results of the conversion, the new CAD Software objects, should be saved in the same directory or in a new directory, and whether sub-directories should also be included in the conversion. Default settings, which are allocated to each new object, can be defined under 'Settings'. A click on 'OK' starts the conversion. During the conversion a progress bar indicates the status of the operation.

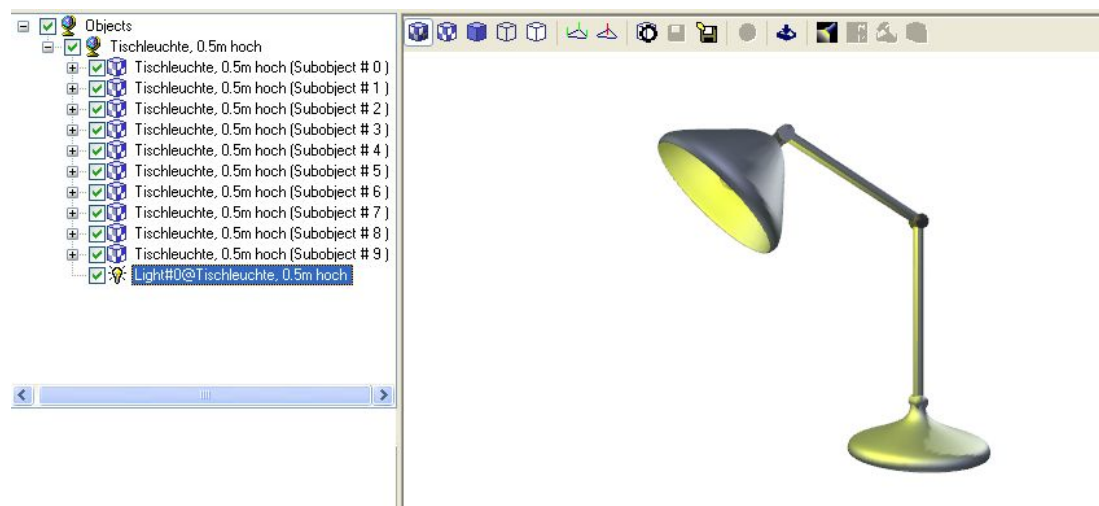


## 3.5 LIGHT SOURCES

The objects to be converted may contain light sources, which can be processed and have their properties changed in the 3D converter. Additionally, new light sources of one of the four supported types can be added to any object.

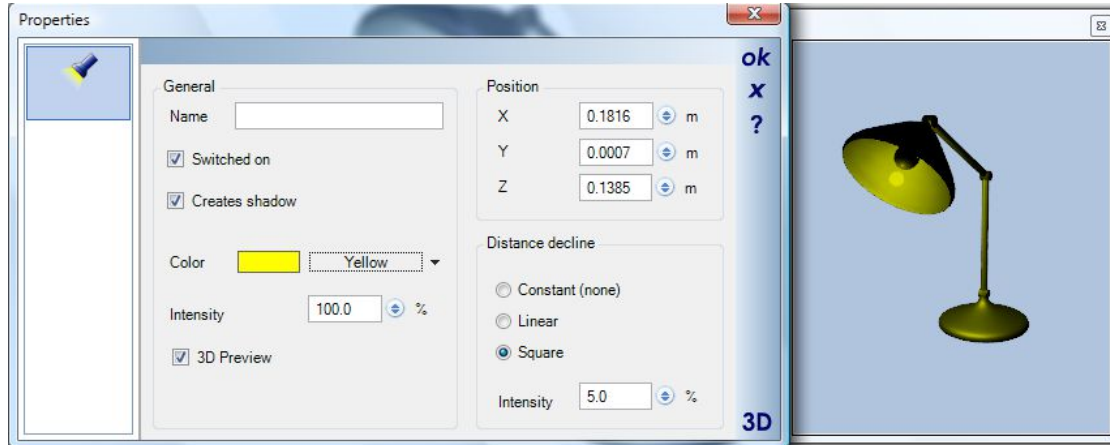
### 3.5.1 *Editing Existing Light Sources*

If an object contains one or more light sources, their presence is shown in tree view of the object hierarchy, to the left of the preview.



A double-click on the entry for the light source activates the properties dialog for light sources. The dialog varies in some respects depending on the type of light source. However, the basic procedure is the same for all light sources. If you double-click on an object with a light source in the CAD Software, a properties section for the light source is shown in addition to the normal properties of the object. Hence such properties as 'Switched on' and 'Create shadows' can be specified. Generally, these properties are activated by default in the converter. When planning it may be necessary to switch off light sources, or prevent them casting shadows if the light source only serves to increase overall brightness.

The light source itself is not shown in the CAD Software visualization. However, it is shown in the 3D preview, since in this case its position and, depending on the type of light source, its direction and angle can be adjusted.




Apart from positioning the light source numerically using coordinates, you can also position it directly in the 3D preview using the mouse by placing the cursor on the 'light source object' and dragging it, keeping the left mouse button pressed. The numerical coordinates for the position of the light source are automatically updated to follow its movement.

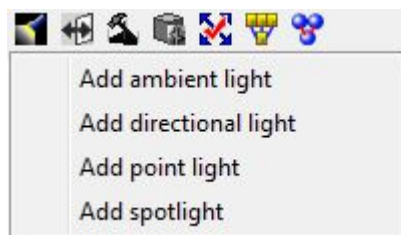
Depending on the origin of an object with a light source, it can occur that it is not visible in the 3D preview, although the visibility option has been activated. The reason for this might be that the light source is too far away from the object, in this case check the coordinates, or that the light source is located within the object itself. This is allowed in some applications.

This is exactly the case in the example shown from the CAD Software catalog. The light source is located within the sub-object for 'light bulb'. This means that in the 3D visualisation you see no effects whatsoever resulting from the light source. The light is reflected within the sub-object and does not shine out. Therefore light sources must be located outside an object, or the material of the object which surrounds the light source must be transparent. As non-visible light sources in the 3D preview can not be moved initially using the mouse, they must first be positioned outside the object by means of the numerical coordinates.

The properties for 'Distance decline' define to what extent the light becomes weaker, dependant on the method, the distance and the amount of dimming specified.

### 3.5.2 Adding New Light Sources

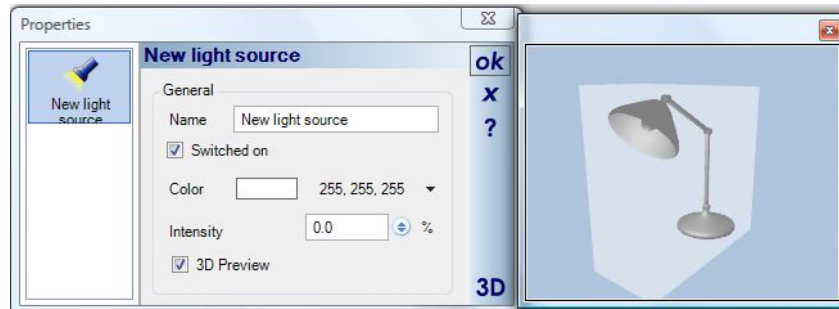
A left mouse click on the  button opens a context menu to select the type of light source.



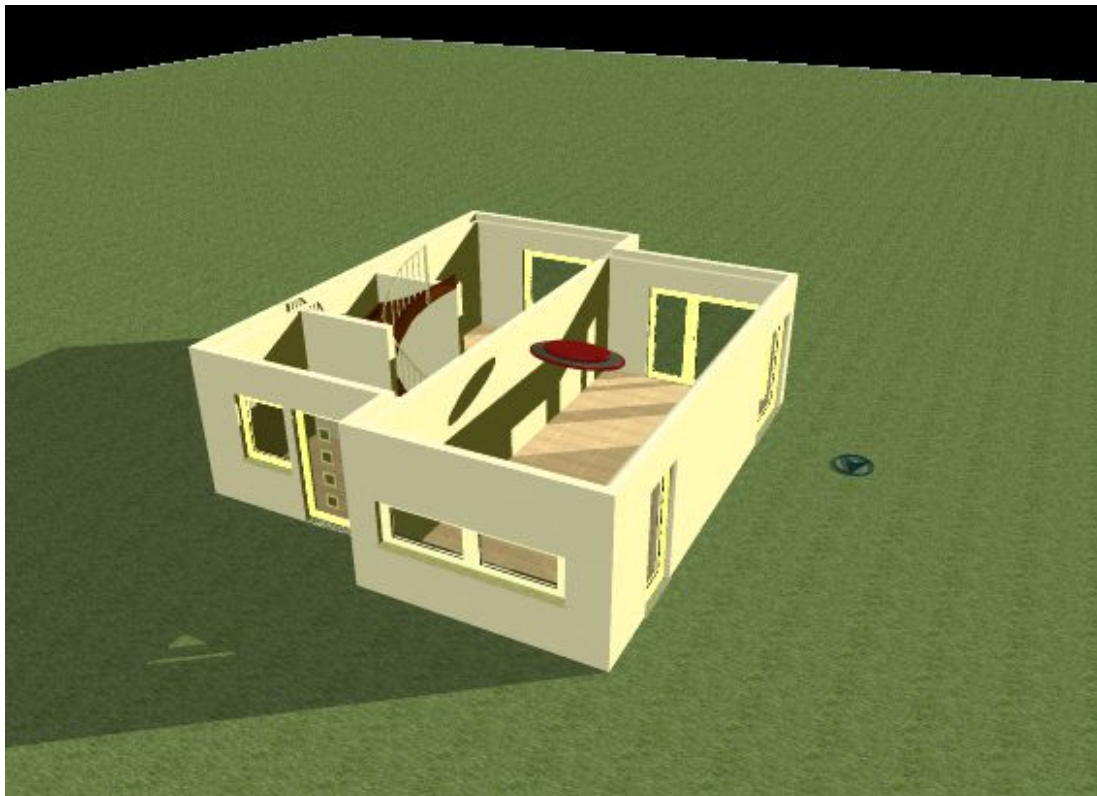
After an entry has been selected, the dialog associated with that particular type of light source is activated.

### 3.5.2.1 Ambient Light Sources

Ambient light sources illuminate all areas of a scene uniformly, and thus increase the overall brightness. They do not cast shadows, therefore this option is not available. The effects of an ambient light source are independent of the position of the 3D object to which it belongs. The only purpose of the 3D object is to enable the properties dialog for light sources to be opened and for the object (the light source) to be positioned from the catalog using drag and drop. The preview in the properties dialog also has no relevance for the object.



The effects of an ambient light source are shown in the following two illustrations, the first with and the second without an ambient light source.

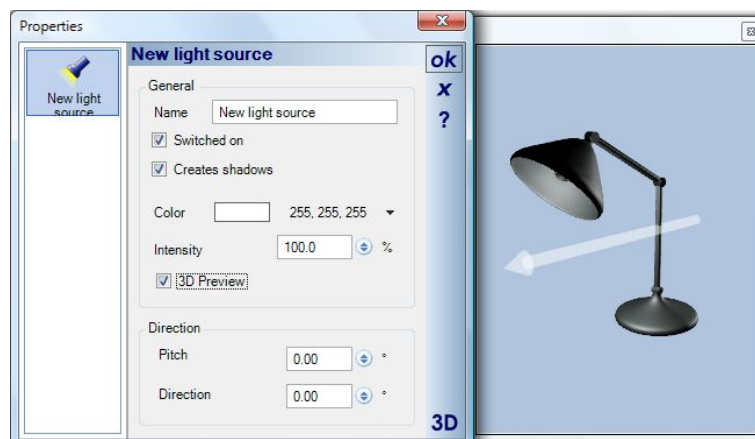






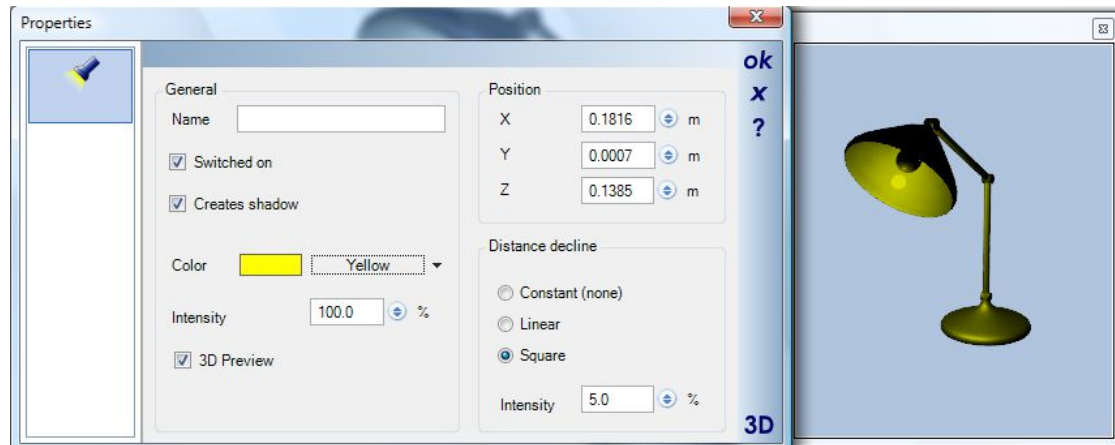
### 3.5.2.2 Directional Light Sources

Directional light sources illuminate the scene from only one direction, and are 'internally' infinitely distant from the location of the observer or the building. The sun is an example of a directional light source.



### 3.5.2.3 Point Light

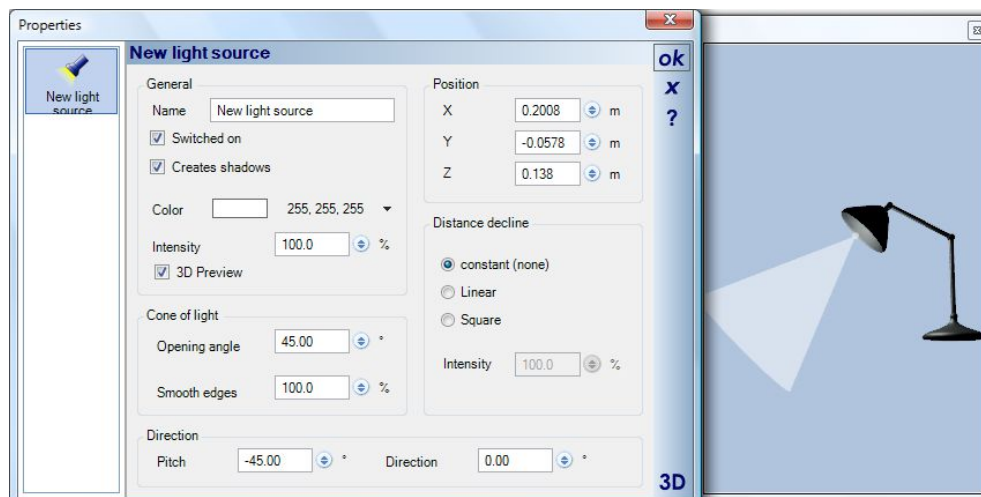
Point light sources have a predefined position in the object and are the closest representation of real lamps which form a part of furnishings. The light shines in all directions around the light source.



Further information about positioning the light source can be found in the section entitled 'Editing Existing Light Sources'

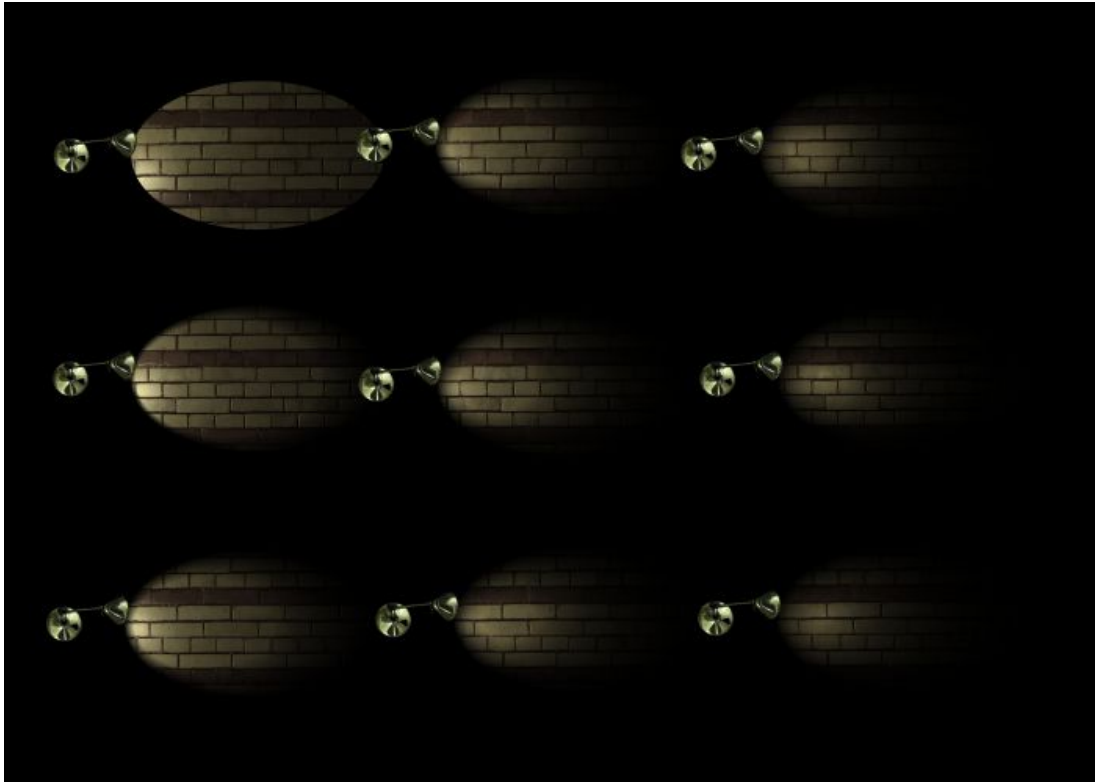
### 3.5.2.4 Spot Light

As with punctual light sources, spot lighting also has a predefined position in the object and therefore also represents a real lamp. However the light does not shine in all directions as for a punctual light source but is cone-shaped with a defined direction, angle and beam width.



The properties for 'smooth edges' and 'Distance decline' can be used to create specific effects, as shown in the following example.

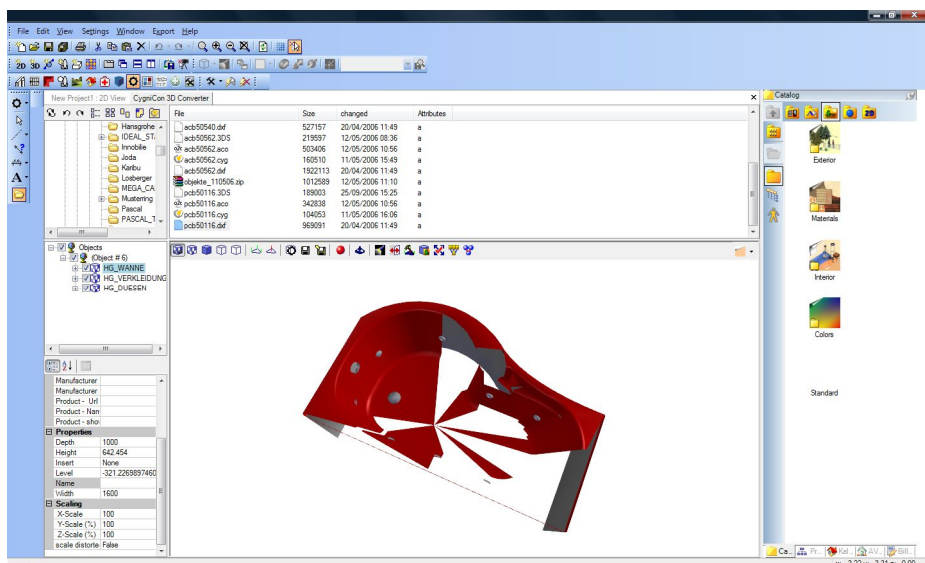





Further information about positioning the light source can be found in the section entitled ‘Editing Existing Light Sources’.

### 3.6 VISIBILITY OF SURFACES


Occasionally, 3D objects are to be converted in which certain surfaces, or the surfaces of certain sub-objects, are not visible.

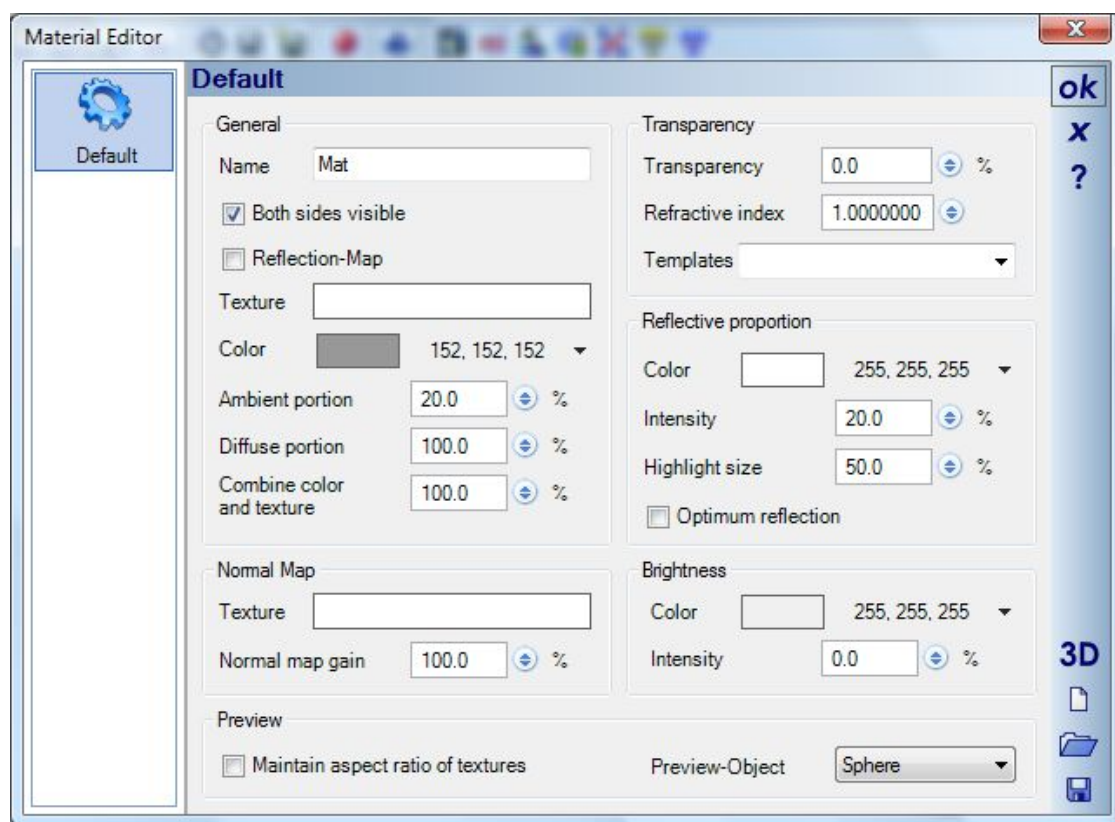


The 3D converter provides two functions which nevertheless enable the use of such objects.

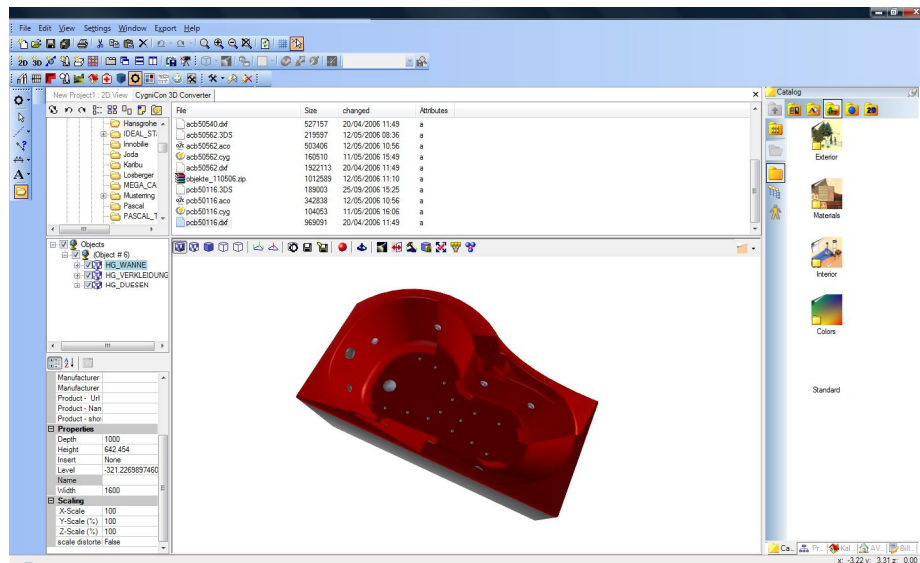
If the object consists of several sub-objects and all surfaces of a sub-object are incorrectly orientated, the visibility of all surfaces can be reversed using the  button. In this case the object or sub-object must first be selected.

This, however, would have no success for the example shown, since only one sub-object is present and within this object only some surfaces are invisible. It is not possible to edit individual surfaces in the converter. Reversing the visibility of the surfaces in the example, would only make the currently invisible surfaces visible, and vice versa.

In the properties dialog for materials  we see that it is possible to specify for a material that both sides are visible.

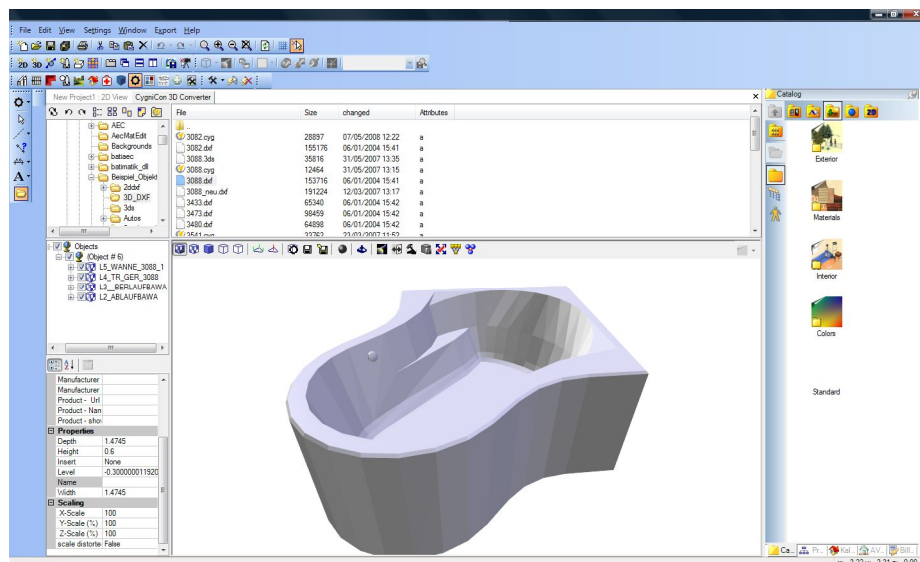



Activating this property for the material results in all surfaces being shown, independent of their orientation.

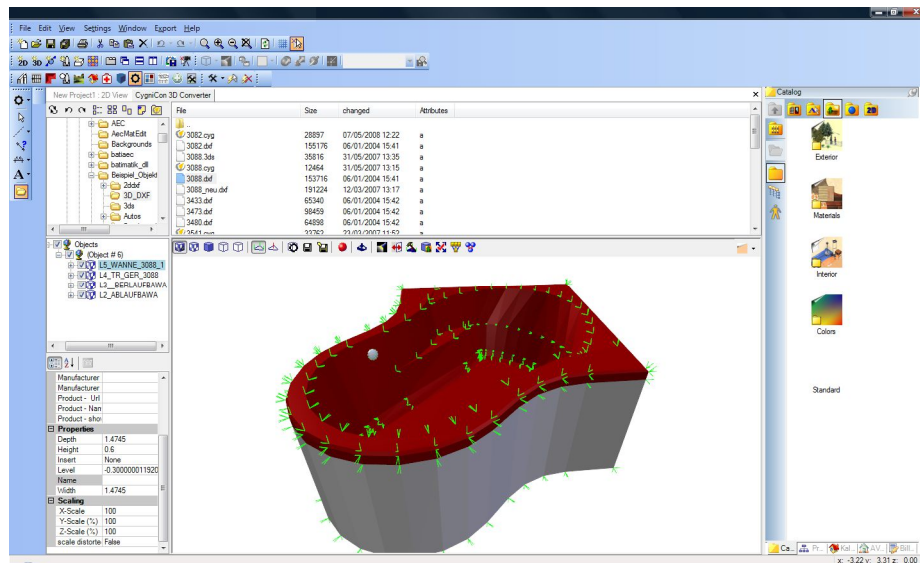



### 3.7 RECALCULATING NORMALS

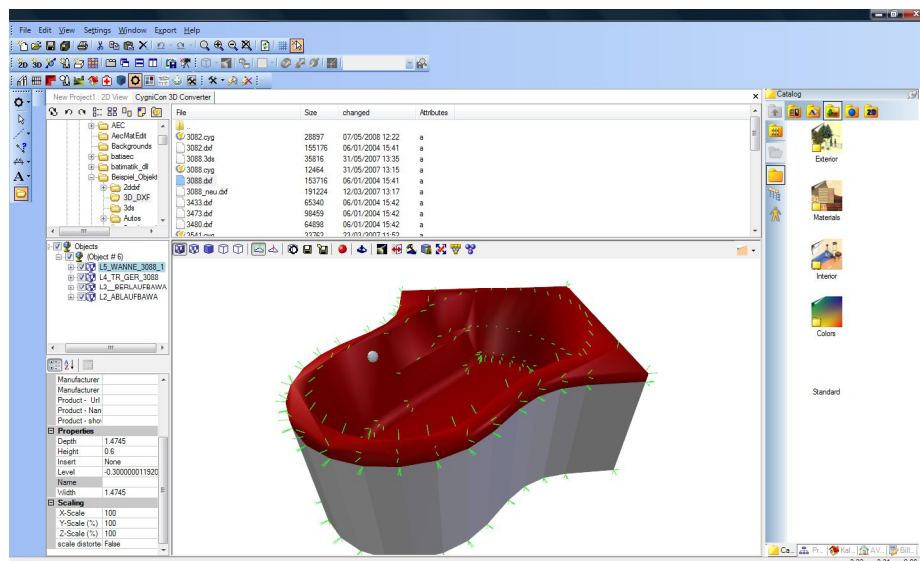
Just as frequent as objects with non-visible surfaces are objects which appear ‘angular’ in the CAD Software visualization. This is often the case for sanitary objects which are in fact ‘rounded’.



The determining factor for this representation of the object are the point normals, which can be displayed for checking by clicking on the  button.



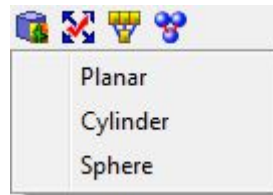
As can be seen in the illustration, at each point where surfaces meet several points normals are displayed, which cause the 'angular' effect in the visualization in the CAD Software. For a selected sub-object the normals can be recalculated by clicking on the  button. Instead of several normals a subsequent check shows only one.



After a recalculation, the transitions between surfaces now appear rounded in the visualization, which is also now the case for the edges of the object.

### 3.8 RECALCULATING TEXTURE COORDINATES

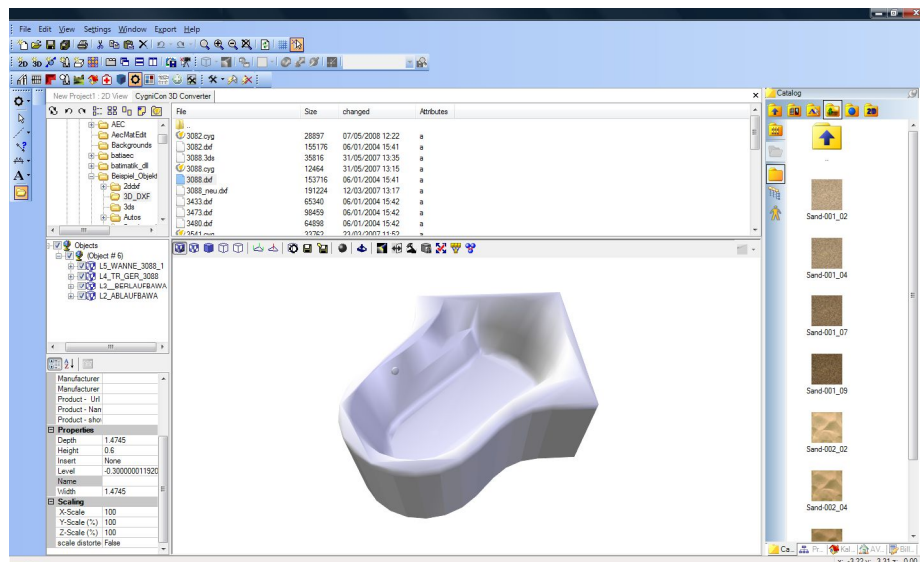
Certain 3D formats such as 3D-DXF do not support material properties or texture coordinates. In order to be able to later allocate materials or textures to these objects in the software, the required texture coordinates must first be calculated. There are three options available to do this.



The option to use depends on the shape of the object or sub-object for which the coordinates are to be calculated. The result is always only an approximation. A 3D modelling program would be required to achieve an exact and more detailed result. Nevertheless, many objects can be formatted in this way for visualization and use in the CAD Software.

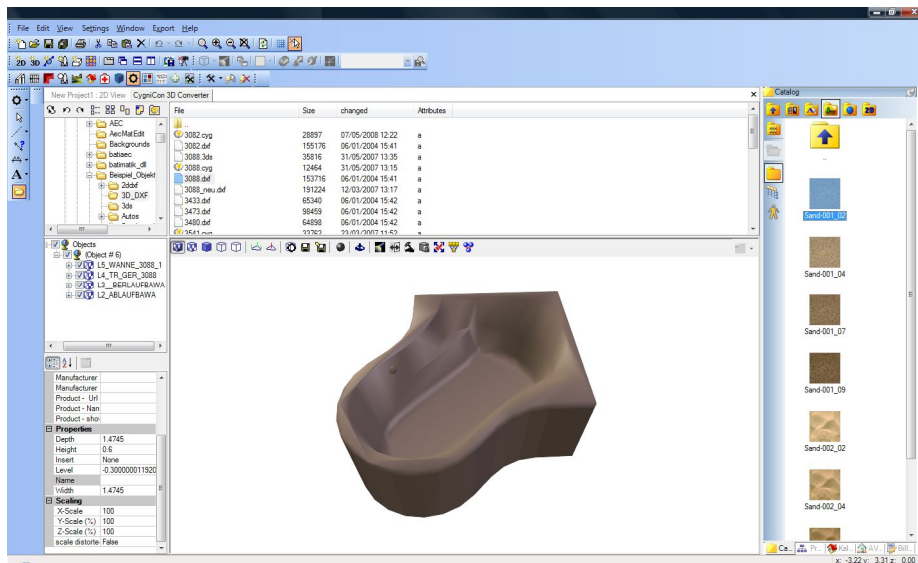
The results can be best shown in an example:

First of all a file without textures is opened, in the example a 3D DXF file.

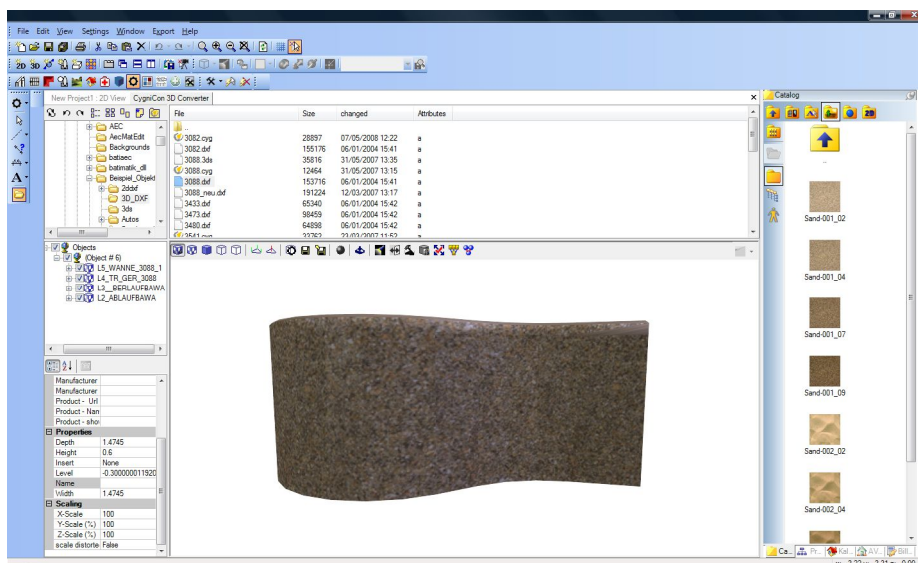



Next we allocate a texture from the CAD Software catalog to the object with drag and drop, in the example a 'sand' texture.

## Editing and Converting Objects Recalculating Texture Coordinates



The appearance of the object has in fact changed, but not as we would normally expect in the CAD Software. The structure of the 'sand' is not visible because the texture coordinates are incorrect. If we recalculate the coordinates with the 'Planar' option, we see the following result.



After the coordinates have been calculated they can be modified, as in the CAD Software, with the dialog for texture coordinates . Further information about this can be found in the documentation for the standard software.



## 4 DOWNLOADING 3D-OBJECTS DIRECTLY FROM WEBSITES INTO YOUR PLANNING

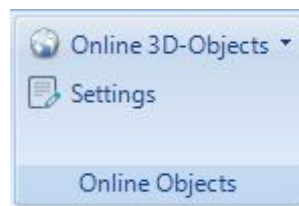
This function is part of the 3D converter plug-in and is not included in all versions, but is reserved for the Professional or Premium versions.

Until now it was already possible to use the 3D converter itself to convert 3D objects from other file formats into our own 3D format (\*.cyg), save them in to your catalogue for further usage in a planning process.

The new functionality is designed to simplify that and thus to work faster, because the selection of a 3D object, download, conversion and planning happens in one step.

### 4.1 ONLINE OBJECTS GROUP ON OUR 3D FUNCTIONS RIBBON

The function itself and the settings dialog can be found on our 3D Functions ribbon.



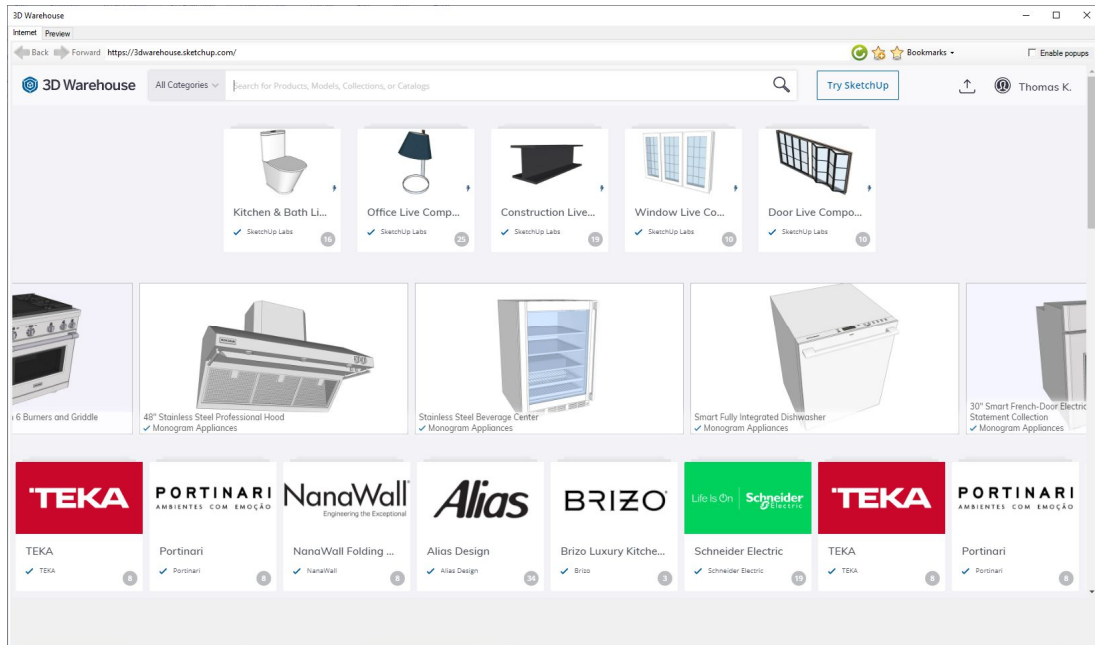
### 4.2 DIRECTLY ACCESSING INTERNET PAGES WITH 3D OBJECTS

The Online 3D Objects button gives you menu entries that refer directly to a website or search engine. By default, two entries are predefined, Google and 3D Warehouse. You can create additional entries using the Settings dialog or the browser window.



## 4.3 BROWSER AND PREVIEW DIALOG

We have integrated a separate, small Internet browser into the dialog. So if you call a website via the menu, you will see the following window for example. Depending on which page you link to



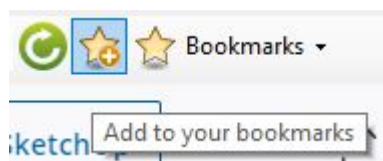
At the top of the dialog there are a few buttons and an option "Enable Popups". Pop-ups are suppressed by default, but there are websites with 3D objects that only allow files to be downloaded from a pop-up window. So if you come across a page like this and nothing happens while you try downloading, allowing popups would be an option to try.

The other buttons are for loading or updating websites and for selecting predefined links from our settings dialog.



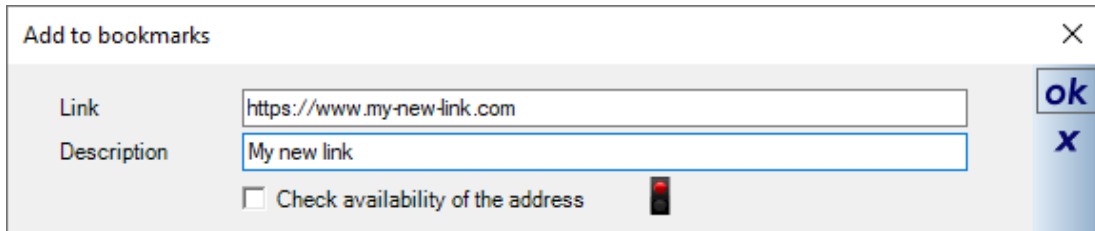
## 4.4 ADDING YOUR OWN BOOKMARKS

The easiest way to add menu entries yourself is to navigate to a website and then press the "Add to your bookmarks" button in your browser window.



You will then receive the following dialog in which you can assign the link a suitable name for your menu.



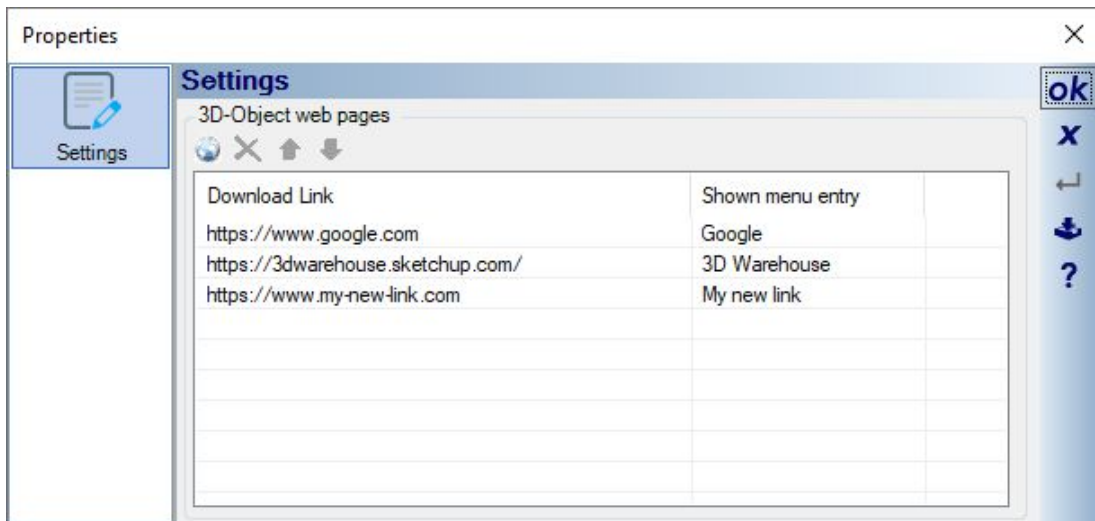


The 'Add to bookmarks' dialog box contains two input fields: 'Link' with the value 'https://www.my-new-link.com' and 'Description' with the value 'My new link'. Below these fields is a checkbox labeled 'Check availability of the address' which is currently unchecked. To the right of the fields are 'ok' and 'x' buttons. A small red traffic light icon is positioned below the checkbox.

The new link only appears on the menu after the software has been restarted and looks like this.



You can manage, rename, delete or sort the menu entries in our Properties dialog.



The 'Properties' dialog box is shown with the 'Settings' tab selected. It features a '3D-Object web pages' section with a table listing saved links. The table has two columns: 'Download Link' and 'Shown menu entry'. The entries are: 'https://www.google.com' (Google), 'https://3dwarehouse.sketchup.com/' (3D Warehouse), and 'https://www.my-new-link.com' (My new link). There are also icons for adding, deleting, and sorting entries. A 'Settings' icon is on the left, and 'ok', 'x', and a help icon are on the right.

Download Link	Shown menu entry
https://www.google.com	Google
https://3dwarehouse.sketchup.com/	3D Warehouse
https://www.my-new-link.com	My new link

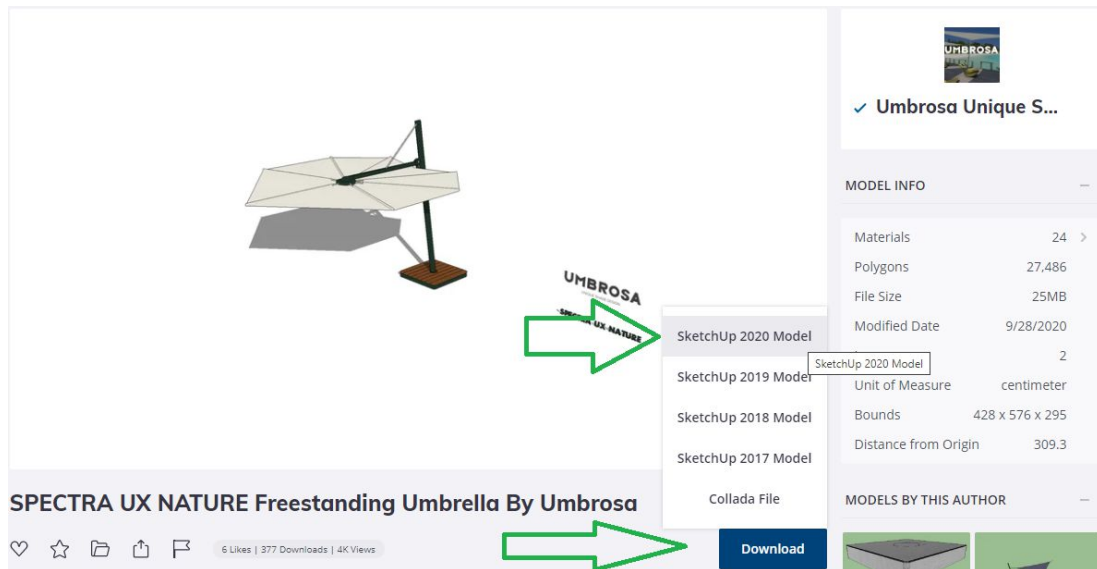
The settings are saved in an XML file called "Objects3DLinks.xml" in your user directory.

## 4.5 DOWNLOADING 3D-OBJECTS

How the download of a 3D object is started differs depending on the websites.

Here is an example from 3D Warehouse. If you have navigated to a 3D object on this page, you will see the DOWNLOAD button below.

The button opens a menu with a selection of available download formats. Usually multiple formats are offered here. The software currently supports Sketchup formats up to 2020 or Collada, to which you have to limit yourself when downloading.



When the download starts, you will see a progress bar at the bottom of the browser dialog for the download itself and the subsequent automatic conversion into our own 3D format.

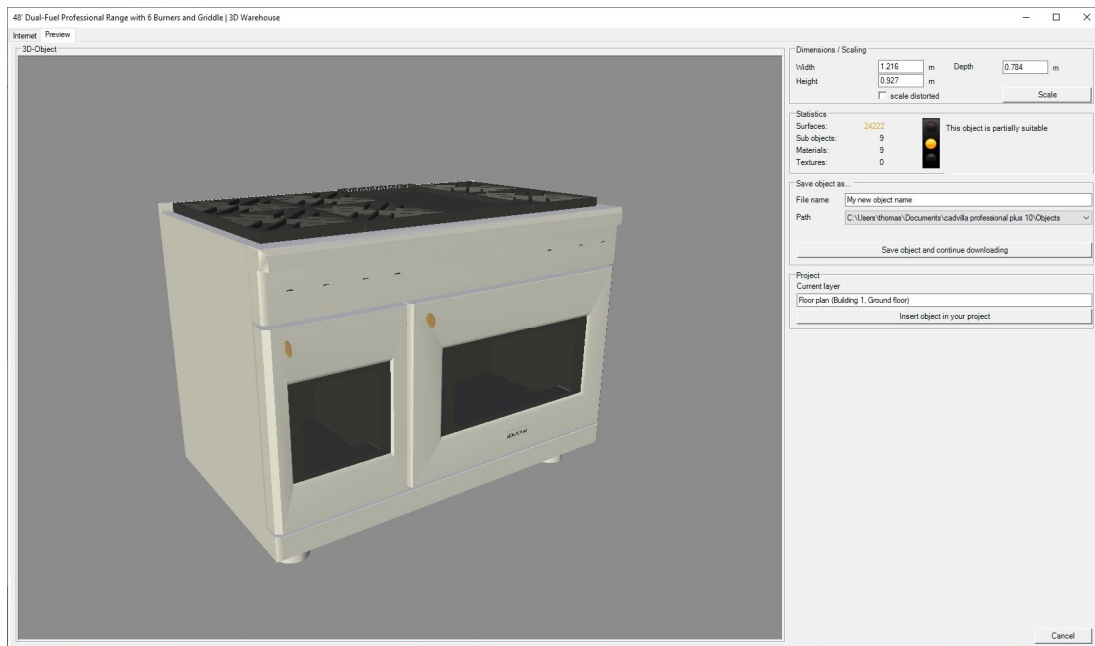
**Note:** On some websites you find information about the size of the object, the number of surfaces and materials before you start a download. This information can and should be taken into account before you decide to pick this object, because both the download and especially the conversion of the 3D model could take a long time. And 3D objects with a very large number of polygons or surfaces and materials are completely unsuitable for use in a building planning software and may cost a lot of memory and performance. It may well be that the modeler did not take this into account and that a single button on an object contains several million surfaces. It is better to refrain from 3D objects with a clearly 5-digit number of polygons or higher as well as objects with hundreds of materials. Or at least download them with caution, i.e. in a new, empty project and not in an ongoing planning process.

When the download process is complete, the preview dialog tab page opens automatically.

## 4.6 THE PREVIEW DIALOG

The preview dialog shows the 3D object after being converted, i.e. as it would look in our software. The quality and the representation depend on the original model or the modeler of the 3D object. So if it doesn't meet your expectations, stop here and choose another item. Some of the imperfections could be revised using the plug-in 3D converter, but there is a separate manual for this.

## Downloading 3D-objects directly from websites into your planning Settings and information in our preview dialog



### 4.7 SETTINGS AND INFORMATION IN OUR PREVIEW DIALOG

On the right of the 3D preview you find some information about the downloaded object. First of all, this includes size.

Depending on the output format, this can already be correct. However, some objects also show sizes of several hundred meters or just a few centimeters. If necessary, scale the 3D object appropriately before inserting it into the plan and saving it.

**Note:** if the size changes drastically, e.g. from a hundred meters to 1 meter, the object may apparently disappear from the 3D view. You may have to zoom the preview again by pressing the HOME key.

Dimensions / Scaling	
Width	1.216 m
Depth	0.784 m
Height	0.927 m
<input type="checkbox"/> scale distorted	
<button>Scale</button>	

Statistics	
Surfaces:	24222
Sub objects:	9
Materials:	9
Textures:	0

This object is partially suitable

Save object as...

File name: My new object name

Path: C:\Users\thomas\Documents\cadvilla professional plus 10\Objects

Save object and continue downloading

Project

Current layer: Floor plan (Building 1, Ground floor)

Insert object in your project

#### 4.7.1 Preview dialog statistics

The Statistics area gives you information as to whether this object should actually be used.

The surface property is an essential information. We use a traffic light with clearly defined threshold values as an indication. Objects with up to 10,000 surfaces are marked in green, between 10,000 and 100,000 in yellow and all above in red.

3D objects can easily contain several million triangles / surfaces and thus severely affect the software and memory consumption. It is best to avoid these objects. In our planning software, 2D representations for floor plans and sections are calculated from the 3D objects itself. The triangles alias surfaces become a multiple of 2D lines for this representation that costs a lot of performance.

The same applies to materials and the resulting memory consumption in 3D views, but depending on whether the materials also contain textures.

It cannot be precisely predicted because it depends on the planning itself, e.g. the number of views, the hardware used and the size of the planning project.

You can also insert larger objects, but you should be aware of the possible effects.

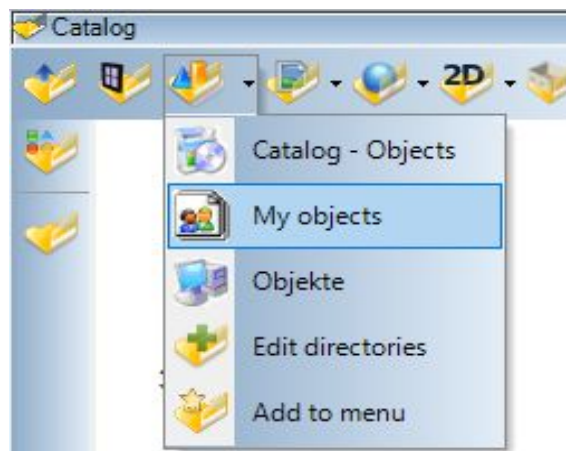
Statistics			
Surfaces:	24222		This object is partially suitable
Sub objects:	9		
Materials:	9		
Textures:	0		

## 4.8 SAVING OBJECTS AND INSERTING THEM INTO YOUR PLANNING

The 3D objects are saved in our own format and thus also preserved for further use in the catalogs. So if you want to plan several objects of the same type, you do not have to perform the download several times, but you can drag and drop the following objects from the catalog into your views as usual.

Define the file name in the “Save object as” area. The default name of the downloaded object is often a bit cryptic.

Below you find the default saving path. All paths predefined in your 3D objects catalog are listed here. Additional path entries must be created there. Please note that the path to the default installation directory \ OBJECTS is often write-protected by your Windows system. As a rule, you should use the path to your user directory, listed in the catalog under "My objects".



This path refers internally to your user directory and is shown in the path selection e.g. as follows: c:\USERS\your\_username\documents\your\_CAD\_version\Objects \

Downloading 3D-objects directly from websites into your planning  
Saving objects and inserting them into your planning

Save object as...

File name

Path  \Objects ▾

Project

Current layer

The objects are always inserted into the current layer of the active view. You can see which this is in the "Project" area. This cannot be changed at this point. If necessary, you would have to activate the correct layer in your project viewer before starting the download process.

The dialog ends with the button "Insert object in your project" and the object is added to your mouse cursor, exactly as if you had just dragged it from the catalog into your view.