Allplan 2005 Architecture Manual

Getting Started

2nd edition, February 2005

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Contents

Welcome

Welcome to Allplan 2005, the high-performance CAD program for architects.

With this manual you will learn about all the basic functions for the main modules in Allplan 2005.

You will find that within a short time, you will be in a position to use Allplan 2005 effectively in your daily work.

This chapter covers the following:

- An overview of the contents of this manual
- Documentation for Allplan 2005
- Additional help on Allplan 2005
- Where to turn for training, coaching and project support

Introduction

This manual consists of three sections:

- Documentation on installing Allplan 2005
- An introduction to basic concepts of and navigation in the program
- A tutorial which guides you from initial 2D drafting to the design of a house in 3D. This tutorial contains 18 exercises, which are combined into 11 units.
  The tutorial will provide you with a sound introduction to Allplan 2005. As the tutorial only touches on the possibilities of some of the tools, please consult – especially later when you work with Allplan 2005 – the **F1** online Help as an important source of information.
- The data used in this tutorial can be downloaded from the Internet. More information is provided at the end of Unit 3, “Project Organization”.

This manual also assumes that you have a working knowledge of Microsoft® Windows® programs. Following this manual will provide both the experienced CAD user as well as newcomers to CAD with a solid foundation in the methods and approach employed by Allplan 2005.

We would like to express our gratitude to the AIC architectural practice in Schöneich for providing us with one of their projects for the tutorial.

Sources of Information

Documentation for Allplan 2005

The Allplan 2005 documentation consists of the following:

- The **online Help** is the main source of information for learning about and working with Allplan 2005.
  While you work with Allplan 2005, you can get help on the current function by pressing the F1 key, or activate **What's This** on the **Standard** toolbar and point to the icon on which you require help.
- The manual consists of three sections. The first section shows you how to install Allplan 2005. The second section provides an overview of basic concepts and terms as well as methods for entering data in Allplan 2005. The third section contains a tutorial which guides you step by step through the process of designing a building - from the first line to walls, windows and roof, and finishing with quantity takeoff operations, photo-realistic images and animated sequences of the finished building.
- The brochure **New Features in Allplan 2005** provides information on what's new in the latest version.
- Each volume in the **Step-by-Step** series deals with a specific concept or series of tools/modules in Allplan 2005 in detail. The areas covered include data management, system administration, geodesy modules, presentation tools, 3D modeling etc. These guides can also be obtained from the Nemetschek training department:

  Nemetschek Deutschland GmbH
  Campus Center Munich
  Konrad-Zuse-Platz 1
  81829 Munich
  Germany

  Phone: (0 18 01) 75 00 00
  Fax: (0 18 01) 75 00 01

Additional help

Tips for efficient usage

The **Help** menu contains the **Tips for efficient usage** item. This topic provides an overview of important tips and tricks.

User board

User board provided in our ServicePlus Portal: thousands of users exchange their knowledge. To register, go to http://serviceplus.nemetschek.de.

LineLetter

The LineLetter is a publication that appears several times a year. It is sent in digital form free of charge to ServicePlus customers. The LineLetter includes practical tips and tricks on all program areas.

FAQs on the Internet

Up-to-date FAQ's are available on the Internet at the following address:

http://www.nemetschek.de/faq

Note: You can also get this address right from the program. On the **Help** menu, point to **Nemetschek in the Internet** and click **FAQs**.

Feedback on the Help

If you have suggestions or questions on the online Help, or if you come across an error, send an e-mail to:

Dokumentation@nemetschek.de

Note: You can also get this address right from the online Help. To do this, go to the **Allplan** menu and click **Help Feedback**.

Training, Coaching and Project Support

The type of training you are given is a decisive factor in the amount of time you actually spend working on your own projects: A professional introduction to the programs and advanced seminars for advanced users can save you up to 35% of your editing time!

A tailor-made training strategy is essential. Nemetschek's seminar centers offer an extensive range of programs and are happy to work out a custom solution with you that will address your own needs and requirements:

- Our **sophisticated, comprehensive seminar program** is the quickest way for professional users to learn how to use the new system.
- **Special seminars** are designed for users who wish to extend and optimize their knowledge.
- **One-on-one seminars** are best when it comes to addressing your own particular methods of working.
- One-day **crash courses**, designed for office heads, convey the essentials in a compact format.
- We are also happy to hold seminars on your premises: These encompass not only Allplan 2005 issues but include analysis and optimization of processes and project organization.

The up-to-date seminar guide is available on the Internet:

www.nemetschek.de/campus

For more detailed information on the current training program, please contact the Nemetschek Campus in Munich:

Phone: (0 18 01) 75 00 00
Fax: (0 18 01) 75 00 01

A request:

We are always trying to improve the overall quality of our program documentation. Your comments and suggestions are important to us and we welcome feedback on the manuals and on-line help.

Please do not hesitate to contact us to express criticism or praise concerning the documentation. Feel free to contact us as follows:

Documentation

Nemetschek Technology GmbH
Konrad-Zuse-Platz 1
81829 Munich
Germany

Phone: (0 18 01) 75 00 00
Fax: (0 18 01) 75 00 01
Email: Dokumentation@nemetschek.de

Installation

Installation Documentation

Documentation of installing Allplan 2005 can be found in a number of places:

- The manual describes the procedure for a first-time installation at a standalone workstation and covers the essentials for first-time installation in a network.
- The **Allplan 2005** CD contains an `install.hlp` file which provides more, up-to-date and detailed information on installing and upgrading (at a standalone workstation and in a network). We **strongly** recommend that you read this file before installing.

Requirements

Hardware requirements

The following table lists the minimum requirements for running Allplan 2005:

- INTEL Pentium III (at least 1 GHz) or compatible
- 256 MB RAM (without display list)
- 1 GB free hard disk space + 100 MB on the system drive
- CD-ROM drive (for the installation)
- 1 parallel or USB port for the hardlock
- Graphics board, resolution 1024 x 768
- 19-inch monitor 1024 x 768
- Network card (only for network operation)
- 3-button mouse
- Floppy disk drive, connection to network or email (for installing the license)

Software requirements

- Allplan 2005 runs on the following operating systems:
    - Windows XP Professional / Home, Service Pack 2
    - Windows 2000, Service Pack 4
    - Windows Server 2003
- In addition to the operating systems mentioned above, Allplan 2005 file servers run on the following operating systems:
    - Novell NetWare 6.5 with NetWare Services
    - Suse Linux 9.1 with Samba server 3.0 based on Reiser file system

    Important: Please check that **all** workstations are running one of these operating systems.

Notes:

- For professional performance, we recommend Windows XP Professional or Windows 2000. Other operating systems such as Linux, HP-UX or MacIntosh have not been tested by us. Please bear in mind that Allplan 2005 does not run on these operating systems (the same applies for file servers). We do not provide any support for these installations.

- Internet Explorer 4.01 or higher

Further requirements

Please note the following if you have installed a new operating system (e.g. Windows XP).

- The operating system must already be installed and running.
- The hardware and software requirements mentioned above also apply to computers which serve as data servers for an Allplan 2005 installation.
- All peripheral devices must be connected and correctly configured.
- When you install two or more Allplan 2005 workstations in a network, it is essential that these workstations are networked correctly.
- When you are working in a network, you need to install Allplan 2005 on all the networked workstations before you can resume your work.
  Please note the following:
    - You can only install Allplan 2005 when you have a valid ServicePlus contract - and thus a license file - for the workstation in question.
    - You cannot use a Allplan 2005 together with earlier Allplan versions or data thereof!

Preliminary Considerations Prior to Installing

Data structure

There are two types of Allplan 2005 data:

- **Program files**: these files are always installed locally on every workstation.
- **Central file storage**: projects and office standard, for example. This data can be installed locally or on a file server.

Prior to installing, decide on the folder in which you want the program to be installed as this can only be altered later by uninstalling and re-installing.

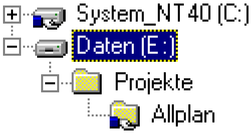
It is a good idea to keep the data files and program files in separate, central locations. This will facilitate backup operations later.

Central file storage when installing in a network

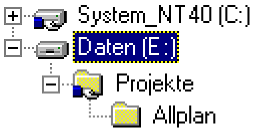
When installing in a network, the folder for the central file storage or the drive where this folder is located must be shared for all the workstations on which Allplan 2005 is to be installed.
This also applies when installing with Workgroup Manager when the central file storage is located on the workstation to be installed. In this case, too, the central file storage must be in a folder under a share.

Example:

You want to use the **Allplan** folder for the central file storage.



The **Allplan** folder is shared. When installing with workgroup manager, you **cannot** use this folder as the central file storage as the folder is not located under a share.



The **Projects** folder is shared. Installing with Workgroup Manager is possible as the **Allplan** folder is located under a share.

Note: To find out how to share folders and drives, consult the online Help system for the operating system you are running.

First-time Installation on a Standalone Workstation

Allplan's installation program allows you to install Allplan 2005 quickly and easily.

To install a standalone version of Allplan 2005 for the first time

➲ Read the following before installing:

- Requirements for installing and running Allplan 2005
- Preliminary considerations

1 Close any applications that are running, shutdown the computer and turn it off.

2 Connect the hardlock to the parallel or USB port.

If you are using several programs that require hardlocks, check that the Allplan 2005 hardlock is first in the chain, followed by the hardlocks for the other programs.

3 Turn on all the peripheral devices.

4 Turn on the computer and boot.

5 Log on as Administrator for the local machine or as a user with administrator privileges.

6 Insert the **Allplan 2005** CD in the CD-ROM drive.

Setup should start automatically. If it doesn't, click **Start** on the task bar, select **Run** and enter the drive letter of the CD-ROM drive followed by the pathname and **setup**. For example, enter **e:\setup**.

7 Select a language for Setup and press **OK** to confirm.

8 Press **Next** to acknowledge the Welcome screen.

9 The terms of the software license agreement are displayed in the **Software License Agreement** dialog box. If you agree to the terms of the agreement, click **Yes**.

10 The **Important Information** dialog box provides information on the documentation of installing Allplan. Press F1 to read it. Otherwise, click **Next**.

11 In the **Installation Option** dialog box select **First-time installation** or **First-time installation with data transfer**. Then click **Next**.

12 In the **Select License Information** dialog box select the drive with the license file.
If you are using a license disk, insert it in the floppy disk drive. Then click **Next**.

13 Select the drive where the Allplan 2005 programs and files are to be installed.

Program folder: this is where the Allplan 2005 program files are installed.

Central file storage folder: this is where the data files (e.g., projects, office standard) are stored.

14 In the **Setup Type** dialog box select the desired mode. Then click **Next**.

Typical: installs all the common options. This is the recommended setting.

Compact: only installs the essential program and files.

Custom: installs the files you specify. By default, all components are enabled. Deactivate the component(s) you do not want to install in the **Select Components** dialog box.

15 In the **Select Program Folder** dialog box, specify the program folder where the symbols for Allplan 2005 are to be installed.

16 Check the settings in the **Start Copying** dialog box. If the settings are OK, click **Next** to start the installation.

17 It can happen that you will now be prompted to restart the computer. Log on as Administrator for the local machine or as a user with administrator privileges again.

First-time Network Installation

- Before you install the program, please read the \Helpfiles\English\install.hlp file on the Allplan 2005 CD and the chapter “Requirements for Running Allplan 2005”.
- The folder for the central file storage or the drive where this folder is located must be shared for all the workstations on which Allplan 2005 is to be installed.
  This also applies when installing with Workgroup Manager when the central file storage is located on the workstation to be installed. In this case, too, the central file storage must be in a folder under a share.
- Select the same folder for all workstations. This folder will serve as the central file storage and will ensure that all workstations have access to the same data.
- If you are using Workgroup Manager, it must be installed on all the workstations in the network. It is not possible to have some workstations with Workgroup Manager and some without.

To install for the first time in a network

1. Install Allplan 2005 on all workstations as described in first-time installation on a standalone workstation.
2. Check every workstation to see whether Allplan 2005 starts correctly.

Unit 1: Basics

This unit provides information on navigating Allplan 2005 and the basic structure of the program.

This chapter covers the following:

- User interface
- Modular structure of Allplan 2005
- Working with projects, drawing file, layers and NDW-format files
- Mouse button assignments
- Activating and quitting tools
- Using the wizard
- Using the shortcut menu
- Correcting errors
- Saving your work
- Defining and modifying format properties
- Using the Clipboard
- OLE objects and XRefs
- Selecting elements
- Advanced point entry
- Precision drawing
- Entering polylines and areas
- Applying hatching, pattern, fill
- Working efficiently using libraries and defaults
- Using smart symbols

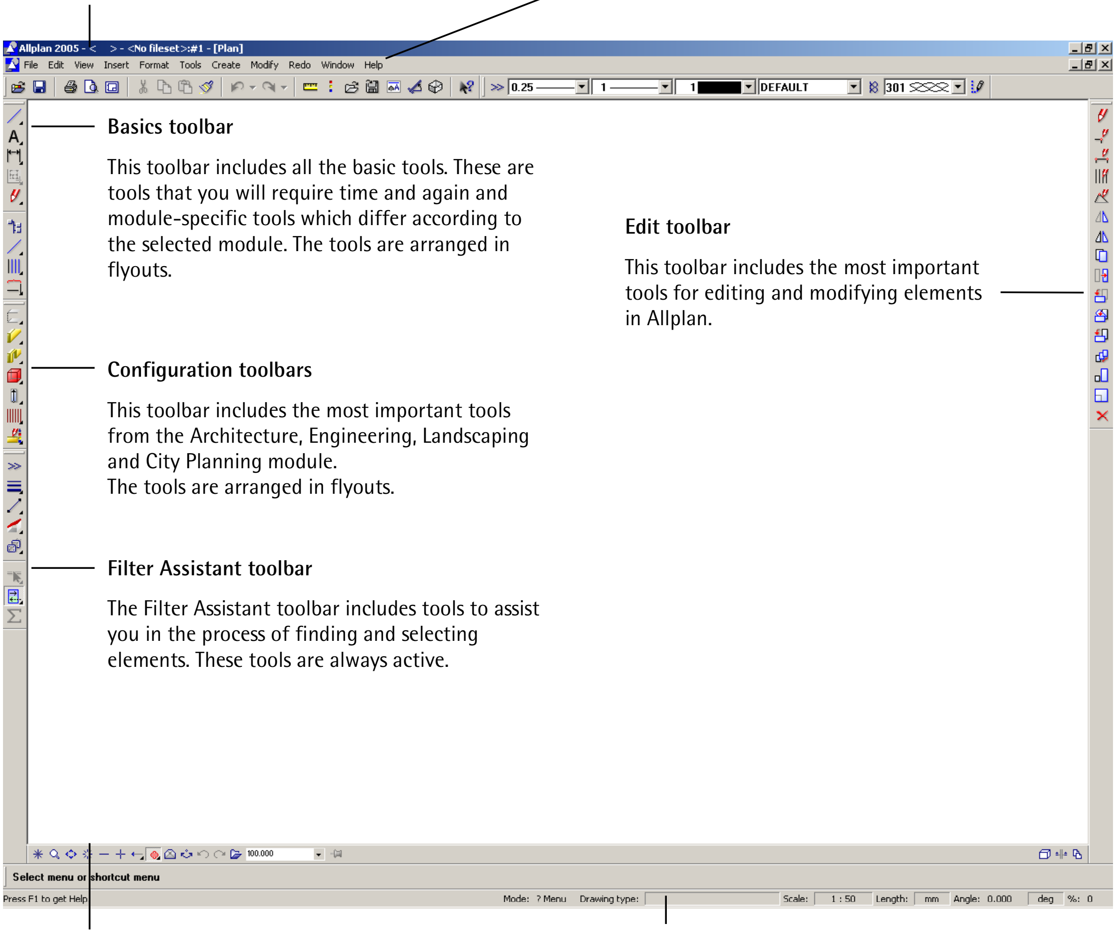
User Interface

Title bar

The title bar of Allplan's application window shows the current project, current fileset and current drawing file.

Menu bar

All the tools found in the toolbars can be activated via the menus.



Allplan 2005 - < > - <No fileset>:#1 - [Plan]

Select menu or shortcut menu

Press F1 to get Help

Mode: ? Menu Drawing type: Scale: 1 : 50 Length: mm Angle: 0.000 deg %: 0

Basics toolbar

This toolbar includes all the basic tools. These are tools that you will require time and again and module-specific tools which differ according to the selected module. The tools are arranged in flyouts.

Edit toolbar

This toolbar includes the most important tools for editing and modifying elements in Allplan.

Configuration toolbars

This toolbar includes the most important tools from the Architecture, Engineering, Landscaping and City Planning module.
The tools are arranged in flyouts.

Filter Assistant toolbar

The Filter Assistant toolbar includes tools to assist you in the process of finding and selecting elements. These tools are always active.

Buttons in the viewport border

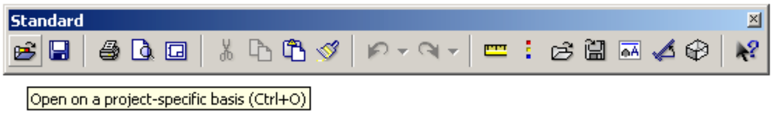
The border at the bottom of each viewport includes multiple buttons which you can use to control the on-screen display.

Status bar

Various types of information on the current drawing are displayed here – e.g., the reference scale and unit of length.

Toolbars

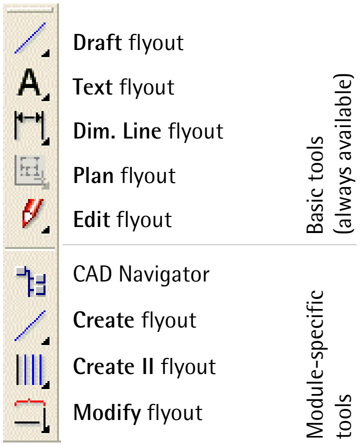
Toolbars contain icons that you can use to execute functions. Positioning the cursor over an icon displays a ToolTip with a short description of the function.



Toolbars can be arranged around the edge of the workspace (this is the default) or made to float anywhere on your screen. To float a toolbar, click the top border of the toolbar or its edge, press and hold down the left mouse button, and drag the toolbar into the workspace.

To protect the toolbars from being moved inadvertently, go to the **View** menu, point to **Toolbars** and click **Fix toolbars**.

Basic Tools toolbar



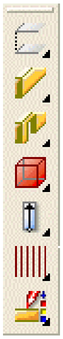
The **top half** of this toolbar includes all the important tools. These are tools that you will require time and again – for example, drafting, text, dimensioning and edit tools. These tools are always available in this form in all the modules.

The **bottom half** includes the tool for accessing the CAD Navigator as well as module-specific tools in the **Create**, **Create II** and **Modify** flyouts. The contents of this flyout change depending on which module is open (in this example: **Draft** module).

Note: An empty icon is displayed when the **Create II** or **Modify** flyouts do not contain any tools.

Configuration toolbars

Architecture configuration



Roofs and Planes flyout

Archit. Component flyout

Archit. Openings flyout

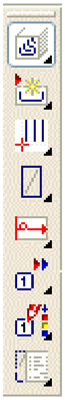
Rooms flyout

Stairs flyout

Rafter Design flyout

3D Modification flyout

Engineering configuration



Model flyout

Enter Bending Shape + Placement flyout

Area Reinforcement flyout

Area Reinforcement (Mesh) flyout

BAMTEC flyout

Display flyout

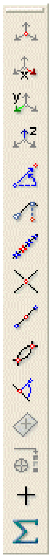
Modify flyout

Lists/Schedules flyout

Allplan 2005 has several standard configurations. Access to the most important tools for a specific discipline is provided in each of these configurations. To select a default configuration, click the **View** menu, point to **Default Configurations** and select a configuration. The relevant configuration toolbar is displayed depending on the configuration you have selected (the examples here show the **Architecture** and **Engineering** toolbars). These contain the most important tools for daily work. You can thus carry out design tasks without having to switch between modules.

Point Assistant toolbar

The **Point Assistant** toolbar includes tools to assist you in the process of entering points. The tools become active when the program expects you to enter a point, e.g., for drawing a line.

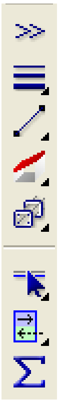


Global point
Delta point
Delta point
Delta point
Polar coordinates
Offset by line
Division point
Point of intersection
Midpoint
Offset by radius
Perpendicular
Outline auto-detect on/off
Define point symbol
Point entry option
Brackets

Note: The **Point Assistant** toolbar is only displayed when **Advanced point entry** is disabled. Otherwise, the tools of the **Point Assistant** are available on the shortcut menu or - depending on the tool selected - displayed in the dialog line.

Filter Assistant toolbar

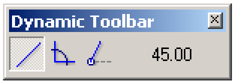
The **Filter Assistant** toolbar includes tools to assist you in the process of finding and selecting elements. The tools in the **Point Assistant** are always active.



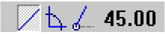
Match
Format filter
Element filter
Architecture/Allfa filter
Engineering filter
Various filters
Selection rectangle
Brackets

Dynamic toolbar

The Dynamic toolbar appears when a function offers several implementation options. Below is the Dynamic toolbar for the **Line** tool. After selecting the function, you can choose from the various data entry options presented on the Dynamic toolbar.



or

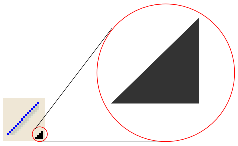


The Dynamic toolbar can be displayed as a separate, free-floating toolbar or docked at bottom right in the status bar or dialog line. You can toggle between the three on the **View** menu- **Toolbars** - **Dynamic Toolbar**.

Flyouts

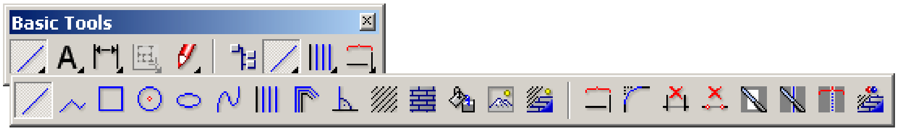
Icons with a small black triangle in the bottom right corner are known as flyouts. These contain additional, related tools.

Tip: When you click the icon, the flyout appears shortly after. When you click the black triangle, the flyout opens immediately.



To open a flyout, click an icon with a black triangle and press and hold down the mouse button. To select a tool, keep the mouse button pressed down and position the cursor over the relevant tool. Then release the mouse button.

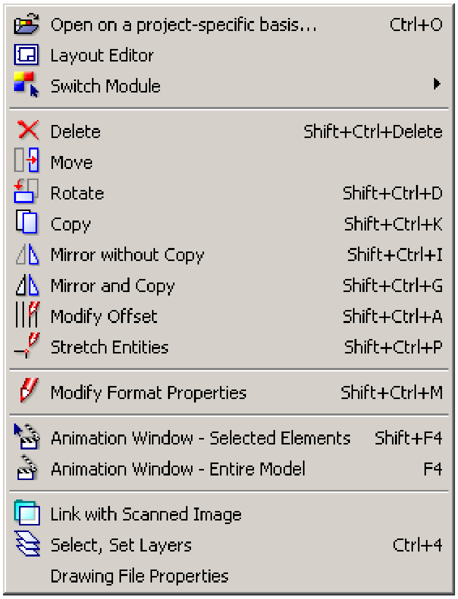
Note: When a flyout is closed, the icon for the tool that you activated last is displayed. This way, you can activate the same tool several times in succession without having to open the flyout each time.



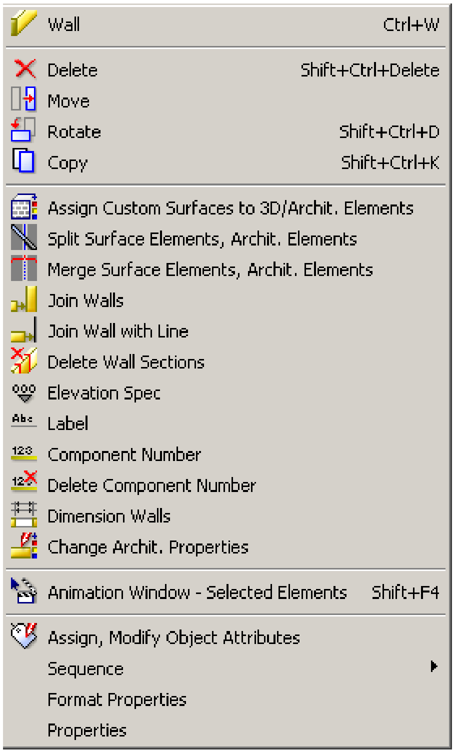
Shortcut menu

The shortcut menu is displayed at the position where the cursor is located when you right-click an element or in the workspace.

- When you click an element with the right mouse button, edit tools appropriate to the element are displayed. Double clicking an element with the right mouse button starts the function that was used to create the element originally. All the parameters of the clicked element are copied.
- When you click in the workspace with the right mouse button, several edit tools and the most important tools are presented You can also open the layout editor and switch between modules.


Open on a project-specific basis... Ctrl+O
Layout Editor
Switch Module
Delete Shift+Ctrl+Delete
Move
Rotate Shift+Ctrl+D
Copy Shift+Ctrl+K
Mirror without Copy Shift+Ctrl+I
Mirror and Copy Shift+Ctrl+G
Modify Offset Shift+Ctrl+A
Stretch Entities Shift+Ctrl+P
Modify Format Properties Shift+Ctrl+M
Animation Window - Selected Elements Shift+F4
Animation Window - Entire Model F4
Link with Scanned Image
Select, Set Layers Ctrl+4
Drawing File Properties

Shortcut menu when clicking in the workspace

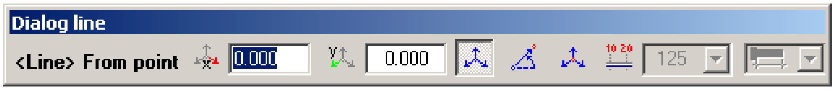


Shortcut menu when clicking a wall

Dialog line

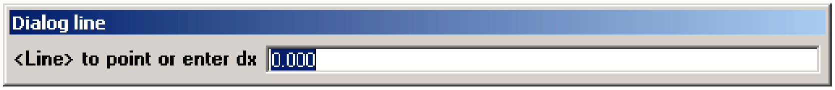
The dialog line below the workspace is where the program prompts you to enter values. Alternatives are separated by slashes.

Note: You can perform calculations in the dialog line and you can transfer the results of measurement operations carried out with **Measure & Compute** as well as results directly from the **Calculator**. You can also use CTRL+C and CTRL+V to copy/paste text to/in the dialog line.



<Line> From point 0.000 0.000 125

When you have enabled the **Conventional point entry** mode, the **Point Assistant** is not available in the dialog line or on the shortcut menu. Rather, it is displayed as a separate toolbar. Every value you enter has to be confirmed by pressing ENTER.



<Line> to point or enter dx 0.000

Status bar

The status bar is the bottom line in the Allplan 2005 application window. Various types of information on the current drawing file are displayed here – e.g., the reference scale and unit of length. You can also modify these values by clicking them.

Note: When the **Dynamic Toolbar in Status Bar** option is active (on the **View** menu – **Toolbars** – **Dynamic Toolbar**), the tools in the Dynamic toolbar are displayed on the right in the status bar.

Orientation in the Program – The Modules

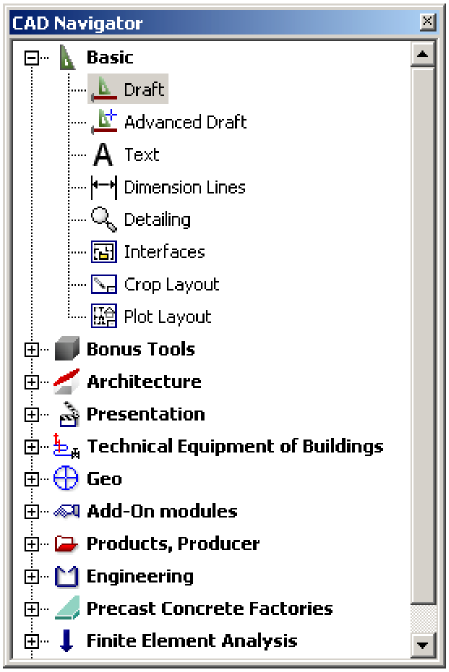
Allplan 2005 has a modular structure. In other words, it features individual program modules, each of which contains the necessary tools for a specific discipline. The most important tools are always at hand on the **Basic Tools** toolbar, the **Configuration** toolbars and on the menus. This way, access to the most frequently used tools is provided without requiring you to switch to a different module. The modules themselves are arranged in families: Basic family, Bonus Tools family, etc.

To switch between the modules, the following three options are available:

- Click in the workspace with the right mouse button and select the desired module in the **Switch module** field on the Shortcut menu.

  Tip: If you have enabled the **Switch module when creating similar elements** option in the **Global Options**, **Miscellaneous** tab, the system also switches to the relevant module when you create elements using the Shortcut menu.

- Use **Tools- Customize** to insert icons from the **Switch Module** category in a toolbar or to define shortcut keys. Thus, you can quickly switch to modules you need frequently.
- Select a module of your choice in the CAD Navigator. This also clearly shows the structure of the individual modules.



Note: You **cannot** use the CAD Navigator to switch to the **Plot Layout** module. Instead, use the **Layout Editor** tool.

Working with Projects, Drawing Files and Layers

A project is an organizational unit. A new project is created for each construction project. Technically, a project is a folder; metaphorically speaking, it is a drawer containing the drawing files. An unnamed **private project** for practice and testing is available to each user.

Filesets are an important organizational unit within projects. A fileset can consist of up to 128 drawing files. You can assign any drawing file to a fileset. Up to 1,000 filesets can be created per project. A fileset can be placed in a layout to be printed with a single command.

The actual design and data creation process happens in drawing files. These are the equivalent of the transparencies used in conventional building design. Drawing files can be used to give projects a structure. In IT terms, a drawing file is a conventional file stored on your hard disk. You can display and edit up to 60 drawing files at once - in other words, you can have several files open simultaneously. A project can contain up to 6000 drawing files. When working without layers, the individual building elements (such as walls, stairs, labeling, etc.) are drawn on different drawing files and superimposed like transparencies.

Layers provide an additional means of applying a structure - within drawing files. They apply to all the drawing files in a project. Design entities and components can automatically be assigned the correct layer. Layers can be set so that they are not visible to the user.

A layout is the unit you send to the printer or plotter. As opposed to design using a conventional drafting board, the scope of the layout does not have to be defined in advance. Generally, you leave the layout (which involves arranging and laying out drawing files and/or filesets) until you’re finished with the design. Each project can contain up to 3000 layouts.

Using NDW-format files in Allplan

By default, Allplan documents (= drawing files) are managed, saved and opened within projects. But you can also save Allplan documents in any folder and open them from there, regardless of the project currently set. Allplan documents opened in this manner are known as **NDW-format files**.

For example, you can use this new function to quickly send a document to a partner office or to temporarily open a drawing file from a different project.

NDW-format files are always opened and displayed in a separate window. You can copy and move elements between NDW files and drawing files (by dragging and dropping them and via the Clipboard). Allplan documents cannot be open as NDW files and as drawing files (not in reference mode either) at the same time.

Unlike drawing files that are always given predefined names in the format of ‘tb00????.ndw’ (????= drawing file number), you can assign any names to NDW-format files.

You can use the **NDW Layout Element** tool to place NDW-format files in layouts.

Elements in NDW-format files are always selected and designed in the window you clicked first.

The project resources (e.g. fonts) are based on the setting of the project that is currently open (either office-specific or project-specific). This means that when you send a NDW-format file to a partner office, the project resources may look different.

Advantages of NDW-format files

- Custom project structure that can be managed in Windows Explorer
- Exchanging data easily within Allplan
- Sending drawing files by email

Restrictions

- When you have licensed a module in the **Precast Concrete Factories** family, the functions for opening and saving NDW-format files are not displayed.
- NDW-format files are not available with the **FEA**, **Bar Reinforcement** and **Precast Concrete Factories** modules.
- The **Import**, **Insert - XRef**, **Section Display** and **Animation Window – Selected Elements** functions are not available for NDW-format files. When you open a drawing file with a XRef as a NDW file, only the frame and the name of the XRef are displayed.
- As long as a NDW-format file is open, the **Link with Scanned Image**, **Insert Bitmap** functions and all the functions in the **FEA** family are not available (not for drawing files either!). Before you can select these functions, you have to close all NDW-format files.

Saving NDW-format files

When the active viewport contains a NDW file, the **Save File** function always applies to this file. Autosave does not include NDW files.

Saving drawing files as NDW-format files

You can use the **Save file as** function to save the current document as a NDW-format file.

Note: The names of Allplan 2005 drawing files may contain characters that are not allowed in filenames (\/:*?”<>|). These characters are replaced by ”_”.

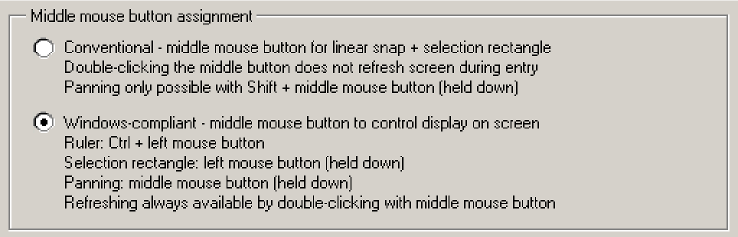
Using the Mouse

The three mouse buttons are associated with functions that change to reflect the current requirements in Allplan 2005. A distinction is made between three different states:

- No tool is activated.
- A drafting tool is activated (e.g. the Line tool).
- An edit tool is activated (e.g. for deleting).

Note: The information in the table is based on a 3-button mouse. If you are working with a 2-button mouse, you can simulate the middle mouse button by pressing the CTRL key and the left mouse button at the same time.

Note: In the **Global Options – Settings** tab, you can specify how to use the middle mouse button.



Middle mouse button assignment

○ Conventional - middle mouse button for linear snap + selection rectangle
Double-clicking the middle button does not refresh screen during entry
Panning only possible with Shift + middle mouse button (held down)

● Windows-compliant - middle mouse button to control display on screen
Ruler: Ctrl + left mouse button
Selection rectangle: left mouse button (held down)
Panning: middle mouse button (held down)
Refreshing always available by double-clicking with middle mouse button

If, in the tables below, the mouse button assignment depends on this setting, a number appears in brackets:

1: stands for the **Conventional** option: **set linear snap to middle mouse button.**

2: stands for the **Windows-compliant** option: **use middle mouse button to control display on screen.**

Table 1: no tool is activated

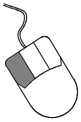
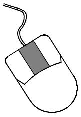
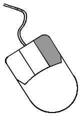
Mouse button	This...	Does this...
Left 	Click on element	Selects the element with handles.
	SHIFT+click on element	Selects an entity group with handles.
	CTRL+click on element	Selects an additional element with handles.
	Double-click on element	Displays the element’s properties.
	CTRL+click on an element	Displays the format properties of an element.
	Clicking and dragging in the workspace	Selects elements with handles. Depending on the setting in the Filter Assistant , the program also selects intersected elements.
	Double-click in the workspace	Opens the **Open on a Project-Specific Basis: Files and Filesets** dialog box.
	CTRL + double-click in the workspace	Opens the **Layer** dialog box.
Middle 	Double-click	Sets the display scale so that all the elements in the visible drawing files (active, edit or reference) can be seen.
	CTRL + double-click	Regenerates the section that is visible on screen.
	Click and drag (2)	Pans.
	SHIFT + click and drag	Pans.
	CTRL + click and drag	Zooms in.
	ALT + click and drag	Zooms dynamically (cursor = center). Depending on the direction in which the cursor is moved, the system zooms in or out.
Right 	Click on an element	Displays the shortcut menu for the element clicked. The shortcut menu contains general tools and edit tools that are specific to the element in question.
	Click in the workspace	Displays the general-purpose shortcut menu.
	Double-click on an element	Activates the tool by means of which the element was created and copies all the settings.
	Double-click in the workspace	Opens the Layer dialog box.

Table 2: a drafting tool is activated (e.g. for drawing a line)

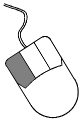
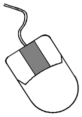
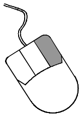
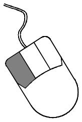
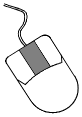
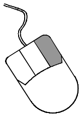
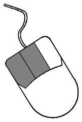
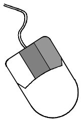
Mouse button	**This...**	**Does this...**
Left 	Clicking in workspace or on element	Places and snaps to points in the workspace.
	CTRL + click	Aligns points exactly with existing points (linear snap).
Middle 	Click in workspace (1)	Aligns points exactly with existing points (linear snap).
	Double-click (2)	Sets the display scale so that all the elements in the visible drawing files (active, edit or reference) can be seen.
	Click and drag (2)	Pans. The arrow on the cursor shows the direction of movement. The further the cursor is positioned from the displacement anchor, the quicker panning takes place.
	SHIFT + click and drag	Pans.
	CTRL + click and drag	Zooms in.
	ALT + click and drag	Zooms dynamically (cursor = center). Depending on the direction in which the cursor is moved, the system zooms in or out.
Right 	Click in workspace	Opens the shortcut menu for the advanced point entry. When the advanced point entry is disabled, clicking in the workspace opens or closes the brackets. Confirms entries when requested in the dialog line: <*confirm*>.
	Clicking on a toolbar	Quits a tool (= ESC key).

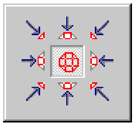
Table 3: an edit tool is activated (e.g. for deleting)

Mouse button	This...	Does this...
Left 	Click on element	Addresses or selects an element.
	Clicking and dragging in the workspace	Selects elements in a rectangular region.
Middle 	1. Clicking + then clicking again in workspace	Selects elements in a rectangular region.
	Double-click (2)	Sets the display scale so that all the elements in the visible drawing files (active, edit or reference) can be seen.
	Click and drag (2)	Pans. The arrow on the cursor shows the direction of movement.
	SHIFT + click and drag	Pans.
	CTRL + click and drag	Zooms in.
Right 	Click in workspace	Opens and closes bracket feature.
		Confirms entries when requested in the dialog line: <*confirm*>.
	Clicking on a toolbar	Quits a tool (= ESC key).
Middle - left 	Clicking an element with middle and then left mouse button	Selects a segment.
Middle -right 	Clicking on element with middle and then right mouse button	Selects elements that have the same pen thickness or linetype (switch in **Global Options**).
	Clicking with middle and then right mouse button in the workspace	Enables the selection rectangle. Use the left mouse button to enclose the desired elements in a selection rectangle.

Controlling the Display on Screen

In Allplan 2005, you can zoom in on any area of the design as exactly as you want to. The icons in the border of the viewport let you navigate freely on screen. These tools are known as ‘transparent’ tools; in other words, you can also use them while a different tool (e.g. Line) is active.

When multiple viewports are open, these icons appear in every viewport.

Icon	Name	Use
✳	**Refresh**	Sets the display scale so that all the elements in the visible drawing files can be seen.
🔍	**Zoom Section**	Zooms a section of the workspace. When there are several viewports, the section is displayed in the viewport where you clicked this button. The section itself, however, can be defined in any of the viewports. Requirements: you have not selected a perspective view and the same view is displayed in both viewports.
✥	**Pan**	Pans the section that is visible on screen by a vector that you specify by setting two points. **Tip:** You can also pan dynamically by **pressing and holding down the middle mouse button** or using the **cursor keys.**
✳	**Regen**	Regenerates the section that is visible on screen.
—	**Reduce View**	Reduces the section displayed on screen in incremental steps. (The display scale doubles.)
+	**Enlarge View**	Enlarges the section displayed on screen in incremental steps. (The display scale halves.)
← → ↑ ↓	**Scroll Left (... Right, Up, Down)**	Scrolls left, right, upwards or downwards.
	**Standard Views flyout**	You can choose between plan view and any of the standard views.
⌂	**3D View**	Opens the **3D View** dialog box, where you can set and save views.

Icon	Name	Use
⟲	Navigation Mode	In the **viewport**: sets a perspective view. When dragging, the cursor behaves in the same way as in animation windows (sphere mode, camera mode). In the **animation window**: when switched off, you can draw in animation windows as in isometric windows.
↶	Previous View	Restores the previous view.
↷	Next View	Displays the next view.
📂	Save, Load View	Saves or restores a custom view. Thus, you can set views you use frequently.
50.000 ▾	Display Scale	Sets the display scale.
🔍	Always on Top	Places the viewport so that it is always on top (i.e., in front of) the other ones.
❐	Hidden-line Image on/off	Displays the current contents of the screen as a hidden line image (on/off). The drawing is displayed as a hidden line image the next time you click **Refresh** or **Regen.**
⫶‖⫶	Activate Section	Displays an architectural section that you have defined with **Define Section.** You can define the section's clipping path by pointing and clicking, or by entering the section identifier.
⧉	Copy to Clipboard	Copies the current contents of the screen to the Clipboard. You can then paste it from the Clipboard into other applications.

Display Sequence

Sequence in which elements are displayed on screen

By default, elements are displayed in the sequence in which they were created or modified. This way, the element you created or modified last is always on top. The program provides several settings for changing the sequence in which elements are displayed. For example, you can prevent fills from hiding all the elements below.

The **Sequence** in which elements are displayed is saved as a number between -15 and +16. Based on this number the elements are displayed on screen: the element to which you have assigned the highest value is displayed on top of all the other elements. When two elements have the same number, the element you created last is displayed on top of the other one. New elements get a fixed default value. Allplan 2003 elements with the **Always on Top** format property are automatically assigned a value of 12. More information is provided in Values for the Sequence element property.

Note: New elements are always displayed on top. The settings are only applied to the elements after you click **Regen**.

In the case of elements consisting of subordinate elements (such as smart symbols, element groups, XRefs), the setting made for the superordinate element has priority over the setting made for the subordinate elements. If, for example, you configure the program to display an element group on top of another element group, all the elements of which this element group consists are displayed on top of the elements of the other element group, regardless of the settings made for the individual subordinate elements.

The ‘Sequence‘ element property

The sequence in which elements are displayed on screen depends on several factors. The following table shows the sequence in which elements are displayed on screen. The priority is given in the **No.** column; the lower the number the higher the priority of the respective setting. For example, elements in reference drawing files are always placed behind elements in active drawing files or drawing files open in edit mode, regardless of other settings.

No.	Setting	Explanation
1	Drawing file status	Elements in active drawing files or drawing files open in edit mode are always placed in front of elements in reference drawing files.
2	**Show/Hide**, **Surface elements in background** option	When this option is activated, surface elements (hatching, pattern, fill) are placed behind other elements.
3	**Sequence** element property	See Sequence element property
4	Time when elements were created/modified	Elements that were created/modified at a later stage are placed in front of other elements.

Values for the ‘Sequence’ element property

The following table lists the default **Sequence** values for various elements created in Allplan 2005. You can modify these values in the **Global Options**, **Entry** tab.

Default values for new elements

Element	Default value
Dimension lines/text with fill	+16
OLE objects	+11
Dimension lines/text without fill	+10
Nemetschek (smart) symbols	+5
Normal design entities	0
XRefs	0

Hatching, patterns	-3
Bitmaps	-5
Fills	-7
Line elements of architectural components (in the case of multi-tier walls, the priority will increase with each additional construction layer by a factor of 1)	+7
Surface elements of architectural components (in the case of multi-tier walls, the priority will increase with each additional construction layer by a factor of 1)	+6
Line elements of architectural rooms	-1
Surface elements of architectural rooms	-8

Notes:

- When you convert a surface element to another one using **Convert Surface Element**, the display priority will **not** change.
- Elements in reference drawing files are always behind the elements in active drawing files.
- When you have enabled the die **Surface elements in background** option in **Show/Hide**, fills are always behind other elements, regardless of the priority set.

When converting data from V2003 to V2005

Property in V2003	Priority in V2005
Always on Top property	+12
All other elements	0

When converting data from V2005 to V2003

Priority in V2005	Property in V2003
Priority > 5	**Always on Top** property
Priority ≤ 5	Without **Always on Top** property

Modifying the display sequence

Two methods are provided for modifying the sequence in which elements are displayed:

- Select **Modify Format Properties** (**Basic Tools** toolbar or **Format Properties** on the shortcut menu of the element selected) and enter a value between -15 and + 16.
- Right-click an element, point to **Sequence** on the shortcut menu and select the desired function:

Function	Effect
Into the foreground	Moves the element to the top. This element is assigned a priority value of +16.
Into the background	Moves the element to the bottom. This element is assigned a priority value of -15.
One level to the front	Moves the element up one level. The priority value of this element is increased by a factor of 1.
One level to the back	Moves the element down one level. The priority value of this element is reduced by a factor of 1.
In front of another element	Moves the element in front of another element. Compared with the selected element, the priority value of the modified element is increased by a factor of 1.
Behind another element	Moves the element behind another element. Compared with the selected element, the priority value of the modified element is reduced by a factor of 1.

Activating and Quitting Tools

In Allplan 2005 you can activate, execute and quit tools in different ways.

Activating tools

- You can click the relevant icon.
- You can double click the element with the right mouse button. This activates the tool that was used to create the element. All the settings and parameters of the element you clicked are used.
- You can activate tools via shortcut keys. An overview of predefined shortcuts is provided on the **Help** menu under **Shortcut Keys Table**. In addition, the shortcut key for tools where one has been defined is shown in the ToolTip.
- You can use the shortcut menu.
- You can activate tools via the menu bar.

Executing tools

Instructions are provided in the dialog line after you have clicked a tool. For example:

- **Point snap** (e.g., **Line** tool: *From point*):
- **Selecting** elements (e.g., **Delete** tool: *Select elements to delete*).

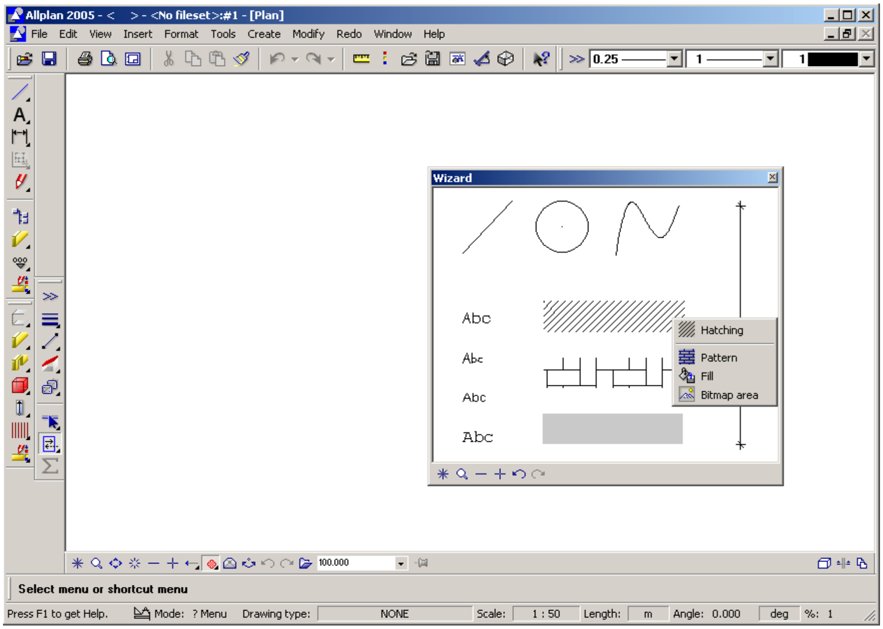
When appropriate, a dialog box or Context toolbar is displayed so that you can make settings for the function.

Quitting tools

- Press ESC on the keyboard.
- Click a toolbar with the **right** mouse button.
- Activate a different tool.

The Wizard

The Wizard is small window which is displayed in the workspace and includes a pictogram-like key representing all frequently used tools. When you click an element with the right mouse button, a Shortcut menu opens with related tools is displayed. This way, the Wizard saves you the effort of looking for icons and tools. All you need to do is click an element with the right mouse button and select a tool on the Shortcut menu.


Allplan 2005 - < > - <No fileset>:#1 - [Plan]
File Edit View Insert Format Tools Create Modify Redo Window Help
0.25
1
1
Wizard
Abc
Abc
Abc
Abc
Hatching
Pattern
Fill
Bitmap area
100.000

Select menu or shortcut menu

Press F1 to get Help. Mode: ? Menu Drawing type: NONE Scale: 1 : 50 Length: m Angle: 0.000 deg %: 1

As opposed to a ‘normal’ Allplan 2005 window, you cannot draw in a Wizard window. But by means of the icons at the bottom viewport border, you can use various tools for controlling the display on screen. The Wizard window has the **Always on Top** property and cannot be maximized or minimized.

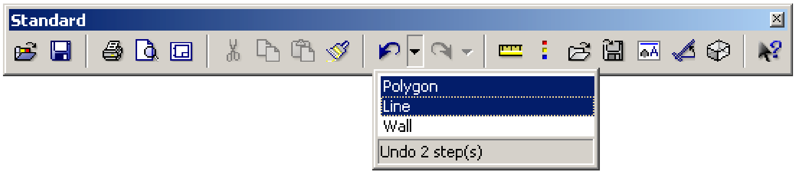
Several predefined Wizard files are provided with the program. In addition, you can also create your own Wizards.

Correcting Errors

When you make an error in Allplan 2005, you can use ↶ **Undo** (**Standard** toolbar) to correct the error. The number of undo steps is unlimited. For example, if you inadvertently moved an element, you can annul the move. You can go back (undo) as many steps as you want, as far back as the last time the data was saved.

Tip: If you inadvertently deleted elements, you can quickly restore them by immediately double-clicking in the workspace with the right mouse button (the **Delete** tool must still be active).

You can undo several steps in one go. Click the arrow beside the **Undo** icon, keep the mouse button pressed down and drag the cursor over all the steps you want to undo. Then release the mouse button.



↷ **Redo** redoes operations that you have undone. Redo operations, however, are not possible if you have added new design entities in the meantime.

Note: You can also activate the Undo tool while another function is active. The function in question will close and all the entries you made while it was active are “undone“.

Saving Your Work

When you exit Allplan 2005, all open drawing files are saved automatically. You do not need to save your data explicitly (like in other programs) prior to exiting Allplan 2005. Exception: NDW-format files have to be saved manually.

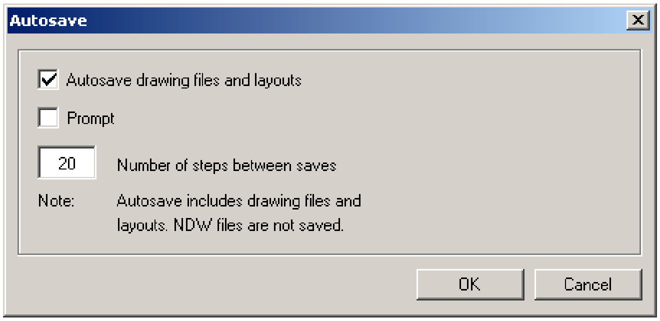
In certain circumstances, Allplan makes backup copies of your drawing files and/or layouts. For more information, see Using .bak files.

While you work in Allplan 2005, you can save your data manually as well as have the program do so automatically after a certain number of steps. The data in the current drawing file and in those that are open in edit mode is saved. And when you perform certain actions (e.g. switching to the Plot Layout module), the program automatically saves your work, too.

Note: None of the actions you performed prior to saving can be undone with the **Undo** tool after saving.

The following actions cause the data to be saved:

- When you switch to a different drawing file, fileset, layout or project.
- When you switch to the **Plot Layout** module.
- When you export data from Allplan 2005 using **Export Data**.
- When you save manually by clicking **Save** (on the **Standard** toolbar)
- When saving automatically. You can activate this function and define the number of steps between saves in **Global Options**, **Miscellaneous** tab.



☑ Autosave drawing files and layouts

☐ Prompt

20 Number of steps between saves

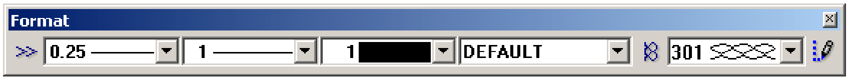
Note: Autosave includes drawing files and layouts. NDW files are not saved.

Note: The interval here is based on the number of tools you activate and not the time elapsed. If you spend some time drawing with the same tool, therefore, data is not saved automatically unless you quit the tool in between.

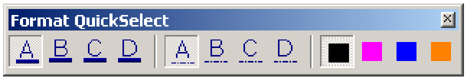
Defining Pen Thickness, Linetype and Line Color

Before you draw an element, you can define its line thickness (pen thickness) and the linetype on the **Format** toolbar. When the Color stands for pen option is active (this is the default), the color is set automatically with the pen.

If you are working with layers and layer attribute matching is active, the format settings are set automatically in accordance with the current layer.

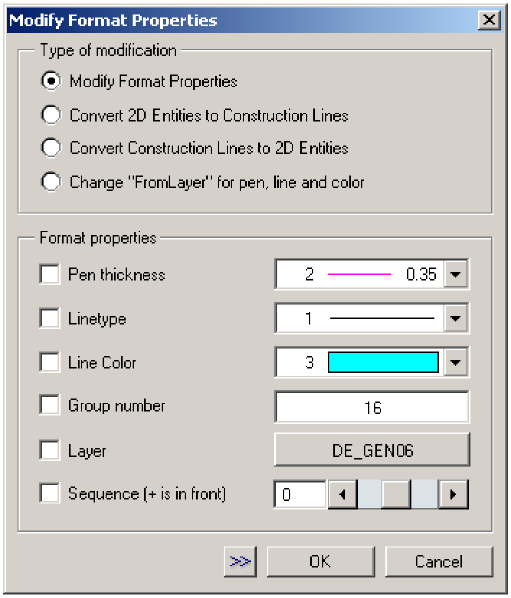


The **Format QuickSelect** toolbar includes a dropdown list with the four most important pen thicknesses, linetypes and line colors. You can configure which settings are presented on the toolbar in **Defaults**, **Pens & Pen Assignments**, **Lines & Line Assignments** and **Colors & Color Assignments**.



Modifying Pen Thickness, Linetype and Line Color

Use **Modify Format Properties** (**Edit** flyout) to modify the pen thickness, linetype and line color of an element. After selecting the tool, you can specify which format properties are to be changed in the dialog box that appears. With ≫ you can match the format properties of an existing element.



Modify Format Properties

Type of modification

- ● Modify Format Properties
- ○ Convert 2D Entities to Construction Lines
- ○ Convert Construction Lines to 2D Entities
- ○ Change "FromLayer" for pen, line and color

Format properties

☐ Pen thickness	2 0.35
☐ Linetype	1
☐ Line Color	3
☐ Group number	16
☐ Layer	DE_GEN06
☐ Sequence (+ is in front)	0

Note: The format properties of individual elements can also be modified via the shortcut menu by clicking **Format Properties**.

Using the Clipboard

In Allplan 2005 you can copy selected elements to the Clipboard and paste them into any drawing file, NDW-format file or into other applications. A number of tools is provided on the Dynamic toolbar to assist you when placing elements.

Note: You cannot use the Clipboard when you define patterns and fonts.

Special features in Allplan 2005

You can use the Clipboard in Allplan 2005 just a you would in any other Windows application. Note, however, that there are some special elements and properties:

- **Layers**: elements retain their layers. Elements on frozen layers (visible and hidden) are not copied.
- **Group number**: the entire contents of the Clipboard are placed as **one** group and assigned a new group number. This way, you can quickly group elements and address them as a single entity (using the middle and left mouse button).
- **Drawing file size**: if the allowable file size is exceeded, the program issues an error message.
- **Text**: if the application from which you have copied text to the Clipboard is an OLE server (Microsoft Word or Microsoft Excel, for example), the contents of the Clipboard are pasted as an OLE object into Allplan 2005. To paste the contents of the Clipboard as normal text, use **Insert Contents – Unformatted (Unicode) Text.** Text of this kind is assigned the text parameters currently set.
- **FEA and Allfa elements**: FEA and Allfa elements cannot be copied to the Clipboard.

Copy

Use this tool to copy selected elements and put them on the Clipboard. You can then paste the elements from the Clipboard into the current drawing file as often as required using **Paste** and **Paste to Original Position**. The elements can also be pasted into other applications. This command is not available when no element is selected.

Cut

Use this tool to cut selected elements and put them on the Clipboard. You can then paste the elements from the Clipboard into the current drawing file or NDW-format file as often as required using **Paste** and **Paste to Original Position**. The elements can also be pasted into other applications. This command is not available when no element is selected.

Paste

You can paste Allplan 2005 elements, text (e.g. from a word processing program) and bitmaps from the Clipboard into Allplan 2005. This tool is only available in plan view. If the Clipboard is empty or contains elements that cannot be pasted into Allplan 2005, this command is not available.

If the application from which you have copied text to the Clipboard is an OLE server (Microsoft Word or Microsoft Excel, for example), the contents of the Clipboard are pasted as an OLE object into Allplan. To paste the contents of the Clipboard as normal text, use **Insert Contents**.

Note: Using the Clipboard, you can only paste Allplan 2005 elements into the same drawing file type from which you copied them. The contents of the Clipboard are always pasted into the active drawing file even if the data was copied from a file open in edit mode.

Pasting elements from the Clipboard into Allplan 2005

A number of tools is provided on the Dynamic toolbar to assist you when pasting elements.

When you paste Allplan 2005 elements in a drawing file or NDW-format file, the original data is not lost (i.e. all the attributes and properties are retained). If you paste text into Allplan 2005, the current text settings apply. Bitmaps can be pasted into the current drawing file or NDW-format file. The following settings are used:

- Color depth: several colors
- Transparency: off; color: black.
- Width: 100 pixels = 1000mm

The Clipboard supports DIB (or BMP) and WMF-format bitmaps.

Note: If the Clipboard contains several formats supported by Allplan 2005, you can choose a format using the **Insert Contents** tool.

Pasting Allplan 2005 elements into other applications

When you use Ctrl+V to paste Allplan 2005 elements into another application, they are inserted as Windows Enhanced Metafile. But when the Clipboard contains text elements (e.g. normal text lines, paragraph text, component numbers, labels), these elements are always pasted into the other applications as “pure” text.

Paste to original position

Use **Paste to Original Position** to insert Allplan 2005 elements at their original position. If the clipboard is empty or does not contain any Allplan 2005 elements, this command is not available.

Note: If you paste the elements into the same drawing file, they exist twice at the same position.

Insert contents

You can use this tool to specify which element on the Clipboard is to be pasted into Allplan 2005. This tool is only available when the Clipboard contains several formats supported by Allplan 2005 (e.g. bitmap and pure text).

Using OLE Objects

The OLE concept lets you exchange information between different applications. Data from a source document (e.g. Microsoft® Word) is associated with or embedded in an Allplan 2005 drawing file. When you select the embedded data, the original application opens and you can edit the data in the source document.

The following object types can be embedded in Allplan 2005 (depending on the applications installed):

- Excel files (`.xls`)
- Word files (`.doc`)
- RTF files (`.rtf`)
- PowerPoint files (`.ppt`)
- Bitmaps (e.g. `.bmp, .jpg`)

The program to which the link is established must be an OLE server program (such as many Microsoft Office programs). Otherwise, the linked program cannot provide OLE objects.

Linking and embedding OLE objects

Two approaches are available for inserting OLE objects in Allplan 2005. The difference lies in the way in which the objects are saved in Allplan 2005:

Linking objects

A link between the Allplan 2005 drawing file and the associated object is established. When the object changes, the link in Allplan 2005 can be updated manually. Double-clicking the linked object in Allplan 2005 opens it in its original application and you can edit it as usual. When objects are linked with Allplan, the path to the source document and thus, to the original application must be retained. When you rename one of these two, you have to establish the link again.

Embedding objects

When objects are embedded in Allplan 2005, a copy of the source document is placed in the Allplan drawing file. After you have inserted this copy, it is no longer linked to the source document; in other words, the Allplan 2005 drawing file cannot be updated to reflect any changes you make to the source document. Embedded objects can be edited either in Allplan 2005 or in their original application; but any changes you make to the object have no effect on the source document.

Linking and embedding bitmaps as OLE objects

When you want to insert bitmaps as OLE objects in Allplan 2005, you should pay attention to the size of the objects to be inserted. It is not the file size that is decisive but the size of the bitmap in the memory. You can determine this size by clicking **Edit Bitmap** on the **File** menu, selecting the file to be checked and clicking **File Details**.

The following limiting values apply when you want to insert bitmaps as OLE objects in Allplan 2005:

- 3,800,000 bytes uncompressed at a file size of 20 MB (normal)
- 12,000,000 bytes uncompressed at a file size of 64 MB (maximum)

After having inserted the bitmap, you should save the drawing file. This reduces (compresses) the data in the drawing file. If the file exceeds the values mentioned above, you can use the **Edit Bitmap** tool to resize the file and save it (under a different name).

For large bitmap files, you can use the **Bitmap** tool. Otherwise, these files cannot be inserted in Allplan 2005.

Transparency of OLE objects

The background of OLE objects can only be transparent or not transparent; the default setting is transparent. Transparent background means that the background color set in Allplan 2005 is displayed instead of the background color of the OLE object.

Therefore, you should disable the transparent setting when you use a black background in Allplan 2005 and the OLE object you have embedded is a Word document containing black text, for example.

Editing OLE objects

Double-clicking an OLE object opens it in its original application and you can edit it as usual. You can also open and edit objects linked with Allplan directly in the original application and then update them in Allplan 2005. All you have to do is double-click these objects and edit them.

Embedded objects can be edited either in Allplan 2005 or in their original application; but any changes you make to the object have no effect on the source document.

You can use Allplan 2005 tools such as Copy, Move etc. to edit OLE objects. To change the size of OLE objects, use the **Resize** tool.

Using XRefs

You can place a drawing file as a XRef in a different drawing file as often as you need. The drawing file will update automatically to reflect any changes you make to the drawing file you have inserted as a XRef. XRefs can be inserted at any scale and at an angle you specify. Please note that you cannot use empty drawing files to insert them as XRefs.

XRefs can be placed in ‘simple’ or ‘advanced’ mode. For more information, see Comparison between simple and advanced XRefs.

A XRef is always placed so that its size matches that of the elements in the drawing file. If the size changes later, you can use **Update All XRefs** on the shortcut menu to update the extents. XRefs can be clipped (but this is only possible when you modify XRefs; you cannot clip XRefs when placing them).

You can enable and disable the display of XRefs and XRef borders in **Show/Hide**.

XRefs are always placed on the current layer. But the individual elements of which a XRef consists retain their layers. When you modify the status of a layer, you need to select the **Regen** function in order for the elements within the XRef to update automatically.

Please note that a drawing file which already contains a XRef cannot be inserted as a XRef again. If a drawing file which is inserted as a XRef no longer exists, the border and the reference are retained, and the file name of the associated drawing file is displayed in the border.

Editing XRefs

You can edit XRefs using the following Allplan 2005 tools: **Delete**, **Copy**, **Move** and **Rotate**. You can use **Modify Format Properties** to change the format properties of the XRef (e.g. the layer). Other Allplan 2005 tools cannot be applied to XRefs.

The scale and the angle of the XRef can be modified at a later stage. You can also change the clip region later on.

XRefs can only be modified and edited as a single entity; you cannot modify individual elements of a XRef. Selecting **Edit Reference Drawing File** on the shortcut menu of a XRef lets you directly open the drawing file which has been inserted as a XRef.

When you change the display sequence of XRefs, this modification always affects the entire contents of the XRef file.

Restrictions

Please note the following when using simple XRefs in Allplan 2005:

- **Point Snap**: the system only snaps to points on the outline of the XRef; elements within a XRef are not snapped.
- **Lists/Schedules**: elements in simple XRefs are not evaluated and analyzed in lists/schedules.
- **Animation**: elements in simple XRefs are not animated.
- **Element Interaction**: architectural elements within a XRef and architectural elements in the drawing file do not interact.
- **Hidden Line Image**: simple XRefs are not displayed in hidden line images.

Note: These restrictions do not affect advanced XRefs. For more information, see Comparison between simple and advanced XRefs.

Selecting Elements, Overview

In order to edit elements you need to select them. First, select the edit tool (e.g., Copy) and then select the elements to which the tool is to be applied. You can select elements either by clicking them or by defining a region around the elements you want to select. You can use the **Filter Assistant** toolbar to help you select elements.

The following table shows a complete overview of selection options:

To do this	Do this
Select an element.	Click the element.
Select several elements and/or regions.	Select the Σ **Brackets** feature in the Filter Assistant, click the elements and/or specify the regions. Then close the brackets. You can also open/close these metaphorical brackets by right clicking in the workspace.
Select elements in a region.	**To specify a selection rectangle**: • Press and hold down the left mouse button to open a selection rectangle. • Enter the two diagonally opposite points by clicking with the middle mouse button (pay attention to the settings made in **Global Options**). **To specify a fence**: Click **Fence** and enter the points to define the outline of the fence.
Select all elements.	Some functions (e.g. **Export**) let you select all elements on the active drawing file and the files open in edit mode by clicking **All** on the Dynamic toolbar.
Reselect the elements that were selected last.	Click **Reselect** in the Filter Assistant.
Select elements with the same group number.	Click on an element with the middle and then left mouse button.
Select elements with the same pen thickness or linetype.	Click on an element with the middle and then right mouse button. This selects all the elements in the current drawing file that have the same pen or linetype. You can specify whether selection here is based on the pen or linetype in **Options – Global Options – Settings** tab.

Selecting elements by entering a region

You can also select elements by specifying a region rather than clicking them. In the **Filter Assistant**, you can specify whether elements fully bounded by the region or fully bounded and intersected elements are selected.

The following options are provided in the Filter Assistant:

- Selects the elements that are fully bounded by the region.
- Selects the elements that are fully or partially bounded by the region.
- Selects the elements that are partially bounded by the region.
- The selection depends on the direction in which you enter the region:
  - To the left selects the elements that are fully bounded or intersected by the selection window. With this method the selection rectangle is shown as dashed lines.
  - To the right selects the elements that are fully bounded by the selection window.

  Note:
  Select elements in direction-dependent manner is active by default.

The easiest way to enter the region is to press and hold down the left mouse button and to enter two points that define diagonally opposite corners of a selection rectangle. You can also use **Fence** to enter a freeform region.

Selecting and editing elements using handles

In Allplan 2005 you normally have to activate a tool and then select the elements to which the tool is to be applied. By selecting the elements directly, however, you can select elements first and then edit them.

To do this	Do this
Select a single element	Click element
Select several elements within a selection window	Click in the workspace, press and hold down the mouse button and open a selection rectangle.
Select additional element	Press and hold down the CTRL key and click the additional element.
Select all elements	Press CTRL + A.
Delete elements using handles	On the shortcut menu, click **Delete** or press the DEL key.
Move elements using handles	Click the selected elements at a handle and drag. Alternatively, enter a displacement value in the X and Y direction in the dialog line and press ENTER to confirm.
Move or copy elements in an orthogonal direction using handles	Press the SHIFT key, move or copy selected elements.

Working with the Advanced Point Entry

All the exercises presented in the tutorial are carried out using the **Advanced point entry**. This intuitive and Windows-compliant point entry is set by default when you install the program for the first time.

Information on the **Conventional point entry**, brackets feature, Point Assistant toolbar etc. is provided in the section entitled “Precision Drawing” and in the online Help for **Allplan 2005**.

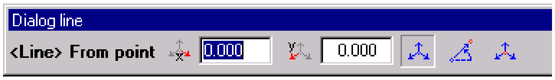
You can switch between the **Advanced point entry** and the **Conventional point entry** mode at any time. All you have to do is enable/disable the **Advanced point entry** on the **Tools** menu. You can also use the key combination CTRL+ALT+P.

With **Advanced point entry** being enabled, the preview always displays the actual future position of the element to be entered. In other words, the position of the element refers to the point snapped by the crosshairs. Elements which can be snapped are displayed in selection color.

Note: The illustrations show the dialog line when floating. The position of the dialog line does not affect the **Advanced point entry** in any way.

Dialog

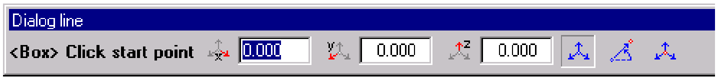
Whenever you click a function which expects you to enter points, the following data entry boxes and icons are displayed in the dialog line:



Dialog line

<Line> From point 0.000 0.000

Except for the **Draft**, **Text** and **Dimension Lines** modules in which the third dimension is usually not required, the z direction is also available:



Dialog line

<Box> Click start point 0.000 0.000 0.000

Preview snaps to points

Of course, you can snap to points and place them with the mouse as usual. But there is an innovative new feature when it comes to designing elements based on existing points:

when you move the crosshairs near a point (all you have to do is point to that point), the system snaps to this point. The point snapped is marked with a red X

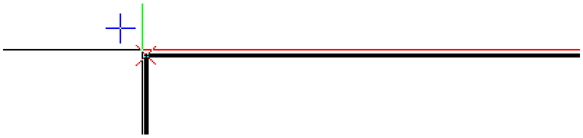
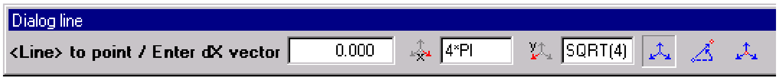


Fig.: point snapped; highlighted by a red X

Points snapped are displayed in all views.

The entries you make in the dialog line refer to this point. Use the TAB key or SHIFT+TAB to toggle between the data entry boxes. You can also do calculations (as with **Calculator**).



Dialog line

<Line> to point / Enter dX vector 0.000 4*PI SQRT(4)

Fig.: calculation: DX = 4π, DY = √4 = 2

Preview shows all points

The entries you make in the dialog line are displayed simultaneously in the preview. The red cross immediately goes to the point resulting from the entry you make.

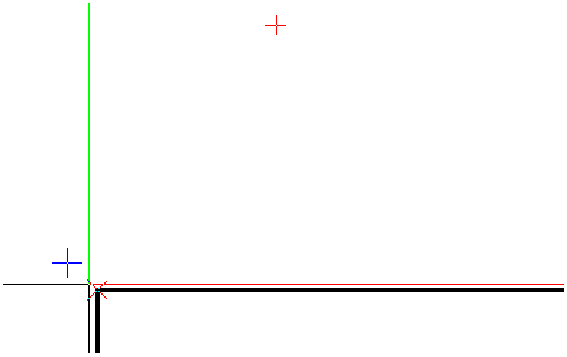
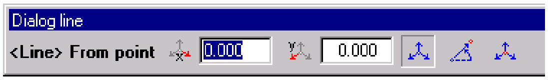


Fig.: preview of the point, at an offset of DX=2, DY=3 to the point snapped

When you press the Enter key or click in the workspace, the point you have just entered is used as the start point of the new element (line in this example) or as the reference point for modification tools.



Dialog line

<Line> From point 0.000 0.000

Fig.: press Enter or click in the workspace to place the point; the line is attached to the crosshairs

But before you place the point, you can also point to another point using the crosshairs: the offset you enter in the dialog line refers to the new point snapped.

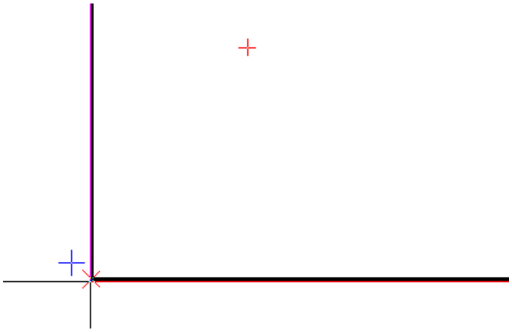


Fig.: preview of the point with an offset of DX=2, DY=3 refers to the new point snapped

Reference to point snapped or point placed?

When making entries in the dialog line, you can see at once whether your entries refer to a point snapped or to the point you placed last:

- In the case of points snapped, the data entry boxes are highlighted in yellow.
- In the case of points placed, the data entry boxes are highlighted in white.

Value entered is proposed

The icons beside the data entry boxes are buttons:
when you click an icon, the value entered is proposed for all further steps; but you can change it any time.

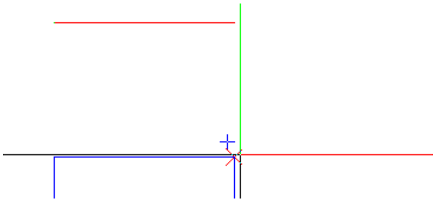


Fig.: DY=3 is proposed again for the next point snapped

Point assistant available on shortcut menu

Click with the right mouse button to access the functions in the **Point Assistant**. These tools assist you when snapping to and placing points.

Tip: When you point to an element and then click the right mouse button, the program automatically applies the tool selected on the shortcut menu to the element clicked and places the point.
When you opened the shortcut menu by clicking in the workspace, all you need to do is click an element.

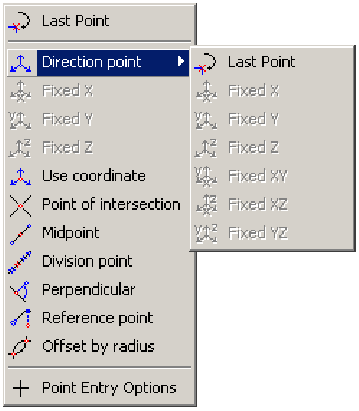


Fig.: point assistant via shortcut menu

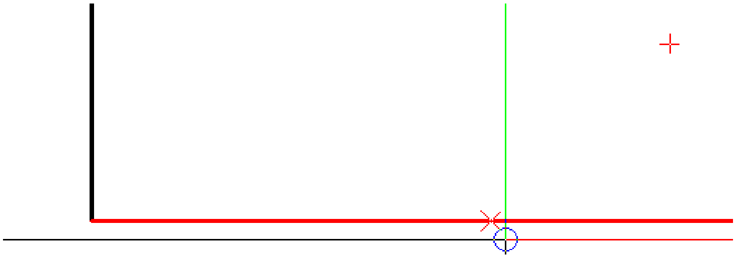


Fig.: the midpoint of an existing line can be determined quickly by opening the shortcut menu directly on the element

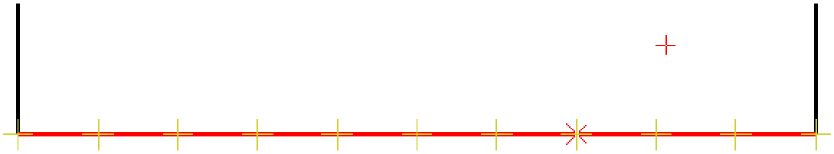


Fig.: division point

Context-dependent point assistant/dialog

The shortcut menu and/or dialog line only include those options that are appropriate to the tool currently selected:

- The **Outline Auto-Detect** tool is only presented for selection when the system expects you to enter an area.
- Only when you have enabled **Ortho Constraint** or **Cursor Snap,** will the system prompt for the DX/DY or length values.
- The **Use coordinate** option is only available with **Global coordinates.**
- When you have enabled **Ortho Constraint, Change direction** is presented on the shortcut menu.

Overview of tools provided on the shortcut menu

This section describes the functions of the **Point Assistant** which are available on the shortcut menu when the **Advanced point entry** is enabled. The other functions of the **Point Assistant** are explained on page 74 and the following pages.

Icon	Name	Use
	Last Point	The last point entered is used.
	Offset Point	The point snapped is fixed; the offset values entered in the x, y or z direction refer to this point even if the crosshairs snap to other points.
	Direction Point	The current coordinate is used as the fixed coordinate. You can select the x, y, or z coordinate or a combination thereof on the submenu.
	Define Point Symbol	When you employ the **Divide Element, Station Element** and **Perpendicular through Station** tools, you can make point settings here. For example, you can define the symbol used to represent the point (for single elements) as well the primary and secondary point number.

When you have enabled the **Advanced point entry**, functions you normally find on the **Point Assistant** toolbar are directly available in the dialog line, saving you unnecessary mouse clicks:

X, Y and Z Coordinate

Delta Point (reference to point snapped/defined)

Polar Coordinates

Global Point

Functions for entering an offset are provided for various elements (e.g. architectural elements and openings):

Offset to Reference Point

Offset to Element

Local or global coordinates

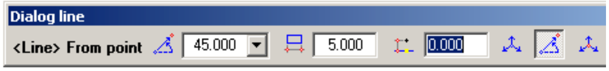
In the dialog line **Delta Point** (local coordinates) is usually set by default: in other words, the values you enter in the data entry boxes refer to the point snapped or the last point entered.

But you can switch to the global coordinate system at any time by clicking **Global Point**: then the values in the data entry boxes refer to the global point (X=0, Y=0, Z=0).

Points based on polar coordinates

When you click **Polar Coordinates** in the dialog line, you can enter the angle, length and offset length (from left to right) of the element in one go.

Click a different icon to disable this setting again.



Dialog line

<Line> From point 45.000 5.000 0.000

Entering points based on point snap and offset entry

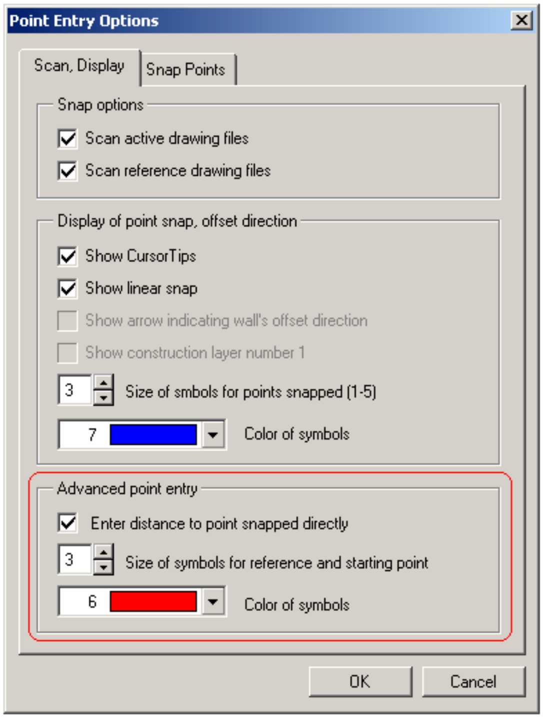
When you have enabled the **Advanced point entry**, you can enter points and elements by pointing to an existing point and entering the offset in the dialog line using coordinates relative to existing points.
In **Conventional point entry** mode, you use the brackets feature (see page 77).

Do the following:

- Use the crosshairs to point to the starting point.
  The system snaps to this point and a temporary marker appears on it.
- Enter the relative coordinates for x, y and z in the dialog line (use the TAB key to toggle between the data entry boxes).
- Place the point by pressing ENTER.

Adjusting the options

You can customize the **Advanced point entry** for your needs: click **Point Entry Options** on the shortcut menu.



Snap options

☑ Scan active drawing files

☑ Scan reference drawing files

Display of point snap, offset direction

☑ Show CursorTips

☑ Show linear snap

☐ Show arrow indicating wall's offset direction

☐ Show construction layer number 1

3 Size of smbols for points snapped (1-5)

7 🟦 Color of symbols

Advanced point entry

☑ Enter distance to point snapped directly

3 Size of symbols for reference and starting point

6 🟥 Color of symbols

Fig.: point entry options

You can make the following settings in the Advanced point entry area:

- **Enter offset to point snapped directly**
  When you have enabled this option, the entries you make in the dialog line refer to the point snapped.
  When this option is disabled, the following rules apply:
  - Entries in data entry boxes highlighted in yellow (relative to points snapped) are ignored.
  - Only when you have already placed a point are the values available in a data entry box (dX/dY/dZ) used as the difference from the start point placed to the end point.

  - If the values are set to 0, a point can be snapped. This point can be used directly (by clicking or pressing ENTER), or you can select **Offset point** on the shortcut menu.
    When you have selected **Offset point**, the offset entries you make refer to this point.
  - When no point is active and you select **Offset point**, the entries you make in the dialog line refer to the point snapped.

  Default: enabled.

- **Size of symbols for reference and starting point (1-5)**

  This is where you define the size of the marker of the reference and starting point.
  Default: 3

- **Color of symbols**

  This is where you define the color of the marker of the reference and starting point.
  Default: rot

Precision Drawing

With Allplan 2005, you can quickly create precise and exact designs without even knowing the coordinates of points or the length of elements, and without complex construction lines. You can match length values and coordinates from existing elements. In addition, you can perform calculations in the dialog line, as well as employ the measuring tools and the calculator, and then transfer the results you obtain into the dialog line.

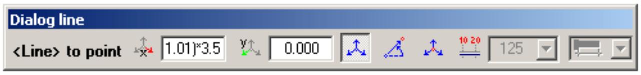
Entering length values and coordinates

General

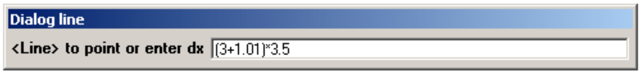
In Allplan 2005, length values and coordinates are always entered as real values. In other words, you do not need to recalculate the length each time to take the reference scale into account. For example, when designing a wall that is 8.60 m long, enter 8.6 (assuming that m is set for the unit of length).

Performing calculations in the dialog line

You can also perform calculations in the dialog line when the system prompts you to enter a length value.



<Line> to point 1.01)*3.5 0.000 125

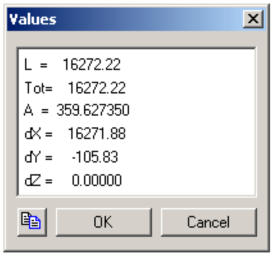


<Line> to point or enter dx (3+1.01)*3.5

Transferring measured values

Values obtained with **Measure** can be transferred directly to the dialog line by clicking the value to be transferred in the **Measure & Compute** dialog box.

Using , you can copy the result to the Clipboard and paste it into other Windows applications by means of CTRL+V.



```
L =   16272.22
Tot=   16272.22
A = 359.627350
dX =   16271.88
dY =    -105.83
dZ =    0.00000
```

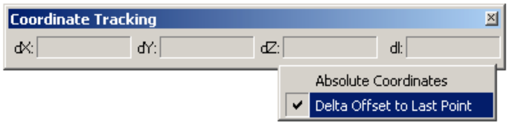
Transferring values from the calculator

Values you calculate with **Calculator** are transferred straight to the dialog line.

Displaying coordinates

The coordinates of the crosshairs in the x, y and z direction and the absolute distance to the last point entered are displayed on the **Coordinate Tracking** toolbar. On the shortcut menu you can specify whether the delta offset to the last point entered or the absolute coordinate values are displayed.

Note: Coordinates are not displayed in isometric views.



Tip: To determine the coordinates of a specific point in an element or to place a point by entering its coordinates, use **Global Point.**
To determine the point coordinates of an element, click the element with the right mouse button, select **Format Properties** and switch to the **Information** tab. The coordinates of all the points of the element you clicked are displayed.

Point snap

When you place a point with the left mouse button, you can snap to points on existing elements as you do so. You can snap to the following types of points: endpoints, midpoints, division points and points of intersection. You do not need to know the coordinates of these points, nor is it necessary to work with construction lines. When CursorTips are activated, a symbol (known as a CursorTip) is displayed at the center of the crosshairs. The CursorTip shows the kind of point that has been detected in the snap radius. Using + **Point Entry Options,** you can set the types of points the system is to snap and whether the system is to scan active, edit or reference drawing files for points.

By means of linear snap, you can align points exactly with existing points. Here, too, visual aids are provided to facilitate the process.

Note: If you have set a cursor snap angle, then this will have priority over any point snap settings you have made, as well as any other settings in the **Point Assistant**. This means that only points in alignment with one of the set cursor snap angles will be snapped.

Using CursorTips

When CursorTips are activated, CursorTips are displayed at the center of the crosshairs before you set points. These CursorTips indicate the type of point detected within the snap radius. CursorTips are displayed after you have activated a drawing tool (the Line tool, for example) and you move the crosshairs across the workspace. You can use + **Point Entry Options** in the **Point Assistant** to configure which types of point the system is to look for. The following CursorTips are displayed to indicate the different types of points:

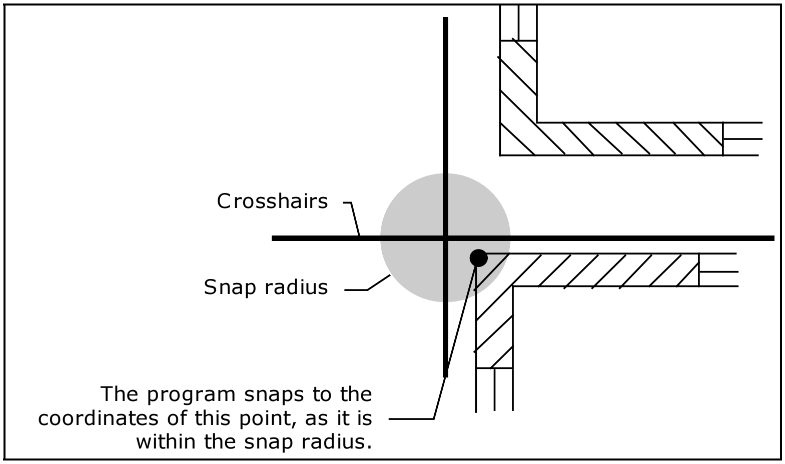
Icon	Meaning
○	**Free point**: There is no defined point within the snap radius. The circle represents the size of the snap radius.
+	**End point**: Snaps to the nearest element endpoint. This option cannot be deactivated.
×	**Intersection**: Snaps to the point of intersection between two elements within the snap radius.
∤	**Midpoint**: Snaps to the nearest midpoint of a line or polygon inside the snap radius.
⊗	**Element**: Snaps to the nearest point on an element within the snap radius.
⌗	**Gridpoint**: Snaps to the nearest gridpoint inside the snap radius.
	Note: ⌗ Define Grid Settings defines the settings for the grid. The grid is only visible when ⌗ **Grid on/off** (on the **Special** toolbar) is active. Gridpoints are snapped even when the grid is not displayed.
◇	**Linear snap using middle mouse button or CTRL + left mouse button**: The nearest point in the detection radius is snapped with the middle mouse button or CTRL + left mouse button (depending on the setting in **Global Options**) when placing points. This way, you can quickly draw mutually perpendicular lines. This option cannot be deactivated.

Point snap with the left mouse button

You can snap to points on existing elements. These points include endpoints, midpoints, division points and points of intersection. You do not need to know the coordinates of these points, nor is it necessary to work with construction lines.

Allplan 2005 scans for points within a defined radius about the crosshairs. This means that when you point or click in the workspace, the system “snaps“ to points within a specific distance (the snap radius), even if the center of the crosshairs is not positioned directly over the point. Specify the snap radius in + **Point Entry Options** (**Point Assistant** on the shortcut menu) in the **Snap Points** tab.

Depending on the setting made in + **Point Entry Options**, the snap radius can apply to the active drawing file or may also include passive drawing files (i.e., drawing files open in edit or reference mode).


Crosshairs
Snap radius
The program snaps to the coordinates of this point, as it is within the snap radius.

Note: In ⁝ **Global Options** you can configure the system to emit an acoustic signal whenever you place an undefined point.

Linear snap

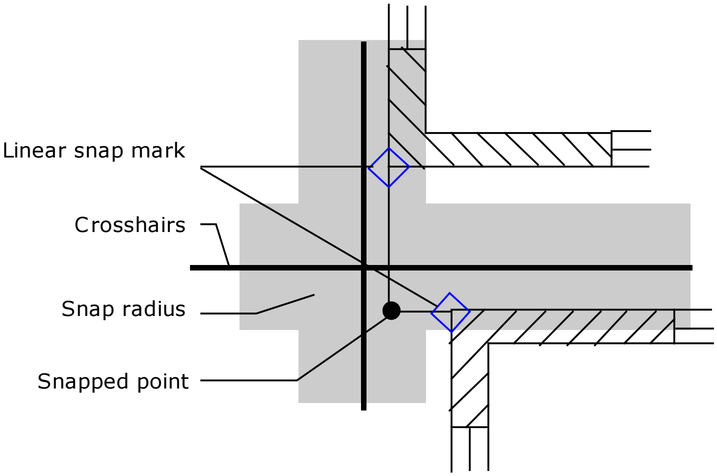
You can use linear snap to place points so that they are in direct alignment with existing points. To do this, use the middle mouse button or CTRL + left mouse button (depending on the setting in **Global Options**). If the system finds a point within the snap radius, the point set is placed in such a manner that it is exactly aligned with the nearest point found inside the snap radius.

Alignment is based on the selected system angle.

If the **Show linear snap** option in **Point Entry Options** is enabled, the program highlights the points that are in perpendicular alignment before a button is pressed and creates temporary construction lines stretching to the point. This provides a better visual check when using the linear snap tool.

Tip: Drafting using linear snap is mainly useful with drawings consisting of few design entities. It becomes more difficult to align with the correct point as the number of design entities increases.

Note: Pressing the SHIFT key during this process will temporarily hide the linear snap feature.



Point Assistant toolbar

The **Point Assistant** includes tools to assist you in the process of entering points. With **Advanced point entry** being enabled, the tools provided in the point assistant are available in the dialog line and on the shortcut menu. In **Conventional point entry** mode, these functions are included in a toolbar.

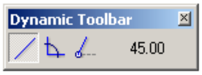
The tools only become active when the program expects you to enter a point - after selecting an entity creation tool, for example.

Icon	Point Snap	Use
	Global Point	Finds a point based on its coordinates. You can also get the coordinates of an existing point by clicking it or entering its point number.
x	Delta Point	Finds a point based on its offset in the X direction relative to the last point entered.
y	Delta Point	Finds a point based on its offset in the Y direction relative to the last point entered.
z	Delta Point	Finds a point based on its offset in the Z direction relative to the last point entered.
	Polar Coordinates	Places a point at a specific distance and a given angle from the last point.
	Offset by Line	Places a point on an element that is at a specific distance from a (reference) point. The reference point is displayed as a direction symbol and is located at either the start or the end of the element, depending on which is nearest to the point you clicked. The distance between the displayed reference point and the contact point is displayed in the dialog line.
	Division Point	Divides a line that you enter or an element into an arbitrary number of segments. The division points can be addressed by clicking or entering a number.
	Point of Intersection	Snaps to the point of intersection between two elements.
	Get Midpoint	Finds the midpoint of an element (e.g., a line) or a line that you enter.
	Offset by Radius	Finds a point obtained from the point of intersection of two new circles that you enter.
	Perpendicular	Finds the point on an element that is obtained by dropping a perpendicular line from an arbitrary point onto the element.
	Define Point Symbol	When you employ the **Divide**, **Station Element** or **Perpendicular through Station** tools (in the **Site Plan** module), you can make additional point settings in the Point Assistant.

Icon	Point Snap	Use
◇	Outline Auto-Detect on/off	Enables/disables the automatic detection of closed, delimited areas.
+	Point Entry Options	Opens a dialog box in which you can make settings for CursorTips and the **Advanced point entry**.
Σ	Brackets	Enables the bracket feature.

Setting a cursor snap angle and using drawing aids

When you draw linear elements (a wall or a line, for example), you can draw either freely or you can restrict the direction in which you draw to a specific angle. You can select one of the methods presented on the Dynamic toolbar after you have placed the first point.



You can restrict movement to either horizontal/vertical (ortho constraint) or set a cursor snap angle of your choice. The current setting for the system angle is taken into account. For example, if the system angle is set to 30 °, then this is interpreted as being horizontal.

Note: If you have set a cursor snap angle, then this will have priority over any point snap settings you have made, as well as any other settings in the **Point Assistant**. This means that only points in alignment with one of the set cursor snap angles will be snapped.

You can use the following options on the Dynamic toolbar to restrict cursor movement to a specific direction or angle:

Icon	Function	Use
/	Normal line	The lines can be drawn at any angle. This is the default setting.
⊾	Lines at right angles (ortho constraint)	The line can only be drawn at right angles to the current system angle.
∠	Cursor snap	The line can only be drawn at specific angles.
45.00	Cursor snap angle	Define the cursor snap angle here.

Using the bracket feature

With the bracket feature, you can enter points and elements using coordinates relative to existing points. You can also use this feature to select multiple elements.

Using the bracket feature to enter points (not with advanced point entry)

Note: When you have enabled the **Advanced point entry**, you can enter points by pointing to the starting point and entering **Delta Points** in the dialog line.

Tip: You can also open/close these metaphorical brackets by right clicking in the workspace.

- Activate the brackets with Σ **Brackets** on the **Point Assistant** toolbar.
- Click a reference point.
  A temporary marker appears on the point.
- Enter the relative coordinates until you find the drop-in point.
- Press Σ **Brackets** to close the bracket feature.

Using the bracket feature to select elements

- Activate the brackets with Σ **Brackets** on the **Filter Assistant** toolbar.
- Click elements and/or open selection rectangles or fences.
- Press Σ **Brackets** to close the bracket feature.

Polyline entry tools

The general polyline input is used to enter polylines and polygonal-bounded areas. It is used by countless Allplan 2005 functions, e.g., when entering hatching, applying a fill or entering a room.

You can enter the polyline from scratch using the drawing aids on the Dynamic toolbar or you can use existing outlines or elements.

Tip: The easiest alternative is to enter a rectangle by setting two diagonally opposite points and then pressing ESC.

Basic polyline input rules

- Entering two points and pressing ESC automatically creates a rectangle.
- Polylines that have to be closed (e.g., for hatching), close automatically when you press ESC or when the last point coincides with the first.
- When you click an element, you can either define a point on the element or choose to use the entire element.
  When you click Options on the Dynamic toolbar, you can make additional settings.
- You can create areas composed of any number of areas by clicking **Multi** on the Dynamic toolbar and then using **Plus** and **Minus** to define whether the area is to be added or subtracted from the overall area.
- You can use **Outline Auto-Detect** to quickly select closed outlines.

Applying Hatching, Patterns or Fills

You can apply hatching, patterns or fills to areas in order to define different materials or to visually highlight areas. In addition, you can apply bitmaps to areas or use architectural surface styles for 2D areas (we will use the term 'surface element' to refer to the wide range of options provided by Allplan).

The library of hatching styles that ships with Allplan 2005 includes a wide range of hatching styles and patterns. However, you can also define your own hatching styles and patterns (click **Defaults** on the **Tools** menu) or modify those that come with the program. You can display the boundary of hatching, patterns and fills as a construction line by setting the appropriate option in **Show/Hide.**

Areas where surface elements (e.g. hatching, patterns or fills) are to be applied are best entered using a standard polyline.

The following tools are available for entering filled areas:

Icon	**Function**	**Use**
▨	Hatching	You can use this tool to apply hatching to an area.
▦	Pattern	You can use this tool to apply a pattern to an area.
🪣	Fill	You can use this tool to apply a color fill to an area.
🖼	Bitmap Area	You can use this tool to place bitmaps on surfaces.
▨	Area Style	You can use this tool to apply architectural surface styles to 2D areas.

The following tools are available for modifying filled areas:

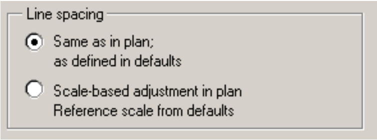
Icon	Function	Use
	Reshape Surface Element, Architectural Area	You can use this tool to add areas to hatching, patterns, fills, bitmaps or architectural elements (slabs, rooms, net stories, floors, ceilings, roof covering) or remove such areas.
	Split Surface Elements, Archit. Elements	You can use this tool to split hatching, patterns, fills, bitmaps and architectural elements (walls, columns, slabs, beams, upstands, rooms, net stories, floors, ceilings) into two parts. This can be useful if you need to split up the 3D plan for creating the plan or plot.
	Merge Surface Elements, Archit. Elements	You can use this tool to merge two areas of hatching, patterns, fills, bitmaps and architectural elements (walls, slabs, beams, upstands, rooms, net stories, floors and ceilings) to form a single element.
	Convert Surface Element	You can use this tool to convert surface elements (hatching, patterns, fills or bitmaps) to surface elements of the same or different type. You can also use the tool simply to modify the properties of a surface element.
	Stretch Entities	You can use this tool to modify the outline of filled areas.

Hatching and Reference Scale

Whenever you apply hatching, you can specify whether the spacing between the hatching lines is to remain constant or change dynamically with the reference scale. This means that you can distinguish between hatching used to display real objects, and symbolic hatching, e.g., concrete hatching. Tiles should appear larger or smaller depending on the selected reference scale. Symbolic hatching, on the other hand, should have the same spacing between lines regardless of scale.

You can make this setting in two places

- In the hatching properties when you create an area with hatching: Here, you can specify whether the hatching is to adapt to the scale or remain constant, regardless of the scale.

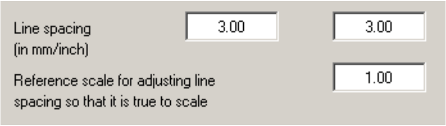


Line spacing

● Same as in plan;
as defined in defaults

○ Scale-based adjustment in plan
Reference scale from defaults

- In hatching defaults: Here, you can set the spacing between hatching lines (for the **Scale-based adjustment in plan** setting) and the scale to which the line spacing is to apply. This setting also defines how component hatching behaves.



Line spacing (in mm/inch)	3.00	3.00
Reference scale for adjusting line spacing so that it is true to scale		1.00

Note: When you change the defaults, all the areas where this hatching style has been applied also change.

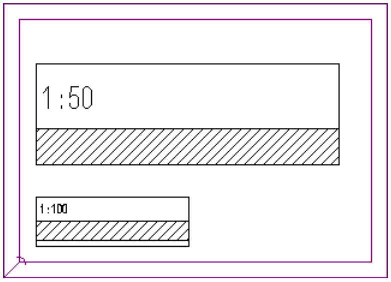
'Same as in plan' hatching setting

When you have enabled the **Same as in plan** option, the spacing between the hatching lines in layouts always remains constant, regardless of the scale. Components like walls are based on this setting when a value of 1 is set for the **Reference scale for adjusting line spacing so that it is true to scale** setting in the hatching defaults.

But the display of hatching styles in layouts differs from that in drawing files. The display in layouts is of relevance.

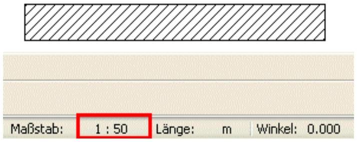
Display in layouts

The spacing between the hatching lines is the same at 1:50 as well as at 1:100 but the number of lines doubles. The spacing is based on the value entered for the line spacing in the hatching defaults (regardless of the scale).

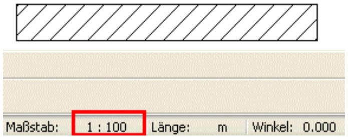


Display in drawing files

As the number of hatching lines doubles, the display in drawing files changes associatively with the reference scale.



Maßstab: 1 : 50 Länge: m Winkel: 0.000



Maßstab: 1 : 100 Länge: m Winkel: 0.000

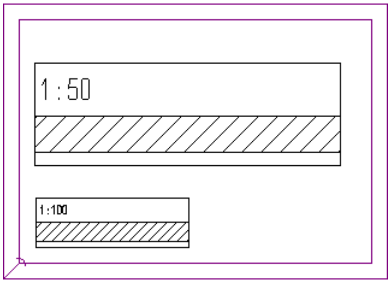
‘Scale-based adjustment in plan’ hatching setting

When you have enabled the **Scale-based adjustment in plan** setting, the spacing between the hatching lines changes associatively with the scale. Components like walls are based on this setting when a value > 1 is set for the **Reference scale for adjusting line spacing so that it is true to scale** setting in the hatching defaults.

But the display of hatching styles in layouts differs from that in drawing files. The display in layouts is of relevance.

Display in layouts

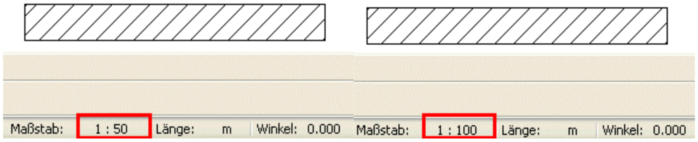
The spacing between the hatching lines is at 1:50 twice as large as at 1:100 but the number of lines remains constant. The spacing is based on the value entered for the line spacing in the hatching defaults and on the reference scale.



Example: You are using hatching 1 with the following settings: the line spacing is 3 mm and the ‘Reference scale for adjusting line spacing so that it is true to scale’ is set to 1:100. This hatching is created in the drawing file with the **Scale-based adjustment in plan** setting being enabled and placed in the layout at a scale of 1:50. The spacing between the hatching lines in the layout is calculated according to the following formula: Line spacing (from defaults): reference scale x scale of layout; i.e. in this example: 3mm : 1/100 x 1/50 = 6mm. At a layout scale of 1:100, the line spacing is 3mm.

Display in drawing files

As the number of hatching lines remains constant, the display in the drawing file does not change when you switch to a different reference scale.



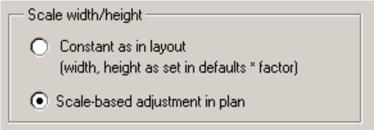
Maßstab: 1 : 50 Länge: m Winkel: 0.000

Maßstab: 1 : 100 Länge: m Winkel: 0.000

Pattern and Reference Scale

The size of a pattern or pattern element and its display at different reference scales depends on three factors:

- the height and width of an pattern element. These values are set in the pattern defaults (on the **Tools** menu – **Defaults** – **Pattern**).
- the **Scale-based adjustment in plan** and **Constant as in layout** options. You can make these settings in the pattern parameters (**Pattern** tool- **Properties**).

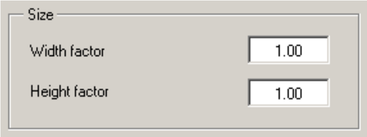


Scale width/height

○ Constant as in layout
(width, height as set in defaults * factor)

● Scale-based adjustment in plan

- the values for the height and width factor of the pattern. You can also enter these values in the pattern parameters.



Size

Width factor 1.00

Height factor 1.00

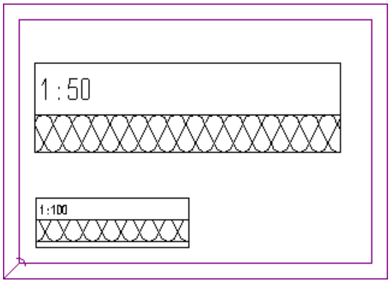
‘Constant as in layout’ pattern setting

When the **Constant as in layout** setting is enabled, the size of the pattern elements in layouts always remains constant, regardless of the scale used to place the layout elements.

But the display of patterns in layouts differs from that in drawing files. The display in layouts is of relevance.

Display in layouts

The size of the pattern elements is the same at 1:50 as well as at 1:100 but the number of pattern elements doubles. The size is based on the value entered in the pattern defaults and on the width/height factor, which is defined in the pattern parameters.



Example: You are using pattern 301 and the height of one pattern element in the layout should be 10 mm. In the pattern defaults, a height of 100 mm is defined for pattern 301. You therefore need to enter a factor of 0.10 in the pattern parameters (pattern height x factor = height of one pattern element in the layout). This yields a height of 10 mm (100 mm x 10), regardless of the scale set.

Display in drawing files

As the number of the pattern elements doubles, the display of patterns in drawing files changes associatively with the reference scale.

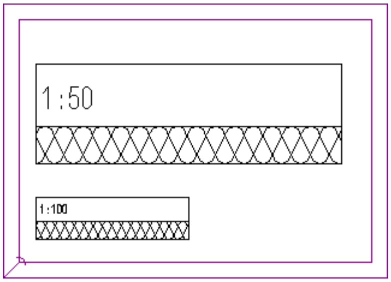
'Scale-based adjustment in plan' pattern setting

When the **Scale-based adjustment in plan** option is enabled, the size of the pattern elements in the layout changes associatively with the scale. Components like walls are based on this setting.

But the display of patterns in layouts differs from that in drawing files. The display in layouts is of relevance.

Display in layouts

The size of the pattern elements is at 1:50 twice as large as at 1:100 but the number of pattern elements remains constant. The size of a single pattern element depends on the following settings: the value set in the pattern defaults, the height/width factor specified in the pattern parameters and the scale at which the layout element was placed.



Example: You are using pattern 301 and the height of one pattern element in the layout should be 10 mm. In the pattern defaults, a height of 100 mm is defined for pattern 301. You therefore need to enter a factor of 10 in the pattern parameters (height of a pattern element in the layout = pattern height defined in the defaults x factor x layout scale). At a scale of 1:100, the height is 10mm (100mm x 10 x 1/100); at a scale of 1:50, the height is 20mm.

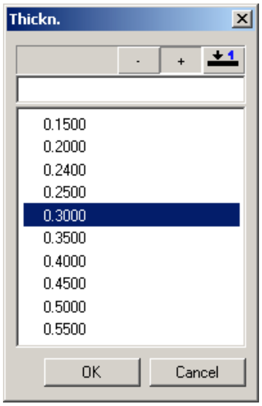
Display in drawing files

As the number of the pattern elements remains constant, the display of patterns in drawing files does not change when you switch to a different reference scale.

Working Efficiently Using Libraries, Favorites and Defaults

Default settings

You can save frequently used settings or values in dialog boxes as favorites and retrieve these whenever they are needed. For example, you can save different wall thickness in the **Wall** dialog box.



0.1500
0.2000
0.2400
0.2500
0.3000
0.3500
0.4000
0.4500
0.5000
0.5500

Click + to add a new wall thickness value.

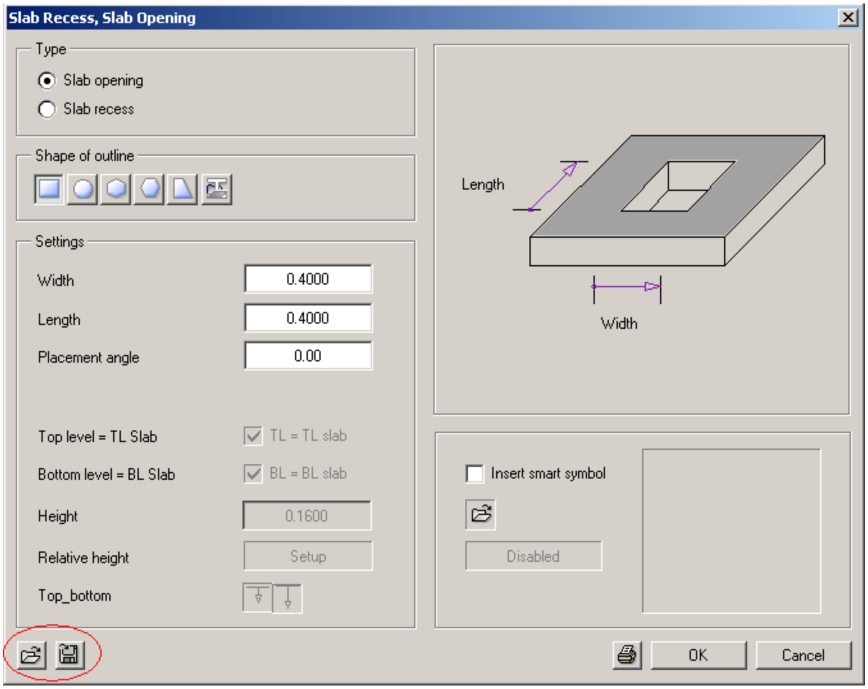
Click - to remove a wall thickness value.

Enter a value and click to look for the wall thickness specified.

Saving components as favorites

You can define frequently used components as favorites (standard components) and store these in a component-specific library. This is especially useful if you are working in a team. The use of standard components not only means that they are readily available, but also reduces the risk of errors.

You can save walls, doors and windows as favorites. You can even save dimension lines as favorite files. All you need to do is click 💾 at bottom left in the component's property dialog. The example below shows the property dialog for a slab opening.



Slab Recess, Slab Opening

Type

● Slab opening

○ Slab recess

Shape of outline

Settings

Width 0.4000

Length 0.4000

Placement angle 0.00

Top level = TL Slab ☑ TL = TL slab

Bottom level = BL Slab ☑ BL = BL slab

Height 0.1600

Relative height Setup

Top_bottom

☐ Insert smart symbol

Disabled

Note: The layer currently set is also saved. When you retrieve favorite files later, this layer is automatically set as the current layer.

Use 💾 to save entire components as favorites. Favorite files are given element-specific or component-specific filename extensions.

Click 📂 to retrieve favorite files (standard components).

Using symbols

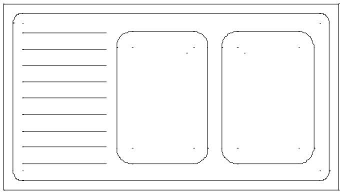
A symbol is essentially a file consisting of any number of design entities. Symbols can be used repeatedly within a drawing. The size of a symbol is practically unlimited. You can even save an entire drawing file as a symbol.

The following tools on the **Standard** toolbar can be used to save and retrieve symbols:

Get from Library

Write to Library

Allplan 2005 ships with a set of basic symbols. However, you can also create your own symbols or purchase various symbol catalogs from Nemetschek.



Symbols provide the following advantages:

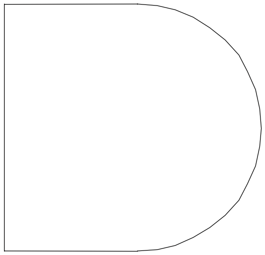
- You can create a library of symbols that contains frequently used components. Instead of drawing the component from scratch each time, just retrieve the symbol from the symbol file.
- Symbols are placed as an entity group. This means that they can be addressed (click with the middle and left mouse buttons) and modified as a single entity. You can also modify each individual element separately.
- You can also access the extensive symbol catalogs offered by Nemetschek. A lot of the symbols offered here will display with different levels of detail, depending on the scale that is set.

Symbols automatically adapt to the reference scale. If your symbols include text, then this, too, can be made to change with the reference scale.

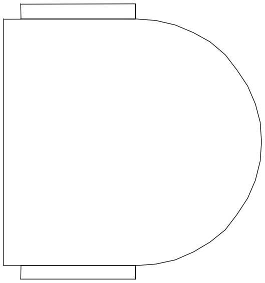
Using smart symbols

A smart symbol is an intelligent symbol whose appearance changes dynamically with the reference scale and view. A smart symbol is composed of several display foils. One foil might contain a 2D representation of an element, while another might include the same element in 3D. Yet another foil can contain a simple representation of the element at 1:100, while another could show a complex representation of the element at 1:10.

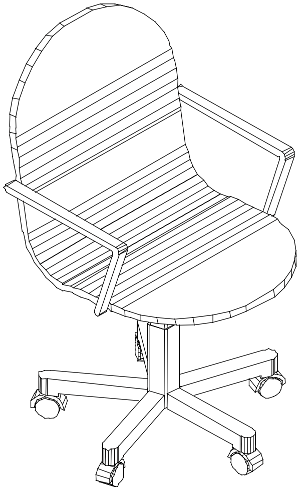
A smart symbol can have a very simple or very complex structure.



Display at a
scale of 1:200



Display at a
scale of 1:100



Displayed in isometric
view

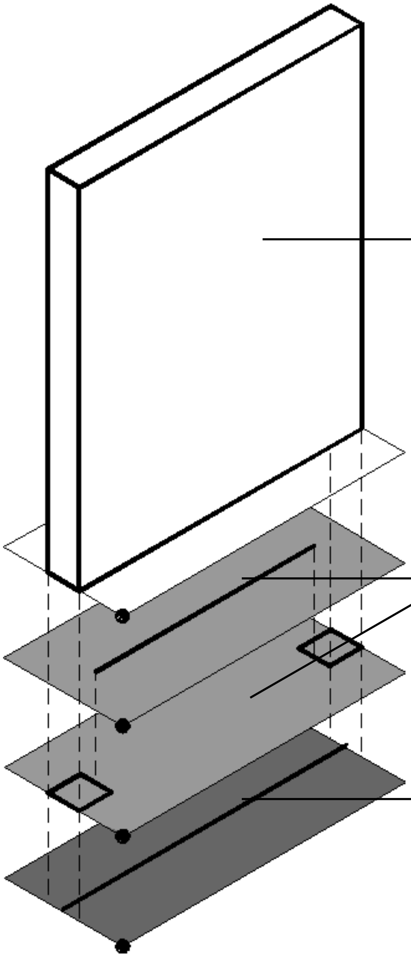
Properties of smart symbols

- Smart symbols take up less space. Once you have placed a smart symbol, all the other instances of the smart symbol simply reference the first instance. This means that, regardless of how many times you actually place a smart symbol, only the disk space for a single instance is required (as opposed to symbols).
- When you use **Modify Display Parameters** to modify an instance of a smart symbol, this modification automatically applies to all the instances of the smart symbol in the same drawing file.
- After you have placed a smart symbol, it no longer references the smart symbol stored in the catalog. This means that overwriting a smart symbol in the catalog with another smart symbol will not affect the instances of the original that have already been placed. If you have the **Smart Symbols** module, you can also use **Update Placed Smart Symbols Based on Catalog** to update placed instances of the smart symbol.
- Checking for design alternatives is drastically simplified. With smart symbols, you can replace all instances of a smart symbol or just a single instance.
- In conjunction with the **Object Manager** module, smart symbols can be assigned attributes (e.g. item number, price) for subsequent analyses in lists and schedules.

Components of a smart symbol

A smart symbol consists of two- and three-dimensional design entities. Allplan 2005 uses the definition and assignment of the individual foils to reassemble the smart symbol for different scales and display modes. The exact position of the foils is preserved, even when you resize a smart symbol. This is made possible by setting a reference point and so-called resizing points.

When you design a smart symbol, you can define areas of the design entity as being dynamic (resizable) or static. A good example is a window frame whose sections remain constant - as opposed to the glass surface whose height and width needs to be variable.



3D view

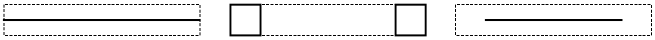
2D view at a scale of 1:1 to 1:99.
This display consists of two foils, as the profiles are to remain constant while the glass surface is to be resized.

2D view at a scale of 1:100 to 1:500

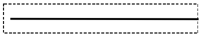
General approach for defining smart symbols

Follow the steps below to define a smart symbol

1. Draw all the elements that are to make up the smart symbol. If the smart symbol is to consist of several congruent foils for different reference scales and/or views, place the elements that belong together beside or below each other in the workspace; this will facilitate the process of selecting foils and setting reference points.

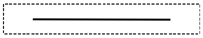
2. Activate the **Smart Symbol** tool (**Create** menu → **Bonus Tools** → **Smart Symbols**), select the catalog where the smart symbol is to be stored, enter a name for it and assign parameters.
3. Select the elements to be placed on the first smart symbol foil.

   Foil 1

4. Define the other foils.
   Every area that is subject to a separate resizing definition gets its own foil.

   Foil 2

   Foil 3

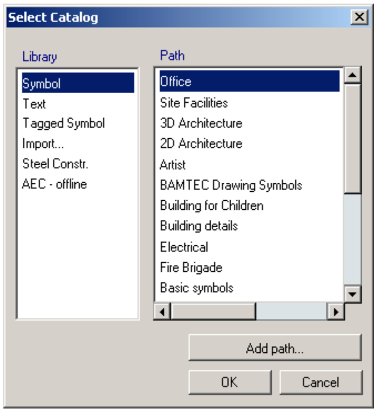
5. Define the smart symbol's MinMax box.

Use **Get from Library** (**Standard** toolbar) to insert the smart symbol in the workspace.

Paths in Allplan 2005

When saving or retrieving standard components, symbols and smart symbols, the system will prompt you to specify a path for the files in question. The example below shows the dialog that is displayed when saving a symbol.

The distinction between the Office, Private and External paths is particularly important in a network environment. However, you can also structure your data if you are using a standalone version.



Path	Meaning
Office	The files in this folder are available to all users in the network. By using an office standard, you ensure that the plans in your office have a uniform appearance. The office standard can only be modified by the system administrator.
Private	The files in this folder are only available to one specific user.
Project	The files in this folder are only available in one specific project.
External data buffer	The files in this path are for backing up or exchanging data.
Your own path	When saving or retrieving symbols or smart symbols, you can define your own paths and save them under a name of your choice by clicking **Add Folder...**.

Unit 2: First Steps

This unit has two exercises that focus on the following modules:

Draft

Text

Dimension Lines

- You will draw a title block that you save as a file that you can use again later.
- You will draw a railing detail including dimensioning information and hatching.

A short troubleshooting section is provided at the end to make sure you succeed.

Initial Settings for Exercises 1 and 2

The first two exercises are designed to provide you with a detailed understanding of the drafting tools in Allplan 2005. The options available for managing projects and drawing files are described only briefly; these topics are covered in detail in later chapters. Detailed information on project organization is provided in unit 3.

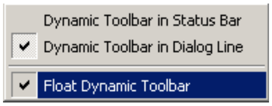
We will start by making the following settings.

The **Dynamic toolbar** should be located at bottom right in the status bar (this is the default). Float the toolbar so that it is always visible.

To float the dynamic toolbar

1 On the **View** menu, point to **Toolbars** and select **Dynamic Toolbar.**

2 Click **Float Dynamic Toolbar** if this setting has not already been activated.



Dynamic Toolbar in Status Bar
☑ Dynamic Toolbar in Dialog Line
☑ Float Dynamic Toolbar

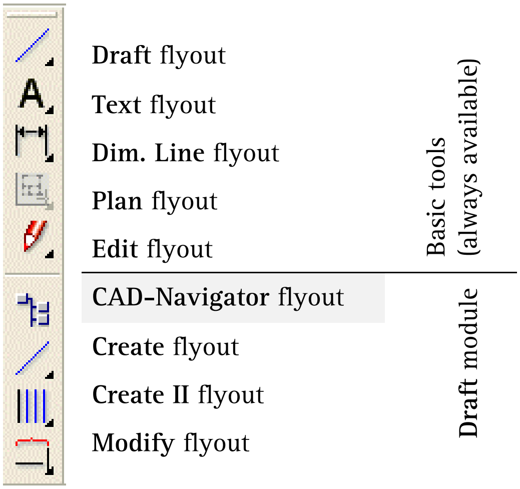
This tutorial uses the **Architecture Configuration.**
Not only are all the tools you need immediately at hand, but this also ensures that the maximum amount of space possible is available to you on screen.

To set the architecture configuration

- On the **View** menu, click **Default Configurations** and select **Architecture Configuration.**

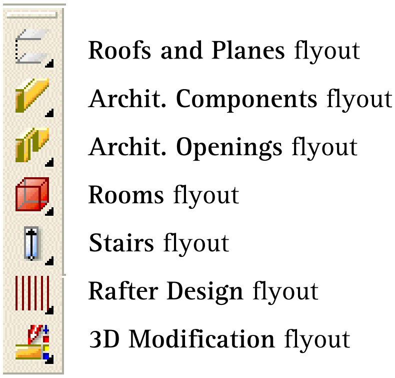
In the **CAD Navigator** in the **Basic** family, select the **Draft** module.

The **Basic Tools** toolbar should now look like this:



Tip: All the flyout toolbars referred to can be found in the "Appendix, Overview of Tools".

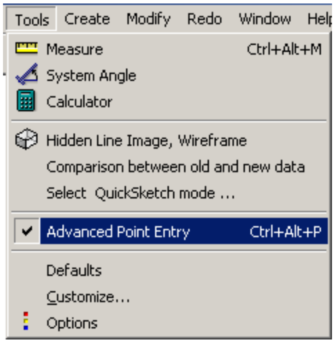
The **Architecture** toolbar consists of the following flyouts:


Roofs and Planes flyout
Archit. Components flyout
Archit. Openings flyout
Rooms flyout
Stairs flyout
Rafter Design flyout
3D Modification flyout

This tutorial uses the **Advanced point entry**.
It is usually enabled by default.

To enable the Advanced point entry

- Open the **Tools** menu and check that the **Advanced point entry** is active.
  If not, enable it.


Tools
Create
Modify
Redo
Window
Help
Measure Ctrl+Alt+M
System Angle
Calculator
Hidden Line Image, Wireframe
Comparison between old and new data
Select QuickSketch mode ...
✓ Advanced Point Entry Ctrl+Alt+P
Defaults
Customize...
Options

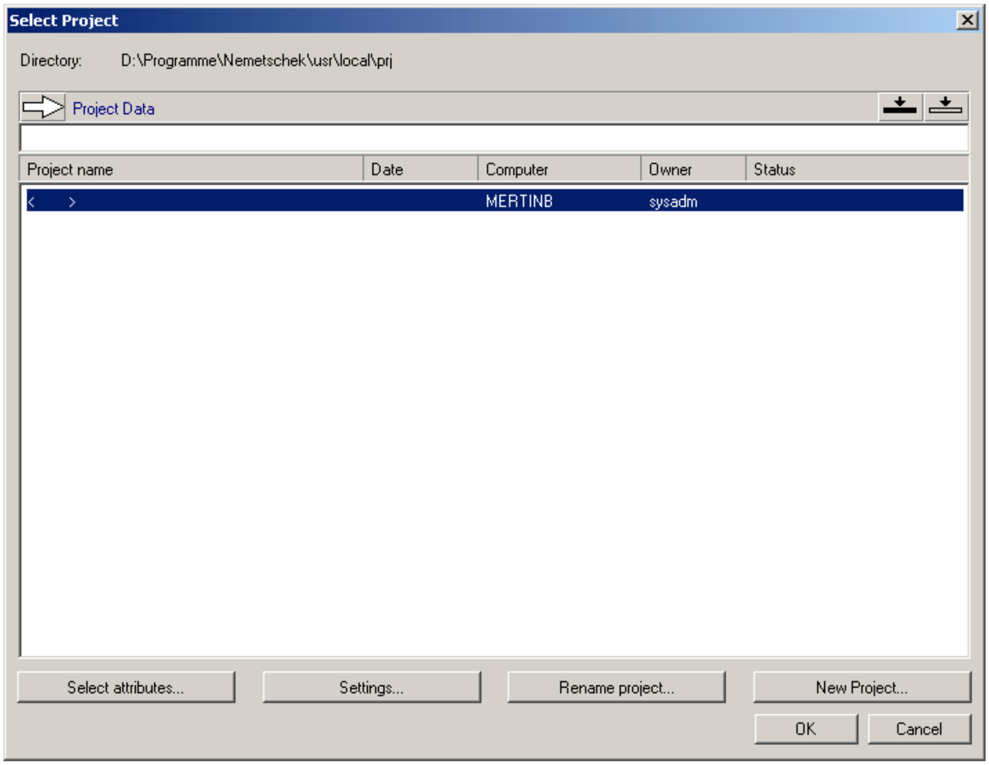
A message appears announcing that the Advanced point entry is enabled. Click **OK**.

In Allplan 2005, you work with drawing files. Drawing files are organized by **project**.

If you have not yet created any projects on your computer, the ”unnamed project” – also referred to as the ’private’ project – is automatically the active project.
This is the project we will use for the initial exercises.

To select a project

1. On the **File** menu, click **Open Project...** .
2. Click the < > project and press **OK** to confirm the dialog box.

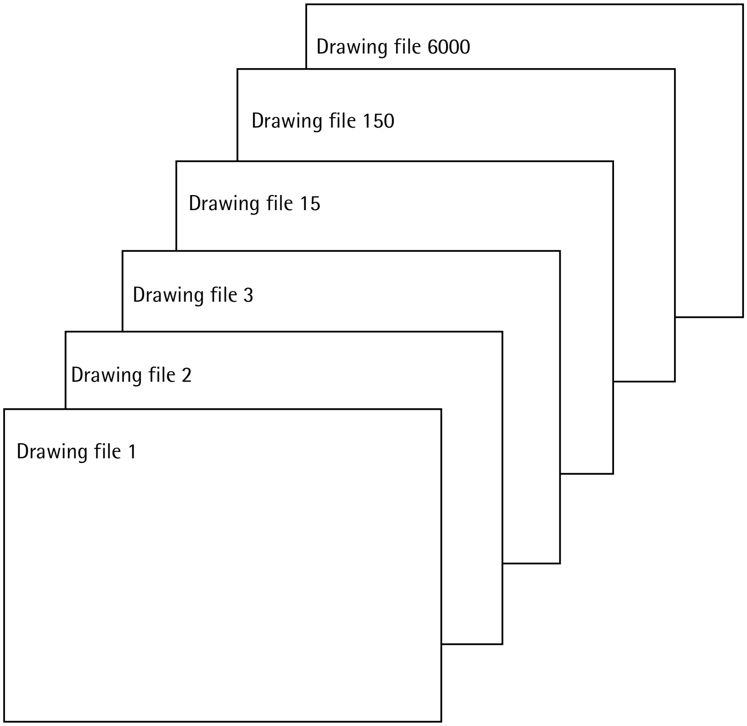


Directory: D:\Programme\Nemetschek\usr\local\prj

Project name	Date	Computer	Owner	Status
< >		MERTINB	sysadm	

Understanding drawing files

In Allplan 2005, the actual design and data creation process happens in *drawing files*. These are the equivalent of the transparencies used in conventional building design. Drawing files can be used to give projects a structure. In IT terms, a drawing file is a conventional file stored on your hard disk. You can display and edit up to 60 drawing files at once - in other words, you can have several files open simultaneously. A project can contain up to 6000 drawing files. When working without layers, the individual building elements (such as walls, stairs, labeling, etc.) are drawn on different drawing files and superimposed like transparencies.

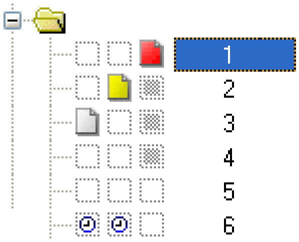


In order to edit the drawing files, they have to be activated (opened). This is done in the **Open on a project-specific basis: files and filesets** dialog box.

Drawing file status

With the drawing file status, you define the drawing file on which you draw and which drawing files are visible and/or can be modified.

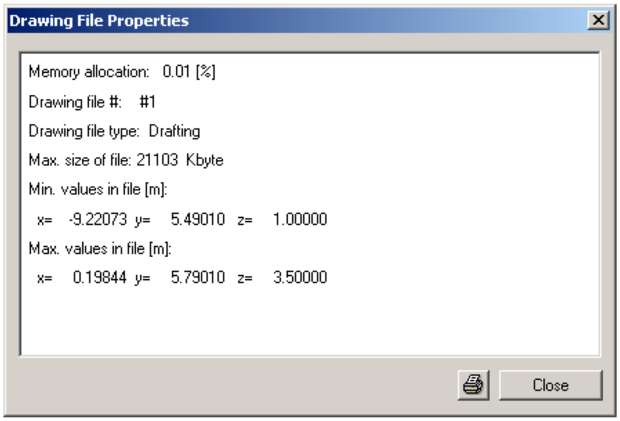
The following illustration shows the different drawing file statuses. An explanation is provided in the table below.



Number	Drawing file status	Remark
1	Active drawing file	The active drawing file is the one on which you draw. There must always be one active drawing file.
2	Drawing file open in edit mode	Elements in edit mode drawing files are visible and can be modified. You can open up to 60 drawing files in edit and/or reference mode.
3	Drawing file open in reference mode	Elements in drawing files that are open in reference mode are visible, but cannot be modified. In the **Global Options**, you can configure the program to display all the elements in reference drawing files using a single color. Empty drawing files cannot be opened in reference mode.
4	Inactive	Elements on inactive drawing files are not visible.
5	Empty drawing file	Empty drawing files have no data type icon.
6	Drawing file assigned temporarily	The drawing file is assigned temporarily to the fileset; this assignment is deleted when you switch to a different fileset.

Information on the active drawing file

To get information on the active drawing file, click in the workspace with the right mouse button and on the shortcut menu, choose **Drawing File Properties**. An information box with all the important information about the drawing file opens.



Memory allocation: 0.01 [%]
Drawing file #: #1
Drawing file type: Drafting
Max. size of file: 21103 Kbyte
Min. values in file [m]:
x= -9.22073 y= 5.49010 z= 1.00000
Max. values in file [m]:
x= 0.19844 y= 5.79010 z= 3.50000

Information	Meaning
Memory allocation	This shows how much of the memory reserved for a drawing file has already been allocated (as a percentage). Background information: a certain amount of memory is reserved for drawing files.
Drawing file number	The number of the current drawing file is displayed here. The number is also displayed in the title bar of the Allplan application window.
Drawing file type	The drawing file type is displayed here. This corresponds to the data type icon that is displayed in the status bar.
Max. size of drawing file	The maximum amount of memory available for the drawing file is displayed in Kbytes.
Minimum/maximum values in drawing file	The minimum and maximum coordinates in the drawing file are displayed here.

For the exercises in this unit, you will be using empty drawing files. First, though, you need to name them. We will now open a drawing file.

To name and select drawing files

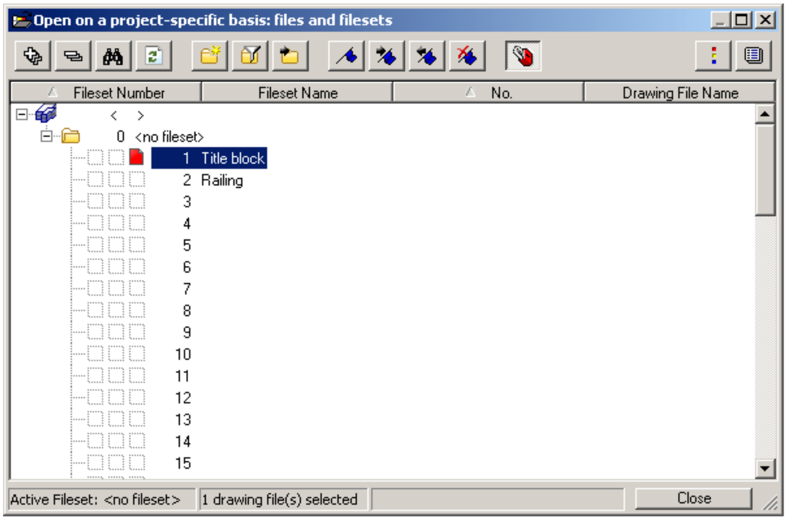
1 Click **Open on a project-specific basis** (**Standard** toolbar)

2 Click drawing file number **1** with the right mouse button and on the shortcut menu, choose **Rename**.

You can now enter a name for the drawing file.

3 Enter **Title block** and press ENTER to confirm.

Tip: To change the status of a selection box, just click it again.

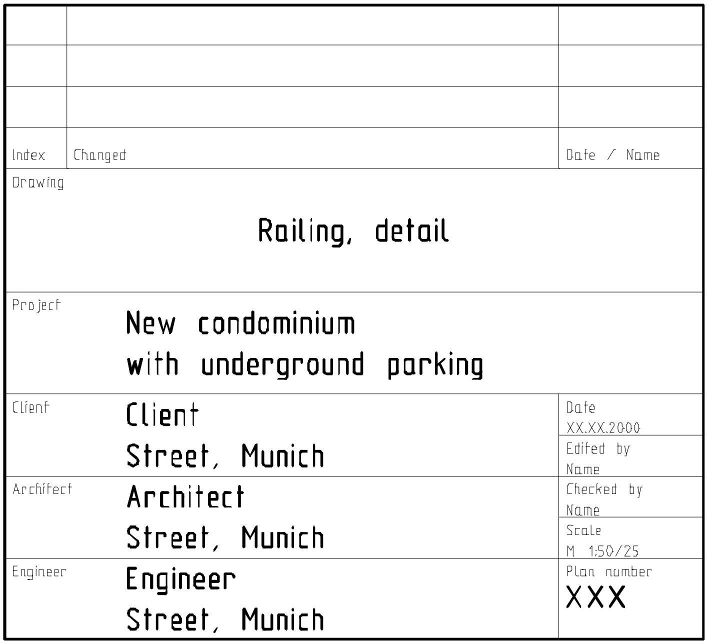


4 Enter **Railing** in the next empty drawing file.

5 Double-click **1 Title block** to activate this drawing file and to close all the others.

Exercise 1: Title Block

In this exercise, you will create a title block and label it.



Index	Changed	Date / Name
Drawing	Railing, detail	
Project	New condominium with underground parking	
Client	Client Street, Munich	Date XX.XX.2000 Edited by Name
Architect	Architect Street, Munich	Checked by Name Scale M 1:50/25
Engineer	Engineer Street, Munich	Plan number XXX

To do this, we will use the **Draft** and **Text** modules in the **Basic** family.

Note: There are also other ways of creating and labeling title blocks. The **Plot Layout** module contains the **Label** tool where you can select from a number of title blocks. These are title blocks that were created as label styles and that convey information on date, project name and more. An example showing how to create a title block as a label style is provided in ”Unit 10: Layout Output”.

Designing the title block

Tools:

Reference Scale

Rectangle

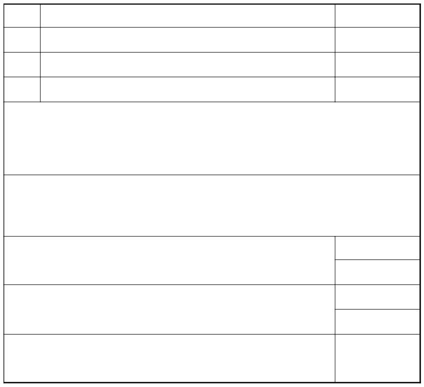
Parallel Lines

Auto-Delete Segment

Delete

Modify Format Properties

Objective:



In the first part of the exercise that follows you will draw the layout of the title block with tools in the **Draft** module.

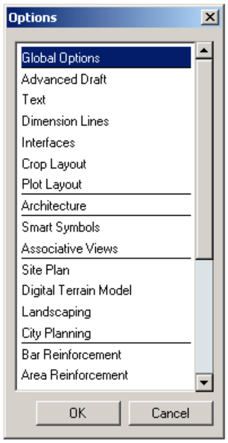
Use the Draft flyout on the **Basic Tools** toolbar (see ”Unit 1: Basics”).

Each module has its own set of basic settings known as **Options.** These contain defaults that affect the manner in which the individual tools function.
This way, you can configure the program to suit your own preferences.

Start by selecting the unit of measurement for the values you enter. We will use **mm** for this exercise.

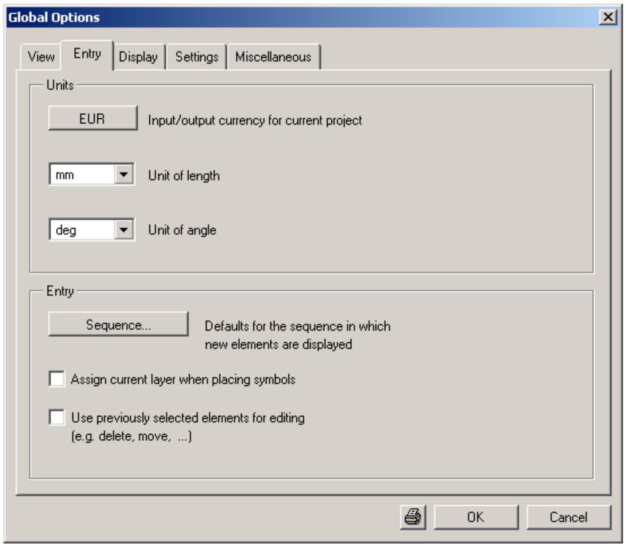
To set units

1 Click **Options** (**Standard** toolbar) and click **Global Options** in the dialog box.



Tip: Alternatively, set the unit of measurement in the status bar: click in the field beside Length and select 'mm' for this exercise.

2 Select the **Entry** tab and click **mm** in the **Unit of length** list box.



EUR Input/output currency for current project

mm Unit of length

deg Unit of angle

Defaults for the sequence in which new elements are displayed

☐ Assign current layer when placing symbols

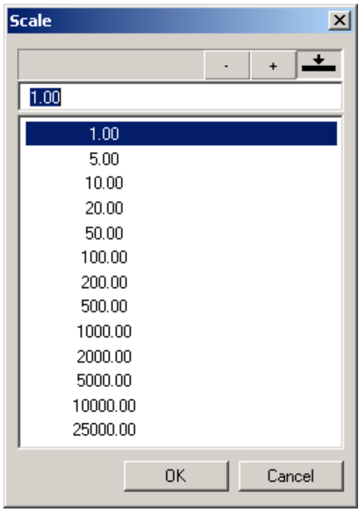
☐ Use previously selected elements for editing (e.g. delete, move, ...)

3 Click **OK** to confirm the settings.

Before you start working, you should also set the reference scale. You can set any scale you want.
The title block will be drawn at a scale of 1:1.

To set the reference scale

1 On the **View** menu, click **Reference Scale**.



2 Click **1.00** in the **Scale** dialog box.

User-defined dialog boxes

In the user-defined dialog boxes in Allplan 2005 you can enter any value in addition to those presented.

⤓ This option is preset: enter a value at the keyboard and press ENTER. The value is set without being added to the list.

+ Clicking this symbol and entering a value at the keyboard (press ENTER to confirm) adds the value to the list.

- Selecting a value and clicking this symbol deletes the value.
You can only delete values you defined yourself.

Start by drawing the outer border of the title block.

To draw the outer border as a rectangle

1 Click **Rectangle** (**Draft** flyout).

2 Place the first point in the workspace.

3 *Place a diagonally opposite point*
Enter **170** for the length. Press the TAB key and enter **155** for the width.
Press ENTER to confirm.

The rectangle is drawn.

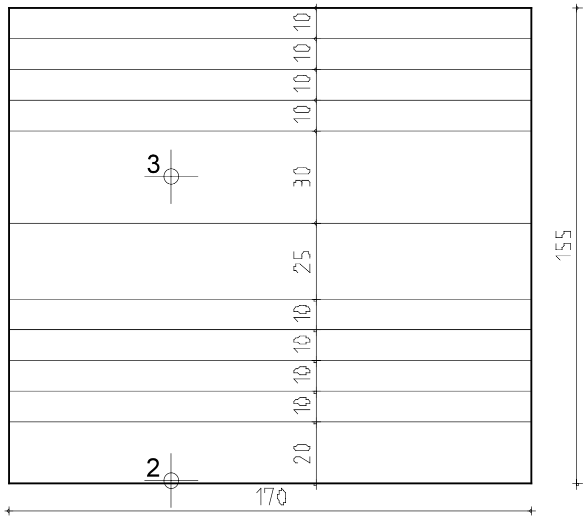
4 In the border of the viewport, click **Refresh.**

Tip: Did you make an incorrect entry? Click **Undo.** You can undo all steps back to the last save.

Create the interior lines as lines parallel to the border.

To draw the interior parallel lines

1 Click **Parallel Lines** (**Draft** flyout).



2 *Click element*
Click the bottom line in the border.

3 *Point through which element is to pass / Enter offset*
Enter **20** for the offset and
press ENTER to confirm.

4 *Which side?*
Click inside the rectangle.

5 *Number*: **1**.

6 *Point through which element is to pass / Enter offset*: **10**;
Number: **4**.

7 *Point through which element is to pass / Enter offset*: **25**;
Number: **1**.

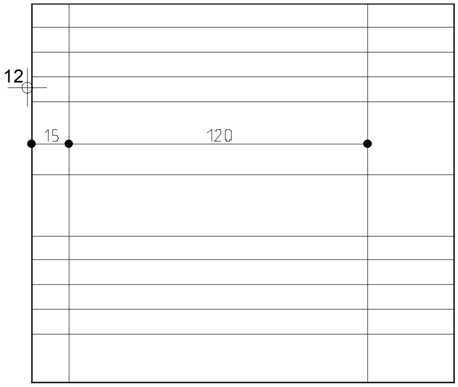
8 *Point through which element is to pass / Enter offset*: **30**;
Number: **1**.

9 *Point through which element is to pass / Enter offset*: **10**;
Number: **3**.

10 Press ESC to quit the tool.

11 To draw the parallel vertical lines, click ▥ **Parallel Lines** again.

12 Click the left-hand side and create two parallel lines - one at an offset of **15** and the other at an offset of **120**.



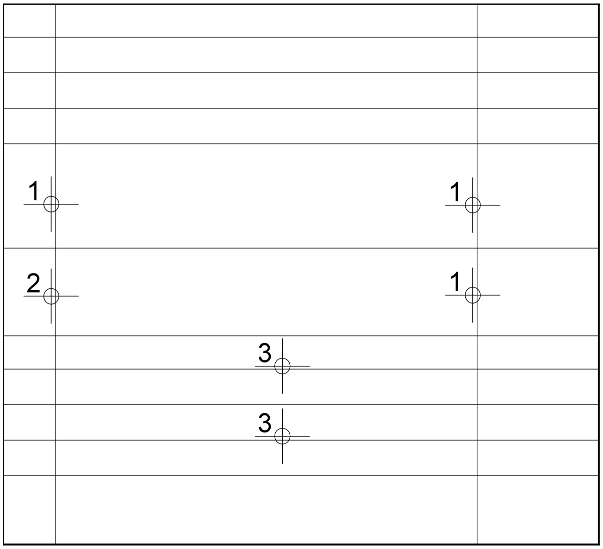
Finally, delete the lines you do not need.

To delete lines and segments of lines

1 Click **Auto-Delete Segment** (**Draft**) flyout and delete the superfluous vertical line segments.

2 Click **Delete** (**Edit** flyout) and delete the vertical line on the left.

3 Click **Auto-Delete Segment** again and delete the superfluous horizontal lines.

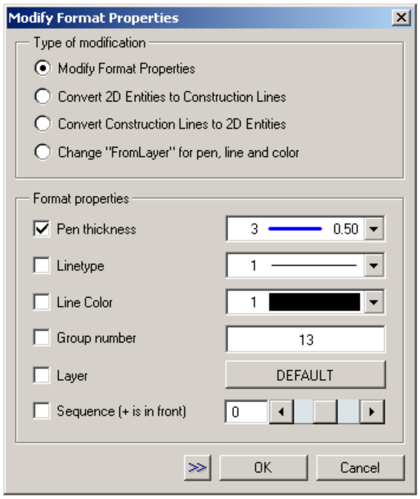


The border of the title block needs to stand out.

To modify the pen thickness

Tip: Further editing tools are also available on the shortcut menu (right click).
Check that no other tool is active when you do so.

1 Click **Modify Format Properties** (Edit flyout).



Modify Format Properties

Type of modification

● Modify Format Properties
○ Convert 2D Entities to Construction Lines
○ Convert Construction Lines to 2D Entities
○ Change "FromLayer" for pen, line and color

Format properties

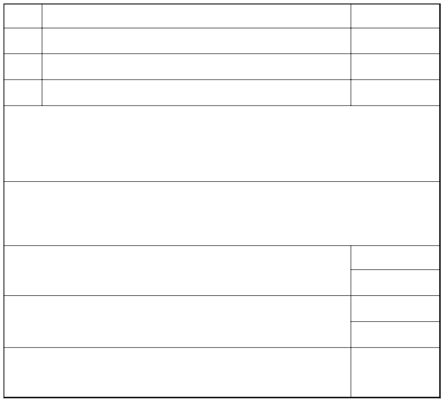
☑ Pen thickness 3 0.50
☐ Linetype 1
☐ Line Color 1
☐ Group number 13
☐ Layer DEFAULT
☐ Sequence (+ is in front) 0

2 Select the **Pen thickness** check box, select pen **3 0.50** and press **OK** to confirm.

3 Click the four lines in the border one after the other.

4 Press ESC to quit the tool.

Your drawing should now look like this:

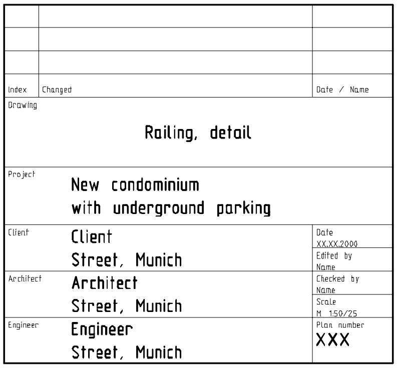


Entering text for the title block

Tools:

- Horizontal Text
- Midpoint
- X Coordinate (Delta Point)
- Y Coordinate (Delta Point)
- Copy
- Edit Text
- Explode Paragraph
- Change Text Settings

Objective:



Index | Changed | Date / Name

Drawing
Railing, detail

Project
New condominium
with underground parking

Client
Client
Street, Munich

Architect
Architect
Street, Munich

Engineer
Engineer
Street, Munich

Date
XX.XX.2000

Edited by
Name

Checked by
Name

Scale
M 1:50/25

Plan number
XXX

The following part of the exercise involves entering the text for the title block using the tools in the **Text** module.

Use the **Text** flyout on the **Basic Tools** toolbar.

Start by entering a label for the contents of the plan in the title block.

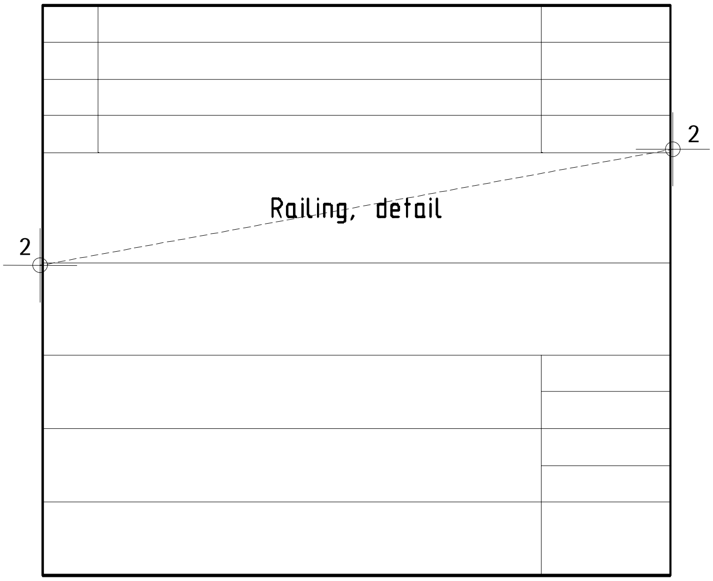
To enter centered text

➲ Use the **CAD Navigator** to switch to the **Text** module.

1 Click **Horizontal Text** (**Text** flyout).

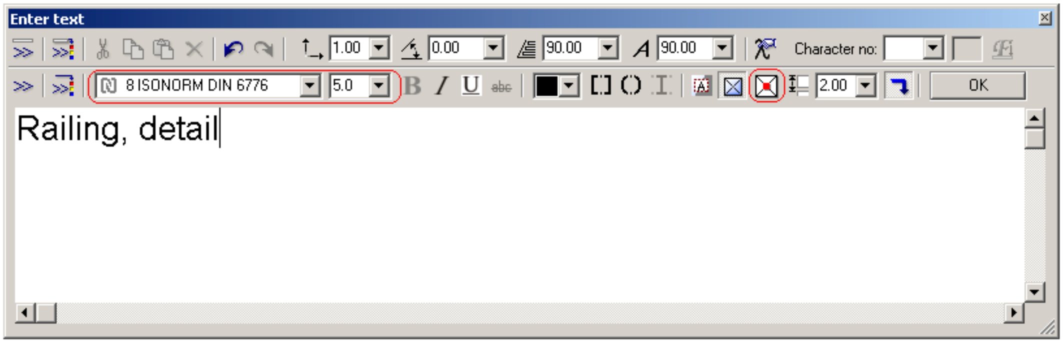
The start point of the text will be exactly in the middle of the small rectangle - in other words, the midpoint of an imaginary diagonal line.

2 Click in the workspace with the right mouse button, then on the shortcut menu (**Point Assistant**), choose **Midpoint** and click two diagonally opposite points in the box.



3 Enter the text parameters:

- Click to center the text starting point
- Text height: 5.0
  The text width adapts dynamically according to the aspect ratio set (in this example: 1.00).
- Line spacing: 2.00
- Font: 8 ISONORM DIN 6776.



Railing, detail

4 For the text, enter **Railing, detail**

5 Click **OK** or press CTRL+ENTER.
The **Horizontal Text** tool remains active.

Enter the name of the construction project in the next field. It is to be left-aligned and we will enter the text as paragraph text. To enter paragraph text, we need to specify a value for the line spacing.

Paragraph text:
When ☒ **Paragraph Text** is active, the lines you enter will form a paragraph. The individual lines of text in a paragraph retain their original spacing regardless of the reference scale you set. The lines in a paragraph can also be addressed as a single entity for easy manipulation.
To delete individual lines from a paragraph, use .
Explode Paragraph resolves paragraph text into its constituent lines.

Line spacing:
The spacing between lines is based on the **line spacing** value multiplied by **text height**. Whenever you press ENTER to confirm a line of text, the program automatically goes to the next line.

Snapping to points and entering offset values in the Advanced point entry:
To position the text exactly, use the point snap feature and enter the offset value. This feature is always useful when you want to place a point relative to an existing point.

To enter paragraph text by specifying an offset and using the point snap tools

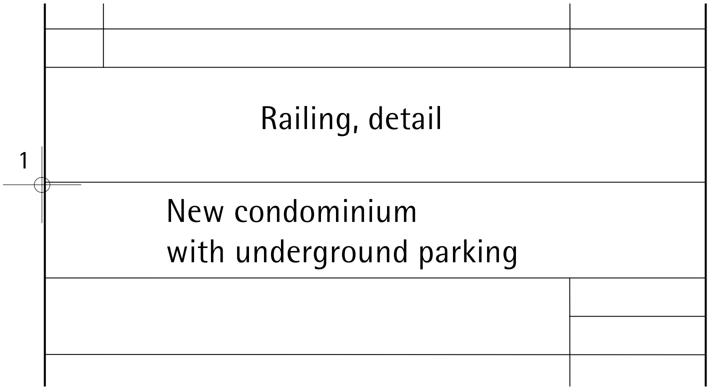
Tip: You can use to save combinations of text settings as favorites:

use + to enter a name in the list and set the corresponding parameters.

➲ The A **Horizontal Text** tool should still be active.
We will define the text's starting point using the **Point snap and offset entry** feature.

1 Point to the point in the title block as shown below.
Do not click the point!

This sets the point that will serve as a reference for measurement. The point appears as a small marker.
To indicate that the entries for and refer to the point the program has snapped to, the data entry boxes for the **X Coordinate** and **Y Coordinate** are highlighted in yellow in the dialog line.



2 In the dialog line, enter a value of **30** for **dX**, press the TAB key, enter a value of **–5** for **dY** and press ENTER to confirm.

3 In the dialog box, change the position of the text's starting point to **top left**, and activate **Paragraph Text**.

4 Enter the following text:
New condominium [ENTER]
with underground parking

5 Press CTRL+ENTER or click **OK** to finish entering text.

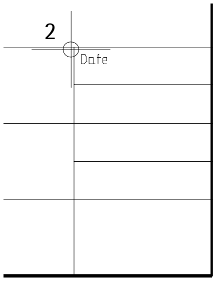
6 Press ESC to quit the tool.

Enter a line of text on the right in the title block and copy it to the fields below.

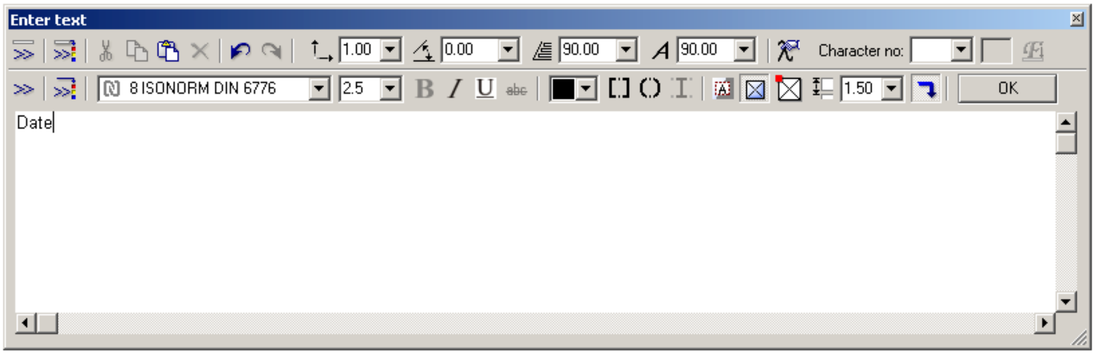
To enter and copy text

1 Click **Horizontal Text** (Text flyout).

2 Set the starting point of the text using the point snap and offset entry feature:
   a) point to the top left corner of the box (see figure below)
   b) **dX = 2**, TAB key
   c) **dY = -2**
   d) Press ENTER to place the point.



3 Set the starting point to **Top left**, change the **Text Height** to **2.5** and the **Line Spacing** to **1.5**. For the sample text, enter: **Date**.



1.00
0.00
90.00
90.00
8 ISONORM DIN 6776
2.5
1.50

Date

4 Press **OK** to confirm the text you entered.

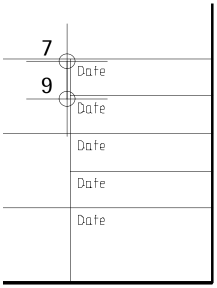
5 Press ESC to quit the tool.

6 Click the text **Date** with the right mouse button and on the shortcut menu, choose **Copy**.

7 *From point*
Click the top left corner of the box.

8 Enter **4** for the number of copies and press ENTER to confirm.

9 *Place point (to point) or enter the number of copies*
Click the top left corner of the box below.



10 Press ESC to quit the tool.

Modify the text using the **Edit Text** tool.

Text modification:
Text can be edited at any time. This provides a comfortable approach if you are using boilerplate - all you have to do is update the text.

To edit text and add a line

1 Click the text at the top with the right mouse button and on the shortcut menu, choose **Edit Text.**

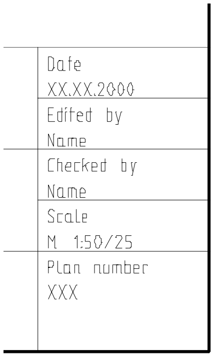
The relevant dialog box appears and can be modified.

2 Enter **Date** at the end of the text, press ENTER to go to the next line and
enter a placeholder for the date in the next line: **XX. XX. 200X**

Note: Check that ☒ **Paragraph Text** is enabled as this is the only way you will be able to modify the lines together later.

3 Press **OK** to confirm the text you entered.

4 Change the entries underneath and use placeholders as shown here following the instructions in steps 2 and 3.



Change the appearance of the placeholder for the plan number. Assign it different text parameters. We will give it a character height of 5 mm and a character width of 6 mm. First, we need to 'explode' the paragraph.

Defining text parameters:
When you enter text, you can use one of the 20 Allplan fonts or you can use all the TrueType fonts you have installed.
The **Text Height** and **Text Width** parameters are absolute values. This means that the text will print out using the values you enter regardless of the selected reference scale.

To change text settings

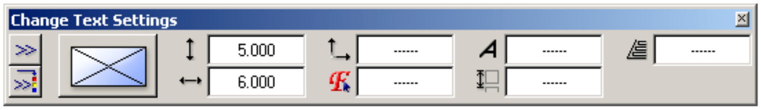
1 Click the **Plan number...** text block with the right mouse button and select **Explode Paragraph** on the shortcut menu.

This explodes the paragraph and you can now modify each line separately.

2 Press ESC to quit the **Explode Paragraph** tool.

3 Click the placeholder XXX with the right mouse button and on the shortcut menu, choose **Change Text Settings**.

4 Change the text parameters:
↕ Text height: **5**
↔ Text width: **6**

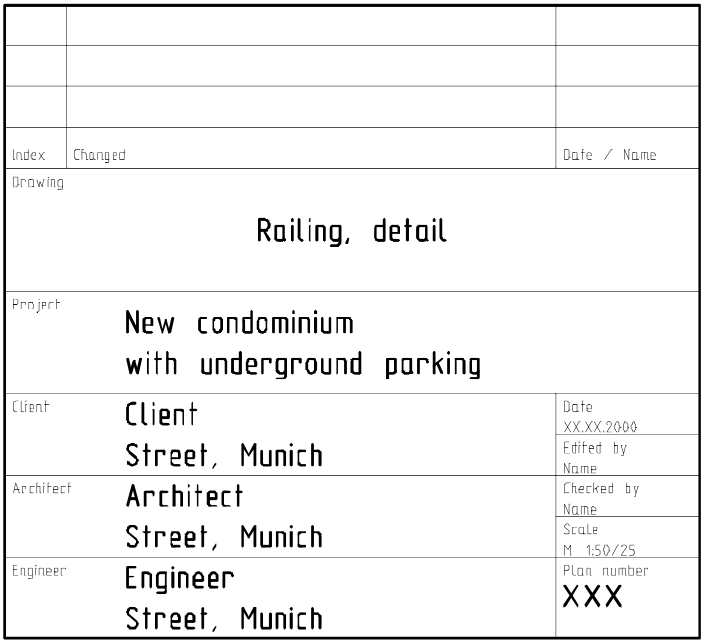


Change Text Settings
↕ 5.000
↔ 6.000

------

5 Click the placeholder XXX.

6 Complete the label using the information provided below.



Index	Changed	Date / Name

Drawing

Railing, detail

Project
New condominium
with underground parking

Client	Client Street, Munich	Date XX.XX.2000 Edited by Name
Architect	Architect Street, Munich	Checked by Name Scale M 1:50/25
Engineer	Engineer Street, Munich	Plan number XXX

Saving and retrieving the title block as a symbol in a catalog

Tools:

Write to Library

Get from Library

In the last part of the exercise you will save the title block as a symbol in a symbol catalog. Then, you will learn how to retrieve it and place it in an empty drawing file.

Symbols

Symbols are design entities that you can use whenever you need. Symbols automatically adjust to the scale of the drawing file and can be addressed as single objects using the middle and left mouse buttons in combination. You can alter symbols and save them using another name.

Symbols are often used for drawings and other common components. In time, you will find that you develop your own extensive symbol libraries for title blocks, fixtures, equipment etc. that you can use time and again.

Symbol catalogs

Symbols are managed in symbol catalogs. Each sub-folder can contain a large number of symbols. Using the ProjectPilot, you can also copy, delete and rename them.

Sub-folders are assigned to libraries.

Office: This folder contains the office's standard libraries and sub-folders. The data in this folder is available to the entire office:

Standalone: for all the local projects,

Network: for all local and remote users and projects. Only the system administrator can store and manage symbols.

Project: The catalogs in this path belong to a specific project and are only available in that project.

Private: The catalogs in this path belong to the user that is currently logged on and cannot be accessed by other users in a network.

If you are not keen on making your own symbol catalog, you can use the extensive symbol catalogs available from Nemetschek.

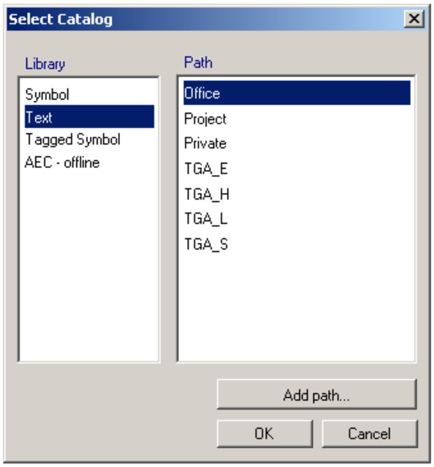
Insert the title block as a symbol in a catalog.

To insert a symbol in a catalog

1 Click 💾 **Write to Library** (**Standard** toolbar).

2 The title block is to be made available to the entire office. In the **Path** area, click **Office**.

3 In the **Library** area, click **Text**.



Tip: You can also change the position of a symbol's base point when you retrieve it.

4 Press **OK** to confirm.

5 *Select the element(s) you want to save as a symbol*
Use the left mouse button to open a selection rectangle around the title block. It is displayed in the selection color.

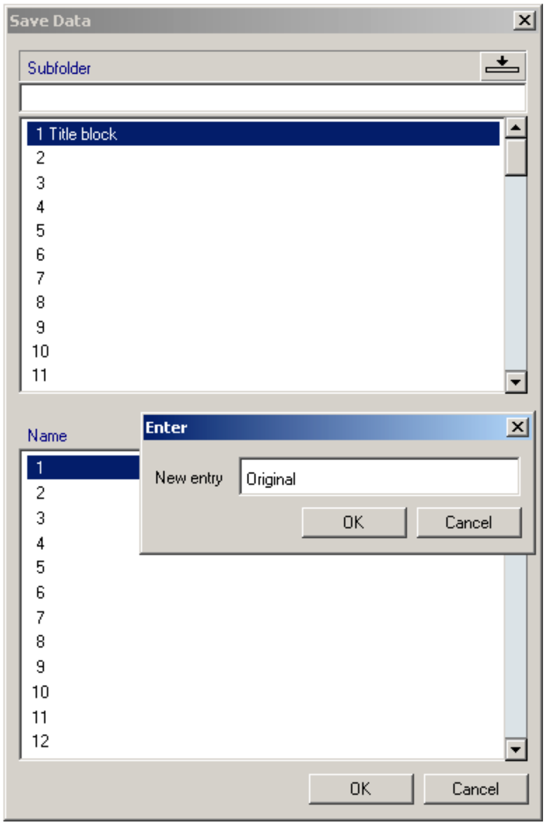
6 *Set the text symbol's base point*
Click the bottom right corner. This is the point at which the symbol will be attached to the crosshairs when it is retrieved.

7 In the dialog box that appears, choose the option **Dumb symbol (not snoop-enabled)** and press **OK** to confirm.

8 Click an empty line under **Subfolder** and enter a name for the symbol file: **Title block**.
(If you choose a name that is already assigned, only the name is overwritten.)

9 Click an empty line under **Name** and enter a name for the symbol: **Original.**
(Choosing an assigned name will cause the symbol it contains to be overwritten.)

10 Press ENTER to finish.



New entry Original

11 Press ESC to quit the tool.

Now retrieve the symbol and place it in an empty drawing file.

In practice, the new drawing file might be a drawing file for another construction project. All you would need to do then is change the project-specific information and save the title block again as a symbol - this time in the Project folder.
Besides the symbols you create and save yourself, you can use this approach to retrieve symbols in the Nemetschek symbol catalogs as well as DWG and DXF format symbols.

To retrieve a symbol from a catalog

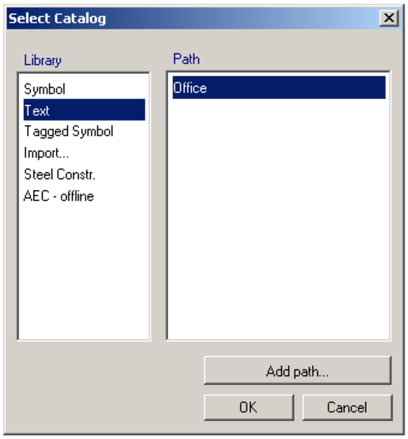
1 Click **Open on a project-specific basis** (**Standard** toolbar), open a new, empty drawing file and close the drawing file with the title block.

2 On the **View** menu, click **Reference Scale** and select **1** (1.000). Alternatively, click the **Scale** field in the status bar.

3 Click **Get from Library** (**Standard** toolbar).

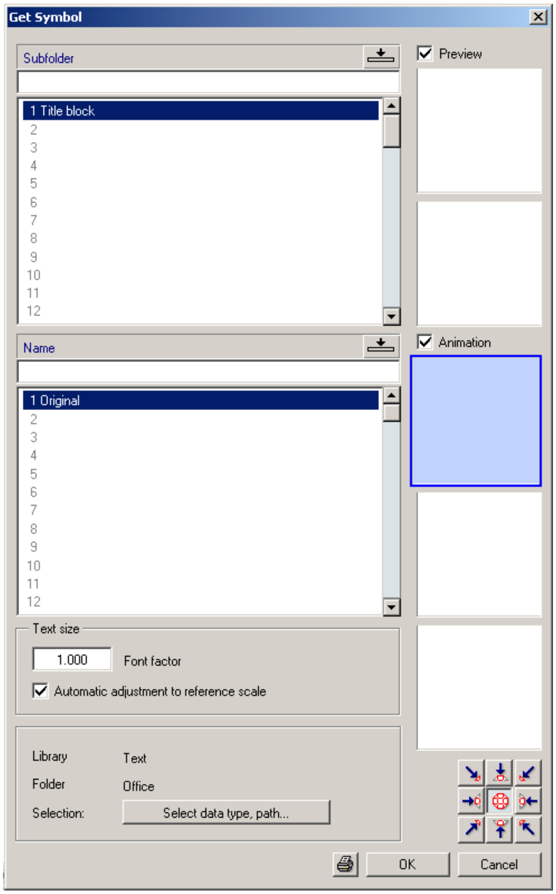
4 In the dialog box which appears, select the **Office** folder and the **Text** library.

Tip: Activate the **Preview** check box to get a preview of the symbol.



5 Press **OK** to confirm.

The **Get Symbol** dialog box is displayed.



Subfolder: 1 Title block, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12

Name: 1 Original, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12

☑ Preview

☑ Animation

Text size: 1.000 Font factor

☑ Automatic adjustment to reference scale

Library: Text

Folder: Office

Tip: Using the tools on the Dynamic toolbar, you can change the position of the symbol's base point and orientation.
You can use the Point Assistant to define the exact drop-in point in the drawing file.

6 Select **Original** in the **Title Block** subfolder.

7 Press **OK** to confirm.

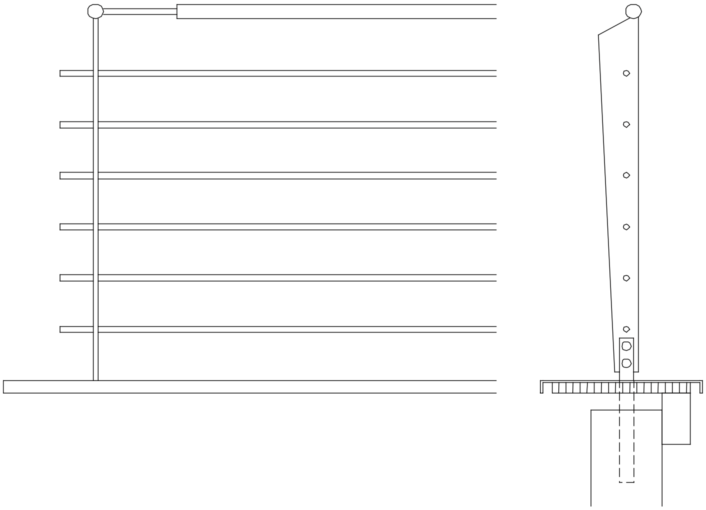
Now you are back in the workspace. The symbol is attached to the crosshairs at its base point.

8 To place the symbol, click in the workspace.

9 To quit symbol retrieval mode, press ESC.

10 If the title block appears too small, click **Refresh** in the border of the viewport.

Exercise 2: Railing Detail



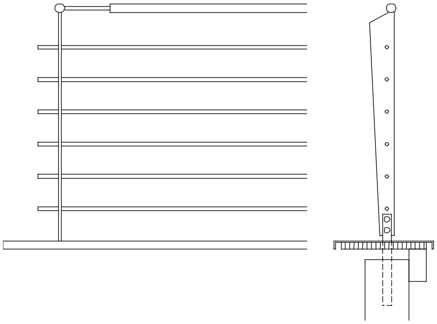
The aim of the next exercise is to draw this detail from a railing. This example was chosen because it is ideal for demonstrating the most important drafting and modification tools provided in the **Draft** module.

Designing a railing detail

Tools:

- Rectangle
- Intersect 2 Entities
- Parallel Lines
- Auto-Delete Segment
- Line
- X Coordinate
- Y Coordinate
- Mirror and Copy
- Midpoint
- Stretch Entities
- Fold Line

Objective:



In this exercise you will draw a railing detail in plan as well as two sections using the tools in the **Draft** module.

Start by making initial settings.

To select a drawing file and to set options

1 Click **Open on a project-specific basis** (**Standard** toolbar) and activate the empty drawing file 2 ”Railing” and close all the other drawing files.

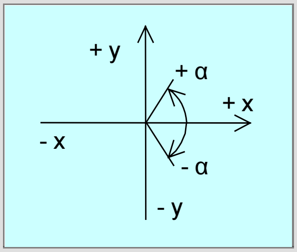
2 Click **Options** (**Standard** toolbar) and then **Global Options.** On the **Entry** tab, set the **Unit of length** to **cm.** (Alternative: Click beside the **Length** field in the status bar and select **cm.**)

3 On the **View** menu, click **Reference Scale** and select **10.** (Alternatively: Click **Scale** in the status bar and select **1:10**).

We will start by drawing the outline.

Tip: If the dialog line prompts you to enter **dX** but you want to enter **dY** (or vice versa), pressing the TAB key takes you to the next data entry field.

Bear the coordinate system in mind and the direction of rotation of angles!



To get a suitable view, use the tools in the border of the viewport:

- Refresh
- Zoom Section
- Pan
- Enlarge View
- Reduce View
- Regen

First we will draw the end of the wall and the base.

To draw lines and parallel lines

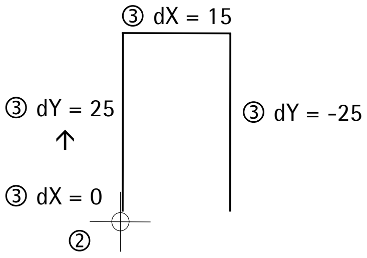
Tip: Made a mistake? You can always go back a few steps by exiting the current function with ESC and clicking **Undo.**

1 Click **Line** (**Draft** flyout).

2 Click in the workspace to place the starting point of the line.

When you move the mouse, you will notice that a preview of the line is displayed attached to the crosshairs ("rubber-band").

3 Enter the dX and dY length values as shown in the illustration.



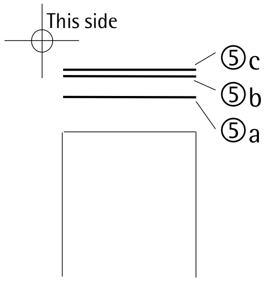
4 Press ESC to finish drawing the line.

5 Use **Parallel Lines** (**Draft** flyout) to draw three parallel lines:

a) *Offset*: 4 *Number*: 1

b) *Offset*: 2.5 *Number*: 1

c) *Offset*: 0.5 *Number*: 1



6 Press ESC to quit the tool.

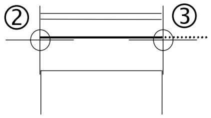
In the following exercise, you will extend the new parallel lines to the left and right.

To lengthen lines

1 Click **Lengthen Lines** (**Edit** flyout).

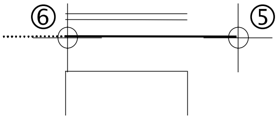
2 Click the point on the left on the parallel line at the bottom first. This is the reference point.

Tip: Note the sequence of the points. The first point serves as the reference point.



3 Click the right endpoint.
The offset between the points is displayed in the dialog line.

4 To change the offset between the lines, enter: **21**.



5 To lengthen the line at the bottom towards the left, first click the right endpoint (= reference point).

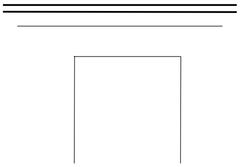
6 Click the left endpoint.

7 To change the offset between the lines, enter: **29**.

8 Using the same approach, lengthen the two lines at the top.

Offset towards the right: **23**

Offset towards the left: **33**



You will now learn how to draw mutually perpendicular lines. A tool is provided for doing this on the Dynamic toolbar.

Tip: On the **View** menu under **Toolbars** you can specify whether the **Dynamic Toolbar** is to float or stay docked in the dialog line or status bar.

To draw mutually perpendicular lines

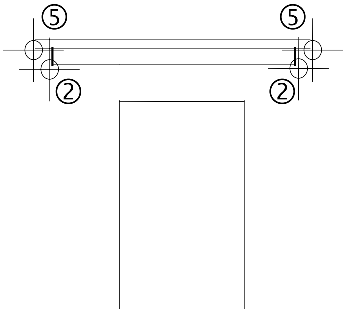
1 Click **Line** (**Draft** flyout).

2 Click the starting point of the first parallel line.

3 Click **Ortho-Constraint** (Dynamic toolbar).

4 Enter the horizontal dX length: **0**.

5 Click a point to define the length of the line.



6 Press ESC to finish drawing the line.

The **Line** tool remains active.

7 Repeat steps 2 through 6 for the other side and press ESC to quit the tool.

Now you will draw a vertical line in construction line format, This line will originate in the middle of the wall. To do this, you will use the **Midpoint** tool.

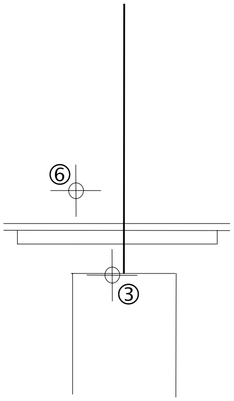
> **Construction lines**
>
> Construction lines are non-printing entities (displayed on-screen using a different color) which you can use as an aid to construction. You can change the default construction line color in the **Global Options** dialog box.
>
> You can toggle construction line mode on/off by clicking **Construction Line on/off** on the **Format** toolbar.

To draw a line using cursor snap and based on a midpoint

➲ The **Line** tool should still be active.

1 On the **Format** toolbar, click **Construction Line on/off** so that it is on.

2 Click the line representing the top of the wall with the right mouse button, and select **Midpoint** on the shortcut menu (**Point Assistant**).
This sets the start of the construction-line format line on the middle of the wall.



3 Press ENTER to confirm the starting point of the line.

4 Click **Cursor Snap** (Dynamic toolbar).

5 Click the button displaying the angle on the **Dynamic toolbar** and set it to 90°.
This sets the cursor snap angle.

6 Point above the line's start point to specify the direction in which it is to extend.

7 Enter the length of the line as follows: **95**

8 Click **Construction Line** (**Format** toolbar) to disable construction lines again.

9 Press ESC to finish drawing each line.

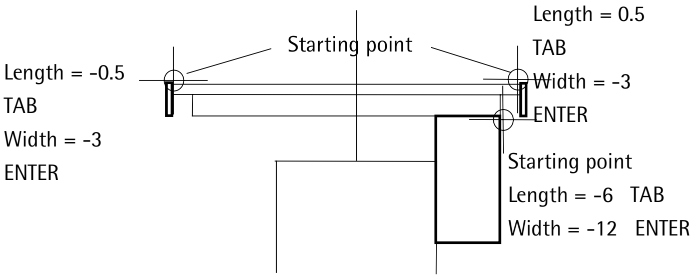
Tip: Select a suitable section by activating **Zoom Section.**

You can use the **Rectangle** tool to draw rectangles.
You should already know how to enter rectangles based on a corner, a height and a width value. In the following exercise you will also learn how to enter a rectangle based on a center line.

To draw a rectangle based on a center line

Tip: Make sure that the length and width values you enter for the rectangle apply to the correct points: the boxes must be highlighted in white.
All you need to do is move the mouse!

1 Use **Rectangle** (**Draft** flyout) to draw three rectangles based on a start point (corner), length and width.

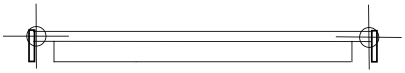


Length = -0.5
TAB
Width = -3
ENTER

Length = 0.5
TAB
Width = -3
ENTER

Length = -6 TAB
Width = -12 ENTER

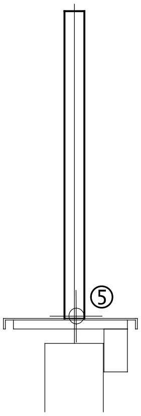
2 Click the segment you want to delete with the **right** mouse button, select **Auto-Delete Segment** on the shortcut menu and delete the other line segments.



3 Click **Rectangle** (**Draft** flyout) to draw a rectangle based on a vertical dividing line. The construction line will serve as the rectangle's center line. It is 84 cm long.

4 Select **Based on Centerline** (Dynamic toolbar).

5 Place the start point of the center line.



6 Press the TAB key to go to the **dY** data entry field in the dialog line and enter the length: **84**. Press ENTER to confirm.

7 Enter the **half width** of the rectangle: **2.5**.

8 Press ESC to quit the **Rectangle** tool.

We will now move the rectangle and draw another one for the attachment piece - based on the rectangle's center this time.

To draw a rectangle based on a center

1 Click **Move** (**Edit** flyout).

2 Select the rectangle by clicking it with the middle mouse button and then with the left one.

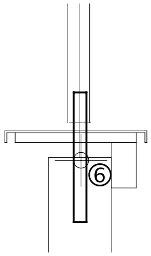
Note: Clicking objects with the middle and left mouse buttons selects all elements belonging to the same segment.

3 *Place a point (from point) or enter the dx vector*
Click a corner of the rectangle.

4 Enter the following values when prompted in the dialog line:
dX: **0** TAB
dY: **2** ENTER

5 Click **Rectangle** (**Draft** flyout).

6 Click **Based on Center** (Dynamic toolbar).



7 Click the center of the rectangle to be drawn.

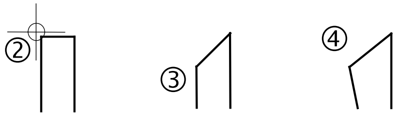
8 Enter the size:
Length: **3**
Width: **34**

9 Press ESC to quit the **Rectangle** tool.

To create the shape of the dividing profile, we will use **Stretch Entities** to alter the shape of the rectangle at the top.

To stretch entities

1. Click **Stretch Entities** (**Edit** flyout).
2. *Select the points you want to modify*
   Click the top left corner.



Tip: You can also make the modification **in a single step**:
dX = –3.5
dY = –5

3. In the dialog line, enter:
   Place a point (from point) or enter the dx vector: **0**
   To dY: **–5**
4. *Select the points you want to modify*
   Click the point again and enter:
   Place a point (from point) or enter the dx vector: **–3.5**
   To dY: **0**

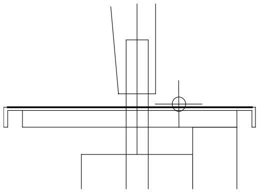
The appearance of the attachment piece needs to be changed. To display the vertical lines in the rectangle as partially dashed, we need to ”cut” the lines into two new segments which can then be altered.

To cut and modify elements

➲ In the **CAD Navigator** select the **Draft** module

1 Click **Cut with Element** (**Modify** flyout).

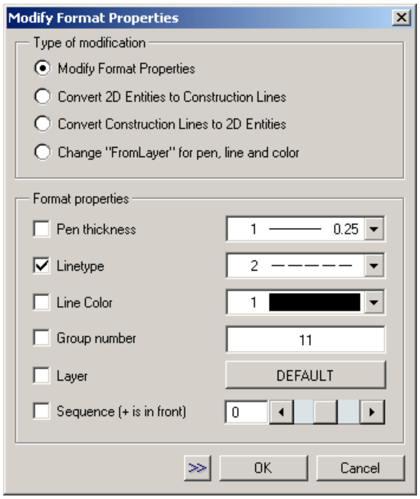
2 Click the line at the top of the base piece.
The points where the elements will be cut appear briefly in construction line format.



3 Press ESC to quit the tool.

4 Click **Modify Format Properties** (**Edit** flyout).

5 Activate the **Linetype** check box, select Line No. 2 and press **OK** to confirm.

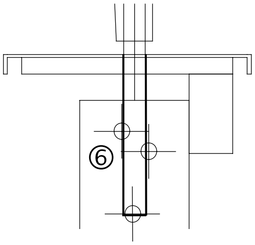


Modify Format Properties

Type of modification
● Modify Format Properties
○ Convert 2D Entities to Construction Lines
○ Convert Construction Lines to 2D Entities
○ Change "FromLayer" for pen, line and color

Format properties
☐ Pen thickness 1 ——— 0.25
☑ Linetype 2 — — — — —
☐ Line Color 1
☐ Group number 11
☐ Layer DEFAULT
☐ Sequence (+ is in front) 0

6 *Select the element(s) you want to modify*
Click the three lines you want to modify.

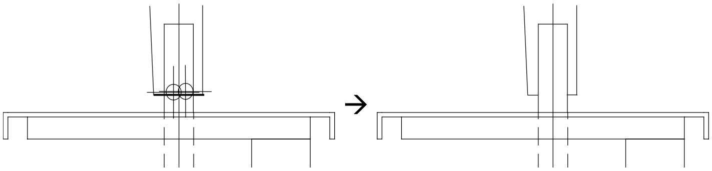


Tip: Alternatively, click the tool in the **Draft** flyout.

7 Press ESC to finish.

8 Using the right mouse button, click one of the profile lines to be deleted and on the shortcut menu, click **Auto-Delete Segments.**

9 Remove the remaining profile line behind the attachment piece.



When you want to place elements precisely based on coordinates you specify, the options available vary depending on the point entry mode currently selected:

Placing points and elements using the point snap and offset entry feature

When you have enabled the **Advanced point entry**, you can position points and elements using coordinates relative to existing points. All you have to do is point to an existing point and enter the offset value in the dialog line.

Proceed as follows:

- Point to the reference point. The program snaps to this point which appears as a small marker.
- Enter relative coordinates for x, y and z in the dialog line (use the TAB key to toggle between the data entry fields).
- Press ENTER to place the point.

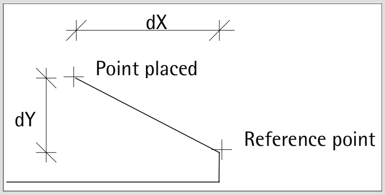
Tip: Clicking anywhere in the workspace with the **right mouse button** has the same effect as clicking ∑ **Brackets.**

Positioning points and elements using the Brackets tool

When you have enabled the **Conventional point entry**, you can use the bracket feature to enter and place points.

Proceed as follows:

- Click ∑ **Bracket** to activate the bracket feature.
- Click a reference point.
- Enter relative **dX** and **dY** coordinates.
- Click ∑ **Brackets** to ’close’ the brackets.

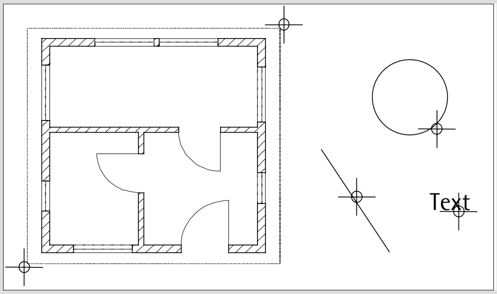


You can use the brackets feature to select multiple elements in different regions, regardless of the point entry mode.

Using the bracket feature to select several elements and regions for common manipulation

Proceed as follows:

- Click ∑ **Bracket** to activate the bracket feature.
- Select regions or click elements.
- To unselect an element, just click it again.
- Click ∑ **Brackets** to ’close’ the brackets.



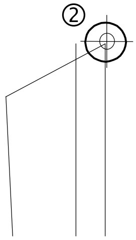
In the following exercise we will draw circles to represent the fixing points and the railing bars.

Tip: You can create arcs by entering different values for the angular offset and the delta angle to those here.

To draw a circle

1 Click **Circle** (**Draft** flyout).

2 Click the tip of the profile to place the *center point.*



Tip: If you press ESC instead of entering values for the starting and delta angle, Allplan will immediately draw a full circle.

3 Enter the following values:
Place a point, click an element or enter the radius: **1.7**
Place start point or enter the angular offset: **0**
Place the endpoint or enter the delta angle: **360**

Press ENTER to confirm each entry.

We will draw more circles to display where the bars are attached. To position the centers on the construction-line format design, use the **Reference Point** tool.

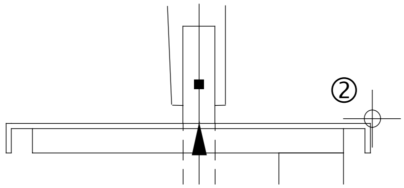
To draw circles based on a reference point

➲ The **Circle** tool should still be active.

1 Click the temporary line with the right mouse button and select **Reference Point** on the shortcut menu to place the center exactly on the temporary line.

A small square will appear at the point you clicked. The reference point (represented by an arrow) is displayed on the nearest endpoint of the element you clicked.
You can move the reference point as often as you need.

2 Point anywhere to the top of the horizontal profile – the reference point moves – and enter a new offset
Place a new reference point: enter **4.**



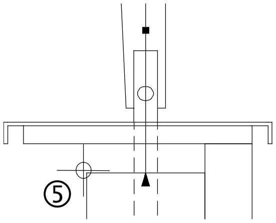
The center of the circle is thus defined.

3 Enter **1** for the radius and confirm the values proposed by the system for the starting and delta angle (**0** / **360**).

4 Right-click the temporary line and select **Reference Point** on the shortcut menu again to place the circle for the next bar 19 cm above the top of the wall.

The reference point (an arrow) appears.

5 Point to the top of the wall – the reference point moves.



6 Enter **19** for the offset (the distance between the reference point and the center of the new circle).

7 Enter **0.7** for the radius and
confirm the starting and delta angle (**0** / **360**).

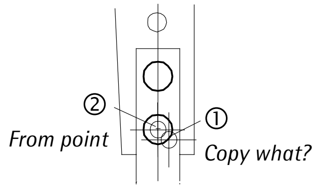
8 Press ESC to quit the tool.

The first circle (fixing point in the attachment piece) needs to be drawn once, the second circle (crossbars in the railing) needs to be copied five times and the circle on the tip (handrail) will be moved a bit.

To copy and move circles

1 Click the first circle with the right mouse button and select **Copy** on the shortcut menu.

2 *From point*
Click the center.

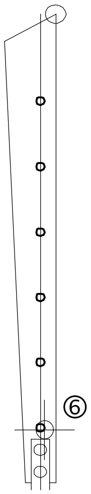


3 *To point / How many copies?*
Enter the number of copies: **1**.

4 *To point*
In the dialog line, enter the **dY** value of **4** for the horizontal offset.

5 Press ESC to quit the tool.

6 Click the second, small circle again with the right mouse button and select **Copy** on the shortcut menu.



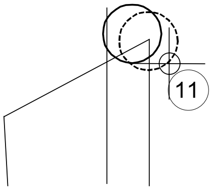
7 *From point*
Click the center.

8 *To point / How many copies?*
Enter the number of copies: **5**.

9 *To point*
In the dialog line, enter the **dY** value of **12** for the horizontal offset.

10 Press ESC to quit the tool.

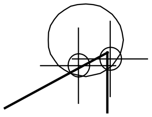
11 Now click the circle on the tip with the right mouse button and select **Move** on the shortcut menu.



12 Enter the values:
Place a point (from point) or enter the dx vector: **-1**
To dY: **0.5**

13 Press ESC to quit the tool.

14 Click **Auto-Delete Segments** (**Draft** flyout) and delete the line segments in the circle.



15 Press ESC to quit the tool.

You have the following alternatives when you see the ***From point / dX*** prompt:

Define a ***dX*** point as a value at the keyboard followed by a ***destination dY*** point.

Or:

Click (**From *point***) an origin point with the mouse and place the element also with the mouse.

Or:

Click (**From *point***) an origin point with the mouse and enter a value relative to the origin point in **X Coordinate**, **Y Coordinate** and, if necessary, **Z Coordinate** in the dialog line or enter a value relative to any point snapped (only possible with the **Advanced point entry**).

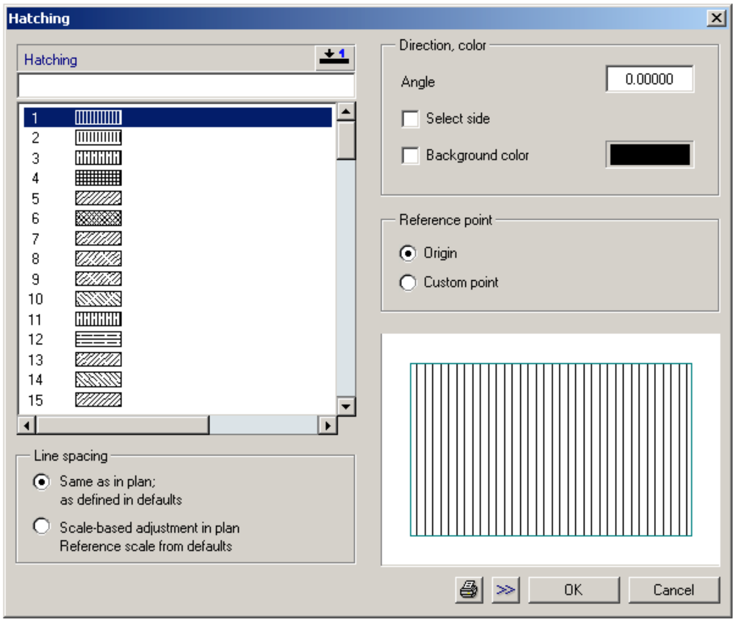
We will now apply hatching to part of the base.

To apply hatching

1 Click **Hatching** (**Draft** flyout).

2 Click **Properties**,
select hatching number 1 and press **OK** to confirm.

Tip: When you make the selection, you can click the **Hatching** list box.



Hatching

Hatching

1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15

Direction, color

Angle 0.00000

☐ Select side

☐ Background color

Reference point

● Origin

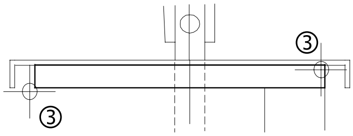
○ Custom point

Line spacing

● Same as in plan; as defined in defaults

○ Scale-based adjustment in plan Reference scale from defaults

3 Click two diagonally opposite points and press ESC to define the rectangular area for the hatching.



Tip: You can select several areas for hatching at once. Recesses in the hatching will appear where areas overlap.

The **Point Assistant** also includes the **Outline Auto-Detect** tool. This tool will automatically detect polygons with a closed boundary.
All you need to do is click within the polygon.

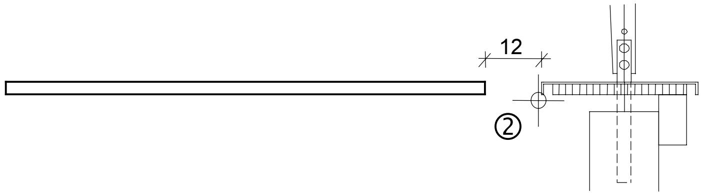
4 Press ESC to quit the tool.

The following exercise has a ”rough design guideline” - tools that you have already encountered are no longer explained in detail.

To design the view

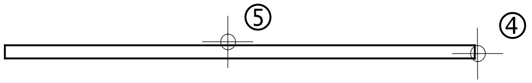
1 Click **Rectangle** (**Draft** flyout).

2 Point to the bottom left corner (the data entry fields are highlighted in yellow),
enter **–12** for the **dX** value and press ENTER.



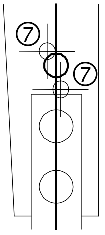
3 Enter the length **–104** for the **dX** value,
press the TAB key
and enter the width **3** for the **dY** value 3.

4 Click the vertical line on the right in the rectangle with the right mouse button and select **Delete** on the shortcut menu.



5 Click **Parallel Lines** (**Draft** flyout) to draw horizontal lines parallel to the rectangle you just created (view of the lower railing bar).

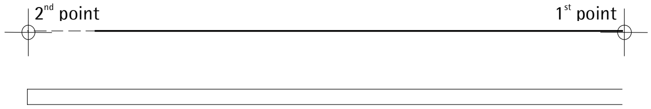
6 *Set point*
Click in the workspace with the right mouse button and select **Point of Intersection** on the shortcut menu to define the position of the parallel line graphically.



7 Click the circle at the bottom, then the construction line and press ESC to quit the tool.

The parallel line is drawn at the height where the two elements intersect.

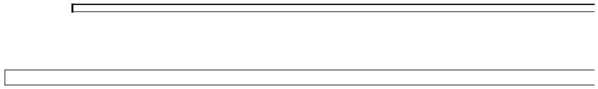
8 Click the top right end of the parallel line you just created, select **Lengthen Lines** on the shortcut menu, click the endpoint on the left and enter the new *offset* **92** cm.



Tip: Click **Refresh** several times to clean up the on-screen display.

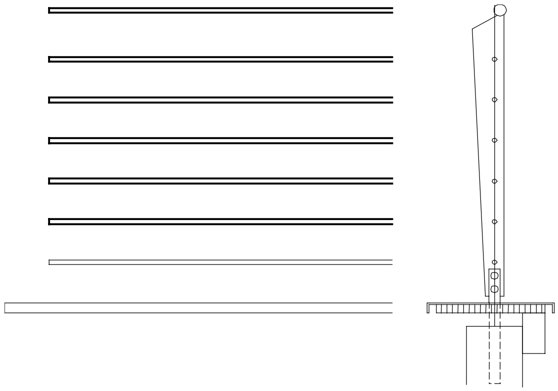
9 Click **Parallel Lines** (**Draft** flyout) again to draw a line parallel to the shortened line.
Offset: **1.4** (above; number: 1).

10 Connect the two parallel lines on the left with **Line** (**Draft** flyout). The first railing bar is now created.



11 Click **Copy** (**Edit** flyout) to copy the entire bar a number of times.
Number: **5** dY: **12**
Press ESC to quit the tool.

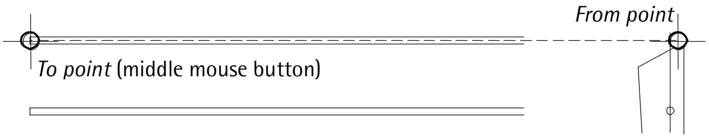
12 Click **Copy** again to copy the railing bar at the top.
Number: **1** dY: **14.5**
Press ESC to quit the tool.



13 Click **Copy** (**Edit** flyout) to copy the circle at the tip of the profile.
From point: Click the center of the original circle.
To point: Align to the center of the original circle with CTRL + left mouse button.

Make sure that the system snaps to the center of the circle and not a point on a line. Enlarge the view if necessary.

ATTENTION!
Aligning with the mouse is not suitable for precision drafting!
In this exercise you can see how difficult it is to align with the right point. To position the point accurately, you can also use the **Midpoint** tool.

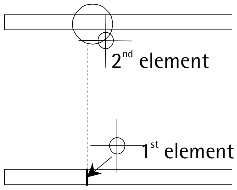


14 Modify the copy of the circle with **Move** (**Edit** flyout) and move it ( ) by the dX value **7.5**.

To select the circle, click it as usual or press the right mouse button twice. The element you selected last is re-selected.

15 Use **Parallel Lines** (**Draft** flyout) to create a line parallel to the end of one of the vertical railing bars (left end).
Offset: **7.** (To the right)
Number: **1.**
Press ESC to quit the tool.

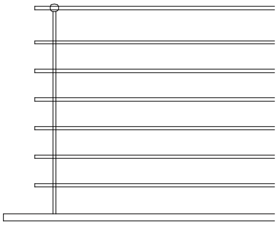
16 Click the parallel line with the right mouse button and on the shortcut menu, click **Intersect 2 Entities**.



Connect this line with the circle, then with the base.

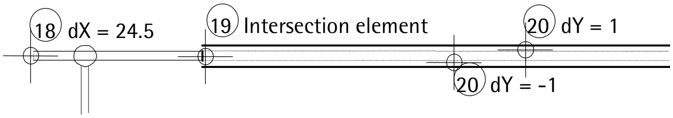
17 Use **Parallel Lines** to draw a line parallel to the one you just lengthened.
Offset: **1**

Your display should now look like this:



The railing bar at the top needs to be changed.

18 Move the vertical line in the railing bar at the top by dX = **24.5** toward the right by clicking **Move** on the shortcut menu (right mouse button).



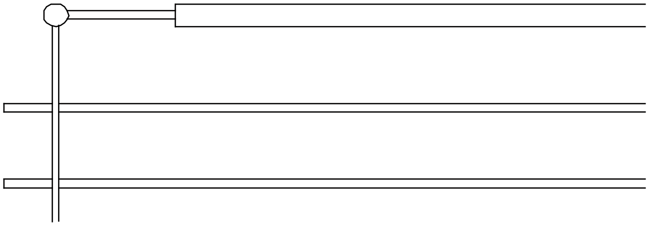
To give the main part of the railing bar a new diameter, the lines first have to be ”separated”. This way the segments can be modified independently

19 Click **Cut with Element** (**Modify** flyout) and click the line you just moved.
The horizontal lines are cut at this point.

20 Use **Move** (**Edit** flyout) to move the line on the right at the top by a dY value of **1** (upward) and to move the line at the bottom by a dY value of **-1** (downward).
Press ESC to quit the tool.

21 Click the vertical line with the right mouse button and use **Intersect 2 Entities** to connect the horizontal lines with the vertical line.

22 Finally, use **Auto-Delete Segment** (**Modify** flyout) to delete any redundant line segments.



23 Press ESC to quit the tool.

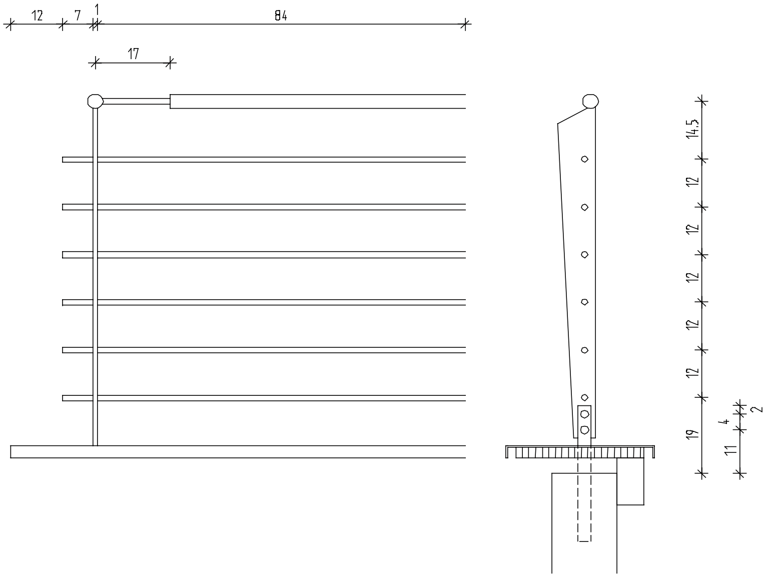
Dimensioning the Railing

To dimension a design, you first need to set the dimension line parameters. Dimensioning then involves three steps:

- Define the dimension line type (Vertical, Horizontal, Angle or Direct)
- Specify a location for the dimension line
- Click the points to dimension

The dimension lines generated can be modified at any time. You can add and remove dimension line points, move the dimension line and change the dimension line's settings.

What you will draw:



The most important parameters are the unit, the position of the dimension text, and the dimension text height and width.
The dimension line always references the design dynamically (associative dimensioning; the points you click are the reference points). Any changes you make to the design are reflected in the dimension line.

Tip: In the **Options** for the **Dimension Lines** module, you can set the decimal marker (point or comma), among others.

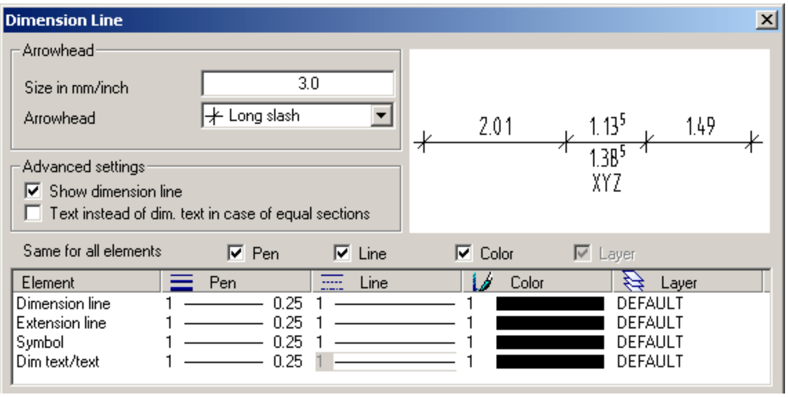
To set dimension line parameters

➲ In the **CAD Navigator** select the **Dimension Lines** module.

1 Click **Dimension Line** (**Create** flyout).

2 Click **Properties.**

3 Check the settings in the top (general) part of the dialog box, select an **Arrowhead** and enter its **Size** and set the **Format properties** for the individual elements of the dimension line.



Dimension Line

Arrowhead

Size in mm/inch: 3.0

Arrowhead: Long slash

Advanced settings

☑ Show dimension line

☐ Text instead of dim. text in case of equal sections

Same for all elements ☑ Pen ☑ Line ☑ Color ☑ Layer

Element	Pen	Line	Color	Layer
Dimension line	1 0.25	1	1 ■	DEFAULT
Extension line	1 0.25	1	1 ■	DEFAULT
Symbol	1 0.25	1	1 ■	DEFAULT
Dim text/text	1 0.25	1	1 ■	DEFAULT

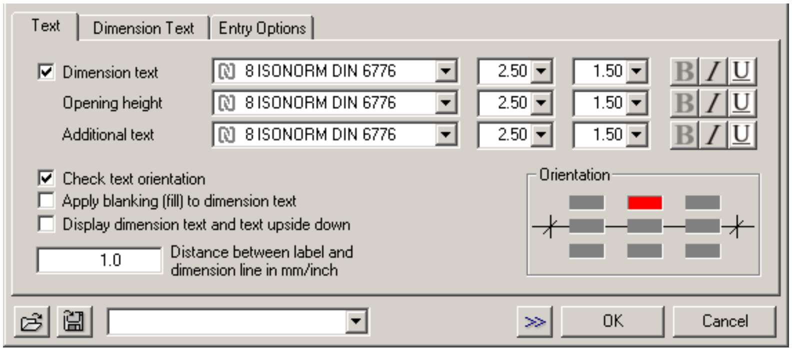
This is where you set the dimension line pen, line, color and layer, regardless of the settings on the **Format** toolbar.

4 Check the settings on the **Text** tab in the bottom part of the dialog box and set the text parameters so that they match those in the figure below.

5 Define the dimension text height and width by entering the following values:

- **Dim. text height: 2.5**
- **Aspect: 1.25** (the text width adapts dynamically to the aspect ratio set: 2 in this example)

6 To define the position of the dimension text, click as required in the **Orientation** area.



☑ Dimension text 8 ISONORM DIN 6776 2.50 1.50

Opening height 8 ISONORM DIN 6776 2.50 1.50

Additional text 8 ISONORM DIN 6776 2.50 1.50

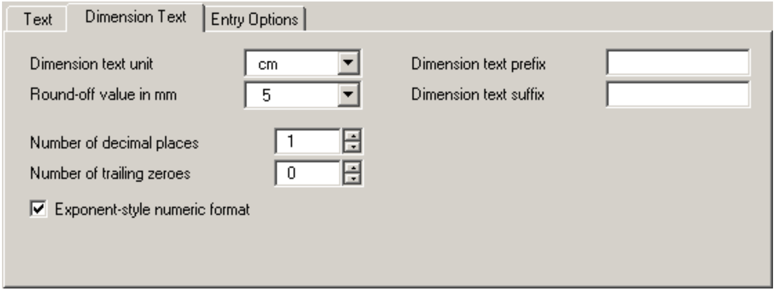
☑ Check text orientation

☐ Apply blanking (fill) to dimension text

☐ Display dimension text and text upside down

1.0 Distance between label and dimension line in mm/inch

7 In the **Dimension Text** tab, click **Dimension text unit** and select **cm**. Enter the other settings as shown below.



Dimension text unit: cm

Round-off value in mm: 5

Number of decimal places: 1

Number of trailing zeroes: 0

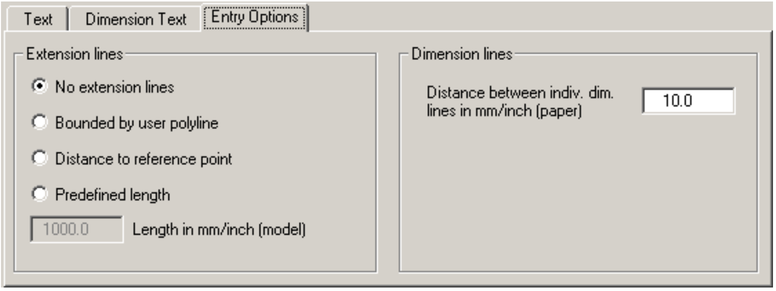
☑ Exponent-style numeric format

Dimension text prefix:

Dimension text suffix:

8 Switch to the **Entry Options** tab and enable the **No extension lines** setting.
Set the other parameters as shown here.

Tip: You can also alter favorites after you have saved them. Just click the name of the favorite and change the settings as necessary.



Extension lines

● No extension lines

○ Bounded by user polyline

○ Distance to reference point

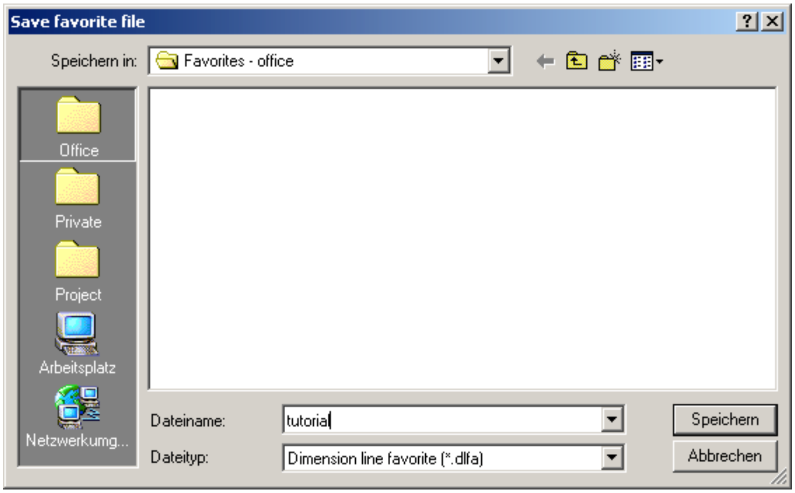
○ Predefined length

1000.0 Length in mm/inch (model)

Dimension lines

Distance between indiv. dim. lines in mm/inch (paper): 10.0

9 Click in the bottom left corner and save the parameters as a favorite file called ”Tutorial”.



Speichern in: Favorites - office

Dateiname: tutorial

Dateityp: Dimension line favorite (*.dlfa)

10 Click **Save** to confirm.

11 Press **OK** to confirm the **Dimension Line** dialog box.

We will now dimension the detail.

To create horizontal dimension lines

➲ The **Dimension Lines** module is open.

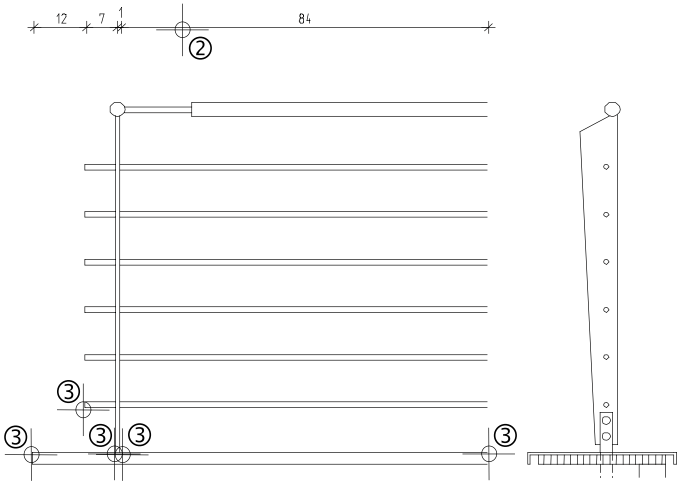
➲ The **Dimension Line** tool is still active.
Set the view so that there is enough space at the top for the dimension line.

1 On the Dynamic toolbar, click **Horizontal**.

2 *Place a point for the dimension line or click a dim. line*
Define the position of the dimension line by clicking a point through which it is to pass.

3 Click the points to be dimensioned.

A preview of the dimension line is displayed immediately. This preview will update automatically to include new dimensioned points. You can click the points you want to dimension in any sequence.

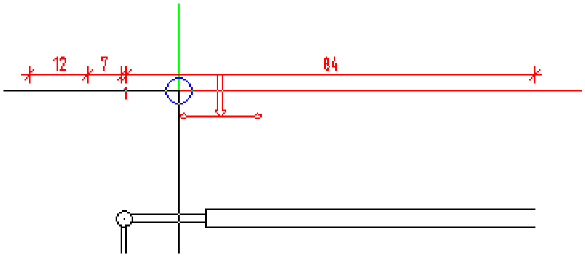


4 To finish entering points, press ESC.

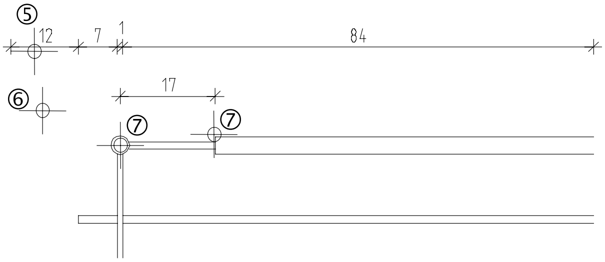
Dimension Line remains active so that you can create the next dimension line.

5 *Place a point for the dimension line or click a dim. line*
Move the crosshairs just below the dimension line as the next dimension line should be below the first one.

The system snaps to the dimension line, which appears in the selection color. In addition, a symbol indicates the side on which the new dimension line is created.



6 Click in the workspace to confirm the side on which the new dimension line is to be created.



7 Click the points to be dimensioned.

8 Press ESC to finish dimensioning.

In the following exercise, we will dimension the section view of the railing using vertical dimension lines.

To create vertical dimension lines

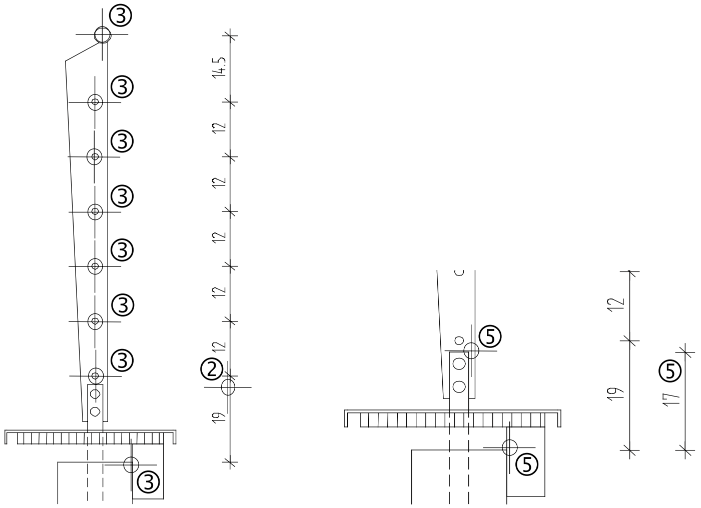
➲ The **Dimension Line** tool is still active.
Set the view so that there is enough space to the right for the dimension lines.

1 On the Dynamic toolbar, click **Vertical** (**Dimension Lines** or **Create** flyout).

2 Place a point through which the dimension line is to pass.

3 Click the top of the wall and the centers of the railing bars.

4 To finish entering points, press ESC.



5 Dimension the height of the attachment piece on the right.

6 Press ESC to quit **Vertical**.

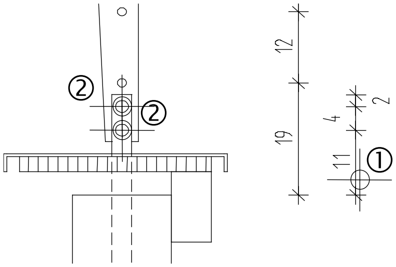
7 Press ESC to quit **Dimension Line**.

Modifying dimension lines

Often, changes in a design will mean that new dimension line points need to be added or removed.
In this case you do not need to re-dimension - you can just add/remove the missing or redundant points.

To add dimension line points

1 Using the right mouse button, click the dimension line to which dimension line points are to be added and on the shortcut menu, click **Add Dim. Line Point**.



2 Click the centers of the circles in the attachment piece.

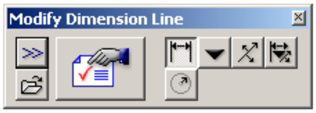
3 Press ESC to quit the tool.

Tip: To remove a dimension line point, click and then a point on the dimension line.
Or:
Click the dimension line in question with the right mouse button, and select this tool on the shortcut menu.

■ *See Also*
Stretching entities and lengthening lines was covered in the exercises showing how to draw the design detail.

It is also possible to change the parameter settings of dimension lines (apart from the spacing between dimension lines).

- Then, click **Modify Dim. Line.**

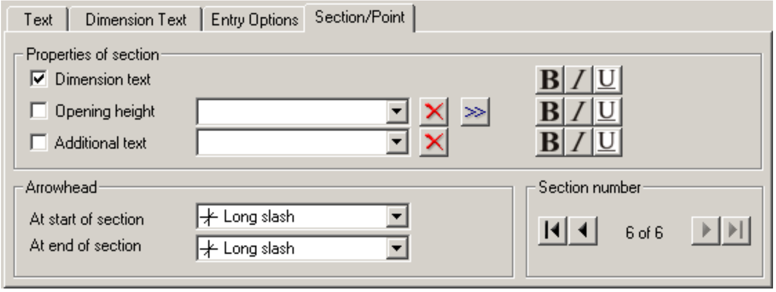


  - Set the new dimension line parameters in the **Properties** and click the dimension lines to apply the changes.
  - Alternatively, you can also select a dimension line type for which the new parameters are to apply on the Context toolbar and then enclose all the dimension lines in a selection rectangle.

- You can also modify dimension lines by clicking a dimension line with the right mouse button and selecting **Properties** on the shortcut menu. Then you can change the parameter settings.

  The **Section/Point** tab is only available in the **Dimension Line** dialog box when you activate dimension lines using this approach. Using this tab, you can modify the parameters of dimension line sections. Depending on the section you clicked, you can modify arrowheads or alter other parameters., for example. All the settings you make only apply to the section you clicked.

  Click ◀ or ▶ to switch to the previous or next section/point..



Properties of section

☑ Dimension text

☐ Opening height

☐ Additional text

Arrowhead

At start of section: Long slash

At end of section: Long slash

Section number: 6 of 6

Troubleshooting

Sometimes, things will not immediately work out as required. This checklist should help you to resolve common problems.

What do I do when ...?

- **I have selected the wrong tool**
  Press ESC and click the correct icon.
- **A tool fails to execute as intended**
  Press ESC to cancel (several times if necessary).
  Click **Undo.**
- **I have deleted the wrong elements**
  If **Delete** is still active:
  press the right mouse button twice.
  If no function is active: Click **Undo.**
- **I have unintentionally opened or want to reject changes made in a dialog box.** Press **Cancel.**

What if..

- **..the workspace is empty but you are sure the drawing file contains design data.**
  - Click **Refresh** (in the viewport border).
  - Click **Plan View.**
- **...the result of a design operation doesn't display correctly**
  Click **Refresh** in the border of the viewport to refresh the display.
- **...the workspace is suddenly divided into a series of different viewports**
  Click **1 Viewport** (**Window** menu).
- **...specific kinds of elements such as text or hatching do not appear in the workspace**
  Click **Show/Hide** (**Standard** toolbar) and check that the element in question is selected.

Tip: Check whether the relevant layer is set so that it is visible.

Unit 3: Project Organization

Project structure, i.e. the way in which you organize your data, is an essential part of any building design project. An efficient and logical structure will allow you to locate the data you need without having to perform tedious searches.

It is worth spending time carefully planning a project's structure before even drawing the first line. Consider the time and effort spent doing this as a good investment - after all, in the long term, it will save you time and money.

Allplan's flexible approach allows users to create their own office-specific structures which, in turn, can be altered to suit the needs of special projects.

This chapter covers the following:

- Managing data with ProjectPilot
- Using layers
- Tips on project organization

Note: If you wish to skip the general chapters and continue working though the tutorial, proceed to the section entitled "Creating a Project" on page 179.

Note: You can also download this training project from the Internet. More information is provided on page 191.

Managing Data with ProjectPilot

What is ProjectPilot?

You use the **ProjectPilot** to create and structure projects in a simple and clear manner.

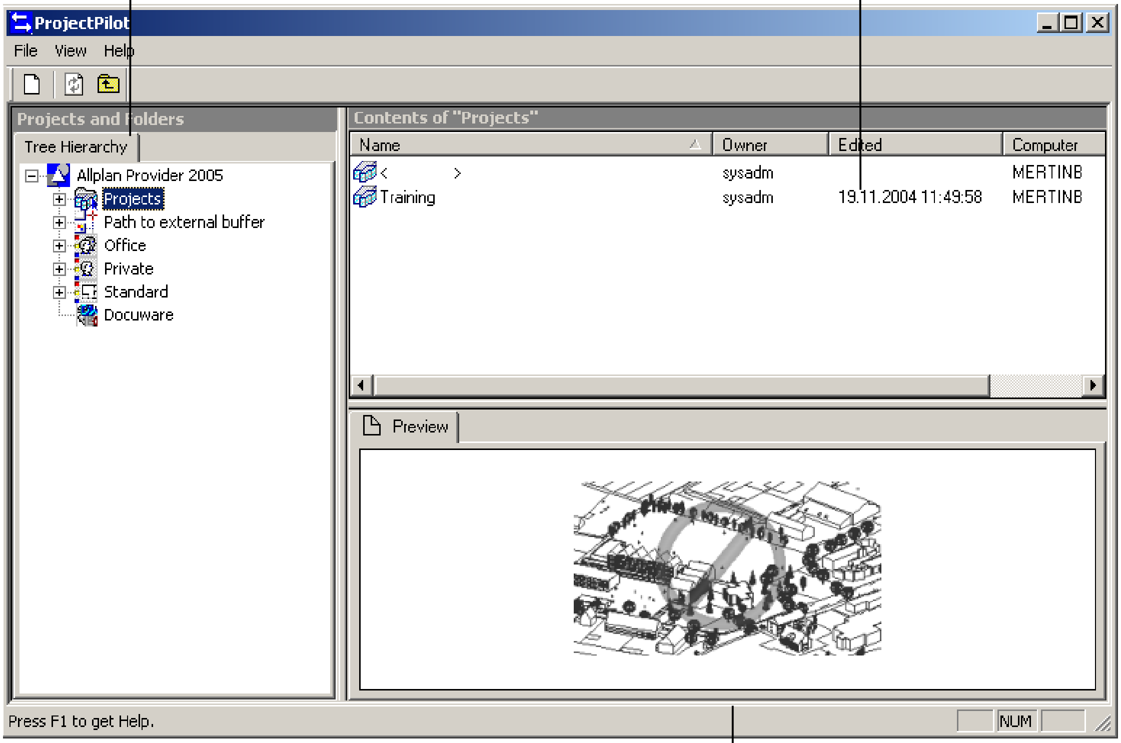
The ProjectPilot is a powerful data management tool developed specially for the data structure of Allplan 2005. The ProjectPilot provides tools for copying, moving, renaming and deleting data (e.g., projects, drawing files, symbols, etc.).

If you are already familiar with Windows Explorer, then you’ll find that working with ProjectPilot is just as easy. Most steps can be accomplished via the shortcut menu and you can move or copy files by dragging and dropping them.

ProjectPilot's user interface

Projects and folders are displayed in a tree structure in the area on the left. Click the plus sign (+) to display the levels in the folder. Click on the name of a folder to display its contents in the right pane.
You can display the contents of the folder and open it at the same time by double-clicking.

The folders and documents contained in the selected node (on the left) are displayed in the area on the right. You can sort the displayed documents by clicking on the title of a column. Clicking in background with the right mouse button lets you display the documents as a list or as icons.



Name	Owner	Edited	Computer
< >	sysadm		MERTINB
Training	sysadm	19.11.2004 11:49:58	MERTINB

Press F1 to get Help.

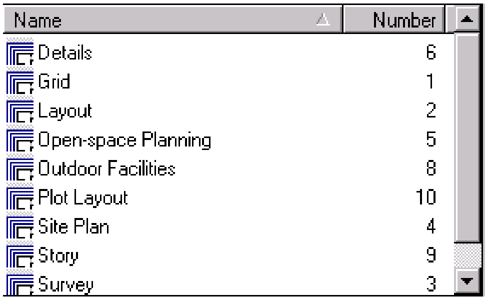
A preview of the currently selected document is displayed in the preview area.
To move the preview, click it with the left mouse button and drag. To zoom in on an area in the preview, open a selection rectangle using the middle mouse button. Double-clicking with the left mouse button or pressing the * key on the number pad restores the preview to its original size.
To display in an isometric view: use the number keys on the number pad.
Check that the Num Lock key is active as you do so.

Common approaches in ProjectPilot

If you are already familiar with Windows Explorer, you will quickly find your way around the ProjectPilot. Most steps can be accomplished via the shortcut menu or by dragging and dropping.

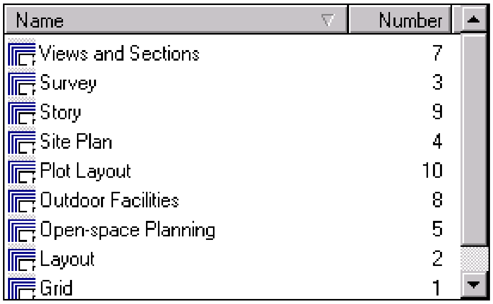
Sorting the displayed documents

You can sort the displayed documents by clicking on the title of a column. The first time you click the column title, the documents are sorted in ascending order. Clicking the same column title again sorts the documents in descending order. An arrow is displayed to indicate which column is being sorted and whether sorting is in ascending or descending order.



Name △	Number
Details	6
Grid	1
Layout	2
Open-space Planning	5
Outdoor Facilities	8
Plot Layout	10
Site Plan	4
Story	9
Survey	3

Sorted in ascending order (arrow points upwards) and according to drawing name



Name ▽	Number
Views and Sections	7
Survey	3
Story	9
Site Plan	4
Plot Layout	10
Outdoor Facilities	8
Open-space Planning	5
Layout	2
Grid	1

Sorted in descending order (arrow points downwards) and according to drawing name

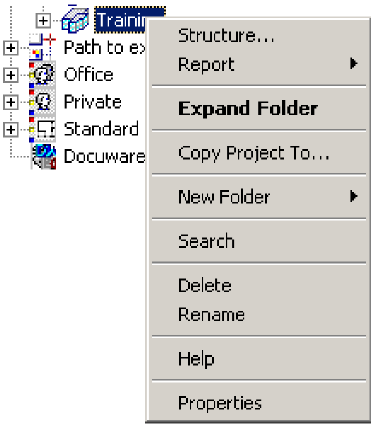
Copying and moving with Drag & Drop

Instead of using the shortcut menu, you can also drag & drop selected documents in order to move or copy them. Select the documents, click within the selection with the left mouse button, keep the mouse button pressed down and then drag. You can tell whether this is possible by the shape of the cursor when the mouse pointer is positioned over the destination area.

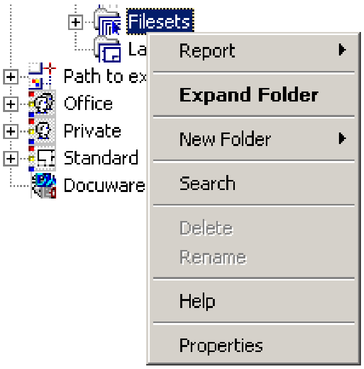
Cursor	Meaning
⊞	The document will be **copied** to the folder that is below the mouse pointer.
☐	The document will be **moved** to the folder that is below the mouse pointer.
	Note: To move documents, hold down the SHIFT key while dragging the documents.
⬈	A shortcut to the document will be created in the folder below the mouse pointer (e.g., when assigning drawing files to a fileset).
🚫	The document cannot be placed here.

Working with the shortcut menu

Almost all tools available in the ProjectPilot can be accessed via the Shortcut menu. Depending on which element you click, a shortcut menu appropriate to the element opens.



Shortcut menu of a project



Shortcut menu of the fileset folder

Using the preview

A preview of the selected document is displayed in the preview area. In this view, you can zoom, pan and select isometric views. You can specify on the **View** menu - **Preview** whether and at which position the preview is to be placed.

- **To disable the preview**: on the **View** menu, point to **Preview** and click **None**.
- **To zoom**: use the left mouse button to open a selection rectangle around the area you want to view in detail. The cursor changes to crosshairs.
- **To pan in the preview**: move the view with the middle mouse button. The cursor changes to a hand. Alternatively, use the cursor keys.
- **To restore the full view of the image in the preview**: double-click in the preview are with the middle mouse button, or press the * key on the number pad.
- **To display in an isometric view**: use the number keys on the number pad. Please note that NUMLOCK and the preview window have to be enabled.

Note: The preview is displayed with specific documents (drawing files, layouts) only.

Generating and printing reports

You can display and print out reports by clicking the category for which you wish to generate a report with the right mouse button and then clicking **Report** on the shortcut menu.

Icon	**Use**
⏮	Goes to the first page in the list.
◀	Scrolls back one page.
3 of 4	Displays the current page and the total number of pages.
▶	Scrolls forward one page.
⏭	Goes to the last page in the list.
🖨	Prints out the individual page or all the pages in the list on a standard Windows printer.
🖨	Opens the **Print Setup** dialog box, where you can choose a different printer and make settings.
✉	Exports the list in different formats.
100% ▾	Enlarges or reduces the display.

A company logo and address is displayed in the header and footer of a report. The program ships with the logo and address of Nemetschek AG but, of course, you can replace this information with your own logo and address:

- To replace the logo displayed in the header, enter your company logo in the `rptlogo.bmp` file in the `nem\allplan\etc` folder. In the report the logo is resized to a size of 120x120 pixels. This change has to be made at all workstations.
- To modify the information displayed in the footer, enter Allplan 2005, select **Tools – Defaults – Office Name and Address** and enter the name and address of your company. If you are working on a network with Workgroup Manager, only the administrator (sysadm) can make these entries or changes.

Using Layers

Understanding layers

Layers provide an additional means of applying a structure - within drawing files. Metaphorically speaking, a layer is a transparency on which design elements belonging to a specific category (load-bearing walls, non-bearing walls) are drawn. Layers can be set so that they are visible or hidden.

The use of layers obviates the need for frequent switching between drawing files and they ensure that associative elements - such as wall dimensions or sill elevation labels - reside in the same drawing file and yet can still be hidden from view.

Layers are important organizational elements. Their importance increases the more people are involved in a project and the more a CAD system is used for the specialist design processes. Layers do not replace drawing files. Rather, they complement them.

Defining the layer on which to design

Every element is automatically drawn on a specific layer. The layer on which you draw is based on the tool you use. A line and a wall, for example, are drawn on different layers.

The layer on which you draw is governed by the following settings:

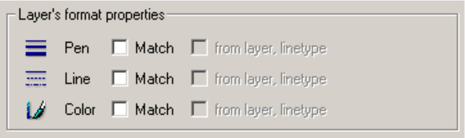
- When you activate a tool (e.g., Line) for the first time, a specific layer is automatically selected as the current layer. The layer in question depends on which tool you activate. This is only possible when the **Auto-select layer with menu** option is activated in the **Layer** dialog box. If this option is disabled, the **Default** layer is always used.
- You can use **Select Layers** or the **Format** toolbar to define a different layer as the current one. This layer will then automatically be used as the current layer the next time you activate the tool.
- If you save components as favorites, the layer you have currently set is also saved. When you retrieve favorite files later, this layer is automatically set as the current layer.

- The sill representation of door and window openings get the layer of the wall in which they are inserted, regardless which layer is currently set.

Setting the format properties of layers

Every layer has **pen**, **line** and **color** properties. In the **Layer** dialog box, you can specify that an element is to automatically assume the properties of the layer on which it is drawn.

The format properties of a layer can also be defined as a **linestyle** and saved under a name of your choice. Elements can then be assigned the format properties from this layer in a fixed manner.


Layer's format properties
Pen ☐ Match ☐ from layer, linetype
Line ☐ Match ☐ from layer, linetype
Color ☐ Match ☐ from layer, linetype

When defining linestyles, you specify whether they change according to the scale or drawing type. You can define different linestyles for various scale ranges and/or drawing types so that the display of elements varies depending on the reference scale / drawing type set. Linestyles enable users to work on a scale-independent basis.

Drawing types define how elements are displayed on screen and in the printout. The display of the elements varies depending on the selected drawing type. Requirements: the format properties are taken from the layer (in a fixed manner) and the use of linestyles is enabled.

Layer access rights

There are different layer access rights. These rights control whether you can see and/or modify layers (and thus the elements assigned to the layers). The access rights are presented by icons in the **Layer** dialog box, **Select Layer/Visibility** tab:

Icon	**Access right**	**Explanation**
🟥	Current	The layer on which you draw.
🟨	Modifiable	Elements in this layer are visible and can be modified.
▨	Visible, frozen	Elements in this layer are visible but cannot be modified.
☐	Hidden, frozen	Elements in this layer are not visible and cannot be modified.

The color of the bottom part of the layer icon shows the rights of the current user group (yellow = editing rights, gray = only visible -> cannot be edited).

The color used to display the upper part shows the current visibility status.

In the **Select Layer/Visibility** tab, you can limit access rights to layers and, for example, set the status of **Modifiable** layers to **Visible, frozen**.

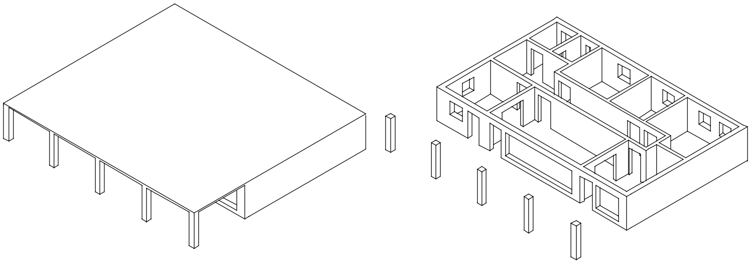
But access rights to layers also depend on the design group to which the relevant user belongs. Design groups are required when several users are working on different levels within the layer hierarchy. This ensures that the layers which serve as the basis for a design are not changed by users unless their design group has the explicit right to do so.

Thus, you cannot assign a higher status (for example, set hidden layers to modifiable) to layers which you are not allowed to access due to the design group you belong.

Setting layer visibility

You can set layers so that they are visible or invisible and thus show/hide the corresponding elements.

This way, you can quickly hide the elements you don't need during the current design phase, selectively modify elements in the displayed layers, check your plan and see whether all the elements are assigned to the desired layer. For example, you might choose to hide the slab layer and then view the spatial arrangement of the building as a hidden line image in perspective view.



Tip: Right click an element and select **Modify Layer Status** on the shortcut menu and then click **Isolate Element Layer** to hide all the layers with the exception of the element layer.

If you find that you often require the same combination of visible and hidden layers (for dimensioning or labeling at certain scales, for example), then it is best to define what is known as a layer set. You can also use layer sets when assembling your layout later on so that only the visible layers are printed out.

Note: In the **Layer** dialog box, enable the **Display in drawing file** option to use a fixed color to display elements on frozen layers.

Managing layers and layer structures

The management of layers and layer structures is generally the responsibility of the system administrator. This person defines which layers are used, sets up the design groups and grants access rights. Employees (architects, engineers, etc.) are assigned to the design groups, and thus they are granted the relevant access rights to the individual layers.

Advantages of organizing data using layers

With large projects in particular, organizing data using layers has significant advantages.

Task-oriented approach

For individual disciplines or design phases like, for example, designing the office arrangement in an administrative building, the same reference drawing files and current drawing file are required for each floor. As you work, you need to switch between the floors frequently.

If you work with layers, you do not need to reassemble the necessary drawing files each time or create filesets with each new project. Just define the layer sets you need for certain design phases/disciplines and store these as an office-specific standard. You can reuse the layer sets time and again – even in new projects.

Benefits during the analysis phase

In order for the interaction between elements to function cleanly, the walls and columns in question have to reside in the same drawing file. This is also the case for certain analysis and evaluation operations. With layers, you can meet these requirements easily.

Easier to assemble layouts

Layer sets are user-defined compilations of layers. These can also be used when editing and assembling layouts. When assembling a layout, you can choose to display only the elements in a specific layer set- switching between 1:50 and 1:100 is thus no problem.

Simplified data exchange via interfaces

Exporting drawing files to DXF/DWG layers is easier as you can assign each layer in a drawing file to a different DXF/DWG layer. When importing DXF/DWG files, the DXF/DWG layer structure can be automatically integrated in the layer hierarchy.

Relationship between layers and drawing files

The use of layers doesn't mean that drawing files don't play a role when it comes to organizing your data. With large project in particular, a combination of both is essential. With the same structural depth, the number of drawing files required is far less when working with layers.

The number of drawing files you need not only depends on the size of the project, but also on your hardware. Modern, fast computers with a lot of memory can handle a lot more data per drawing file without this leading to a noticeable downturn in performance. To be on the safe side, however, it is advisable to settle for a compromise between drawing file size and computing power in order to avoid pushing the hardware to its limits.

The interplay between layers and drawing files depends on the following factors:

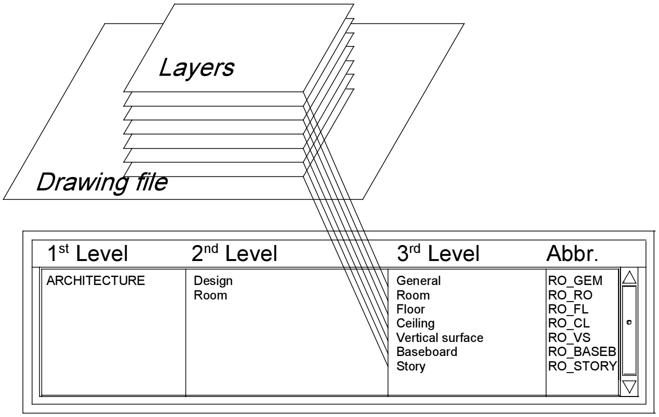
- The size of the project and the number of designers involved at any one time.
  If several designers are working on one floor, create one drawing file per area of responsibility (e.g., East Wing, Central Unit, West Wing, for example.)
- Simultaneous involvement of specialist designers on the project.
  Separate drawing files should always be used for the specialist designs in order to facilitate concurrent activity.

Layer hierarchy

The management of layers and layer structures is generally the responsibility of the system administrator. This person defines which layers are used, sets up the design groups and grants access rights. Employees (architects, engineers, etc.) are assigned to the design groups, and thus they are granted the relevant access rights to the individual layers.

Layers are not arranged linearly but hierarchically in a tree structure. An exception is the default layer which is not integrated in the hierarchic structure. The layer structure consists of the following three hierarchic levels:

- The first level describes the layer category (e.g., ARCHITECTURE, ENGINEERING).
- The second level is divided into special fields within the category (e.g., Design, Room).
- The third level consists of the layers themselves. Every layer has a full (long) name with a detailed explanation of the contents. Each layer also has an abbreviated name (e.g. Ceiling, RA_CE).



1st Level	2nd Level	3rd Level	Abbr.
ARCHITECTURE	Design	General	RO_GEM
	Room	Room	RO_RO
		Floor	RO_FL
		Ceiling	RO_CL
		Vertical surface	RO_VS
		Baseboard	RO_BASEB
		Story	RO_STORY

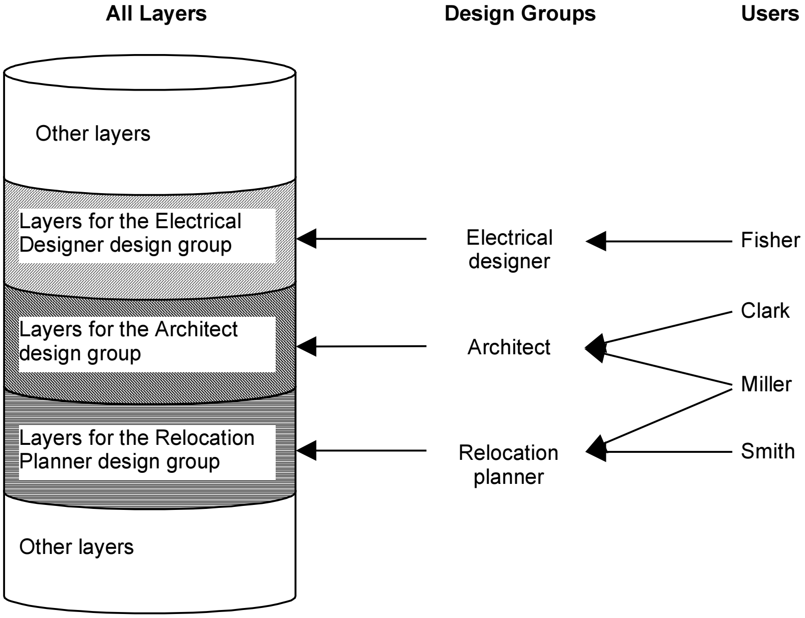
The current layer's abbreviation is displayed on the **Format** toolbar. The long name is displayed in the ToolTips of the **Select, Set Layers** dialog box.

When you create a project, you can decide whether you want to use the layer structure of the office standard or a project-specific layer structure. Detailed information is provided in Using Project Resources.

You can save layer structures and give them names. If you have assigned linestyles, they are saved together with the layer structure (with the same file name plus the extension .sty). When importing a saved layer structure, you can import this linestyle file, too.

Using design groups

Access privileges can be controlled at layer level by means of design groups. Design groups are generally assigned when there are several people working on the same project: When installing with Workgroup Manager, the individual users are assigned to one or several design groups, Thus, the users can only see and/or modify the layers to which the relevant design group is granted access rights.


All Layers
Design Groups
Users
Other layers
Layers for the Electrical Designer design group
Layers for the Architect design group
Layers for the Relocation Planner design group
Other layers
Electrical designer
Architect
Relocation planner
Fisher
Clark
Miller
Smith

Design groups not only control who accesses which layers. By defining design groups with a selection of layers that are available while drawing, the entire design process can be facilitated.

The design group called ALLPLAN is created automatically after the program has been installed. This group has read and write access for all layers. Thus, all users can see and modify all layers.

Using layer sets

A layer set is a set of layers that you can select when compiling and arranging layouts. You can also use layer sets control which layers are visible/hidden. Only the elements in the selected layer set are displayed in the layout.

For example, you can select a layer set for working drawings so that only the data that is relevant to a working drawing appears in the final printout.

Creating a Project

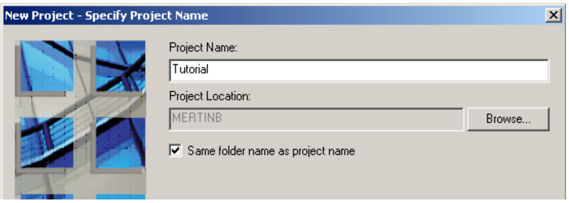
We will start by creating a project for the exercises in the units that follow.

To create a project

1 On the **File** menu, click **ProjectPilot / Admin...**.

ProjectPilot opens.

2 In ProjectPilot, click **New Project...** on the **File** menu.



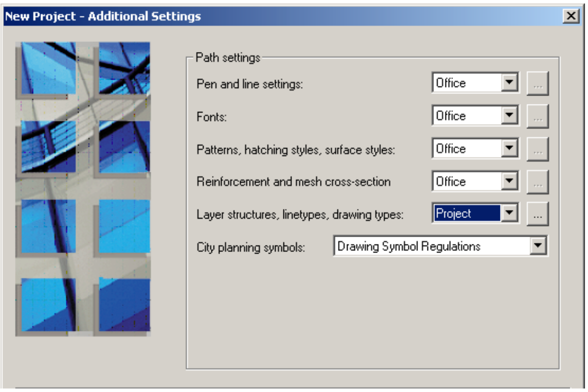
New Project - Specify Project Name

Project Name: Tutorial

Project Location: MERTINB

☑ Same folder name as project name

3 Enter the project name **Tutorial** and click **Next**.



New Project - Additional Settings

Path settings

Pen and line settings: Office

Fonts: Office

Patterns, hatching styles, surface styles: Office

Reinforcement and mesh cross-section Office

Layer structures, linetypes, drawing types: Project

City planning symbols: Drawing Symbol Regulations

4 Set the layer structure to **Project** and press **Next** to confirm.

5 Confirm the following dialog boxes by clicking **Next** and **Finish**, respectively.

6 Exit ProjectPilot by clicking **Exit** on the **File** menu.

You are back in Allplan in the project **Tutorial**.

Path settings
These define whether the pens, linetypes, hatching styles, fonts and material catalogs available in that project are based on the office standard or whether they are project-specific. In practice, the office standard is generally used.

Office:

Choose this option if you want different projects within the same office to use the same settings (for hatching, linetypes etc.). If you are working in a network, the office standard is the same on all computers and can only be changed by users with special privileges.

Project:

Choose this option if you want the settings, for instance for patterns and/or hatching styles, to apply to this project only (in which case they will probably be different to those used as the office standard).

Creating a Fileset

For the exercises that follow, you will create your own, simple project structure. In the case of case of a 'live' project, we recommend that you organize your data by story and layer sets (see "Tips on Project Organization", page 184).

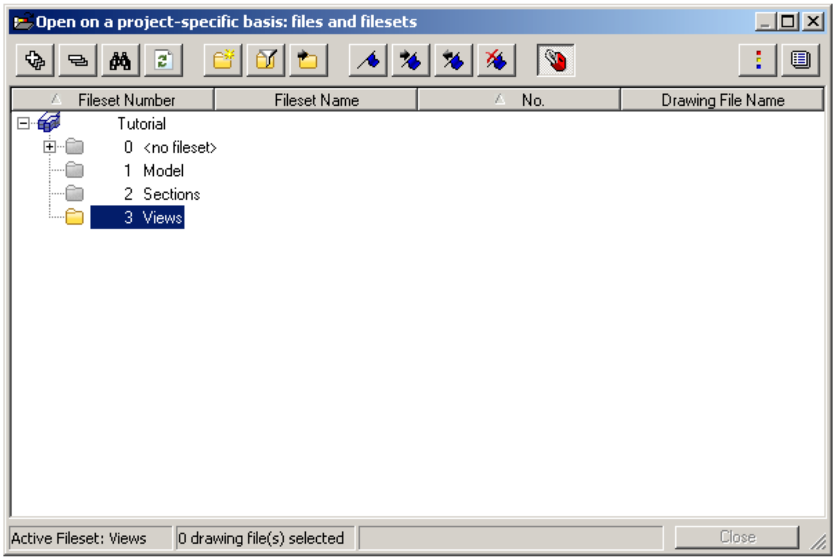
Tip: To open a detailing window in a drawing file (displaying a section of the drawing at a larger scale), the drawing file must belong to a fileset.

To create a fileset

1 Click **Open on a project-specific basis.**

2 Close the drawing file tree for fileset **0** by clicking the minus sign beside the fileset called **<No fileset>** in the **Files and Filesets** dialog box.
Or click **Collapse All Filesets** displayed in the toolbar at the top.

3 Click **Create Fileset** at top left, enter the fileset name **Model** and press ENTER to confirm.


Open on a project-specific basis: files and filesets

Fileset Number	Fileset Name	No.	Drawing File Name

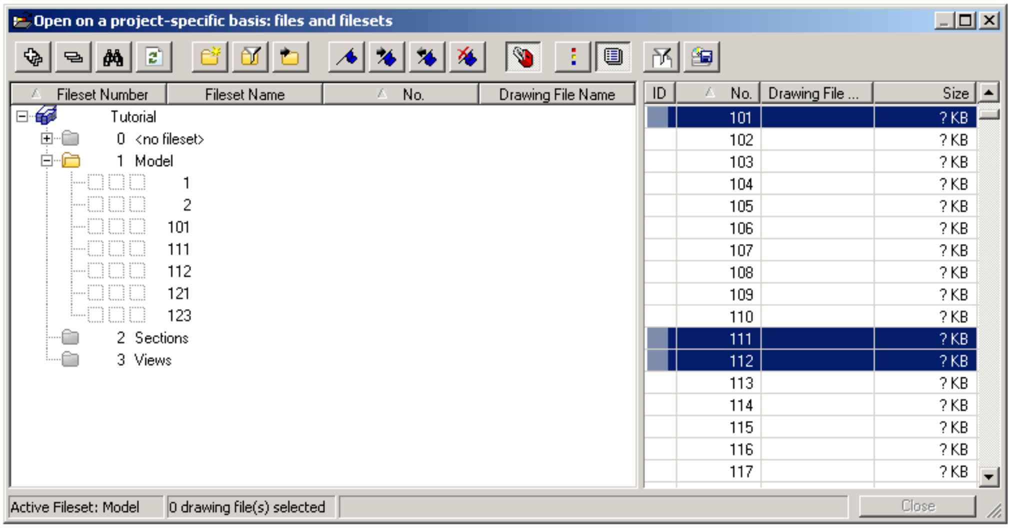
Tutorial
0 <no fileset>
1 Model
2 Sections
3 Views

Active Fileset: Views
0 drawing file(s) selected

4 Create the filesets **Sections** and **Views** in the same way.

5 Click **Show/Hide Drawing File List.**

6 Press the **CTRL key** and select the drawing files **1**, **2**, **101**, **111**, **112**, **121** and **123**.



ID	No.	Drawing File ...	Size
	101		? KB
	102		? KB
	103		? KB
	104		? KB
	105		? KB
	106		? KB
	107		? KB
	108		? KB
	109		? KB
	110		? KB
	111		? KB
	112		? KB
	113		? KB
	114		? KB
	115		? KB
	116		? KB
	117		? KB

Active Fileset: Model

0 drawing file(s) selected

Tip: You **select the drawing files** as in Windows® Explorer:

Press the **CTRL key** to select a series of non-adjacent drawing files (e.g., 10, 16 and 28).

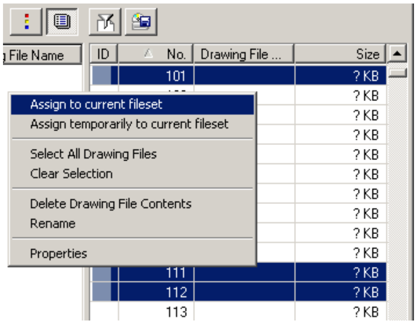
Press the **SHIFT key** to select a range of adjacent drawing files (e.g., 10 – 20).

Or open a selection rectangle around selected drawing files with the mouse.

7 Click one of the selected drawing files (without releasing the mouse button!), drag the selection to the fileset **Model** and release the mouse button.

The drawing file tree for the fileset opens. The drawing files are thus assigned to the fileset.
If you have selected a drawing file too many, you can drag it out of the list in the same way.

Note: As an alternative to **dragging & dropping**, you can also select the fileset, select the drawing files and, on the shortcut menu, click **Assign to current fileset**.



8 Now assign drawing files to the other filesets in the same way and using the information in the table below.

Fileset	Drawing file number	Contents
Model	1	Grid
	2	Section clipping path
	101	Basement model
	111	Ground floor model
	112	Ground floor carport
	121	Roof model
	123	Roof
Sections	200	A-A hidden line calculation
	201	A-A detail
	202	A-A outdoor facilities
	210	B-B hidden line calculation
	211	B-B detailing
	212	B-B outdoor facilities
Views	300	East, hidden line calculation
	301	East, detailing
	302	East, outdoor facilities

Tip: Naming drawing files was dealt with in unit 2.

9 Name the drawing files as shown.

10 Select a drawing file and click **Close** to confirm.

Other drawing files will be opened in subsequent exercises. Then assign these drawing files to the fileset as described.

Tips on Project Organization

Allplan is a very flexible system that allows you to develop your own custom solutions for projects within the office. The structure presented here for large-scale projects is intended only as a guide. You can use the entire structure or just parts of it.

You will probably find this structure useful when you start. As you progress, you will be in a better position to judge what needs changing/adding to suit your own needs and requirements. We would like to emphasize once again that a carefully though out project structure will save time for everybody in the long run. The system has the following structure:

- Store general project information in drawing files 1-99. For example, the site plan, axis system or layout.
- Story design starts at drawing file 100.
  The first digit indicates the number of the story. The last two digits provide information on the contents. The sequence in which the drawing files are named should be identical on each floor.
- Use the drawing files starting at number 1000 for elevations and the relevant sections.
- Use the drawing files starting at number 2000 for detailing.

Setting Up Layers

When you created the project, you set the layer structure to **Project**. All the settings you make, therefore, will apply to this tutorial project only.
The office standard is thus unaffected by any changes. You will probably use the office standard in your daily work. The office standard's settings are defined by the system administrator and apply for the entire office.

Allplan 2005 provides a very extensive layer structure designed to meet a broad range of requirements.
You can also define your own layer categories/hierarchies and layers. For this guide you will be using the layers in the main architectural category.

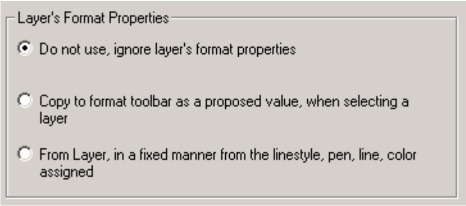
You can specify whether the format properties (pen, line, and color) are based on your custom settings, whether these properties are proposed by the program and displayed on the **Format** toolbar (you can modify them at any time) or whether these attributes are always taken from the relevant layers (from the linestyle or the setting assigned to the layer).

In the tutorial, we will work independently of the predefined layer format properties and make these settings while drawing.

To disable the 'Match layer's format properties' setting

1 Click **Select, Set Layers** (**Format** toolbar) and then select **Set...**.

2 Switch to the **Format definition** tab and enable the **Do not use, ignore layer's format properties** setting.



Layer's Format Properties

● Do not use, ignore layer's format properties

○ Copy to format toolbar as a proposed value, when selecting a layer

○ From Layer, in a fixed manner from the linestyle, pen, line, color assigned

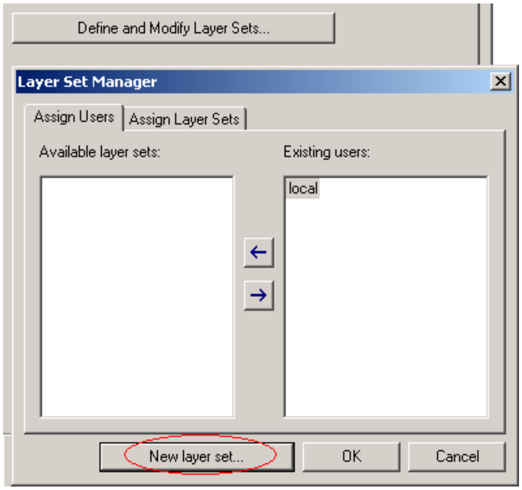
Defining layer sets

A layer set is a saved combination of visible and hidden layers. Both when setting up your layouts and when turning layers on and off, activating a layer set is a rapid way of showing/hiding only those layers that are required for a specific situation. First create and name the layer sets. Then assign layers to these layer sets.

To define layer sets

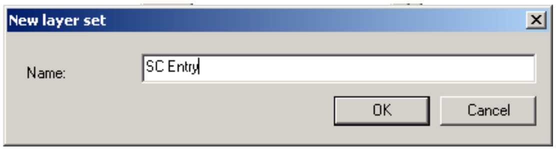
➲ The **Layer** dialog box is still open.

1 Select the **Layer Sets** tab and click **Define and Modify Layer Sets....**



2 In the **Layer Set Manager** dialog box, click **New layer set....**

3 Name the first layer set **SC Entry** and click **OK** to confirm your entry.



Name: SC Entry

4 If you are working with workgroup manager, assign the user **local** to the design group.

5 Repeat steps 2 through 3 (4) and create more layer sets:

- LS Design
- Model
- SC Rooms

You can enter any name you choose. The names here mean the following:

- **LS**: layer sets to appear in printouts
- **SC** (**Screen**): defined on an entry and check-oriented basis
- **Model**: contains the components for the visual 3D check.

6 Press **OK** to confirm the entries you have made in the layer set manager.

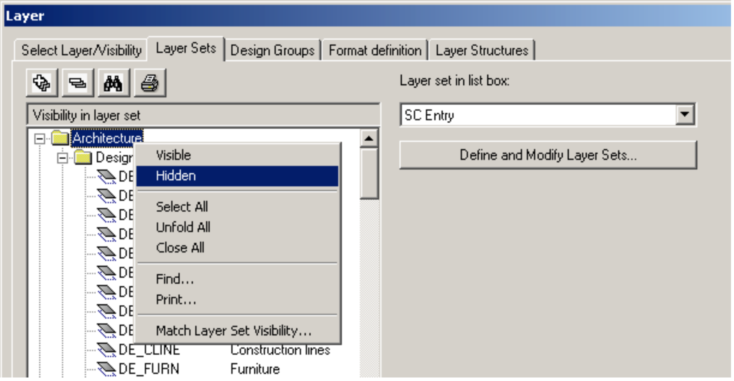
Now you need to define which layers are to be visible and which hidden in each layer set.

To define visible and hidden layers for the layer sets

➲ The **Layer** dialog box is still open.

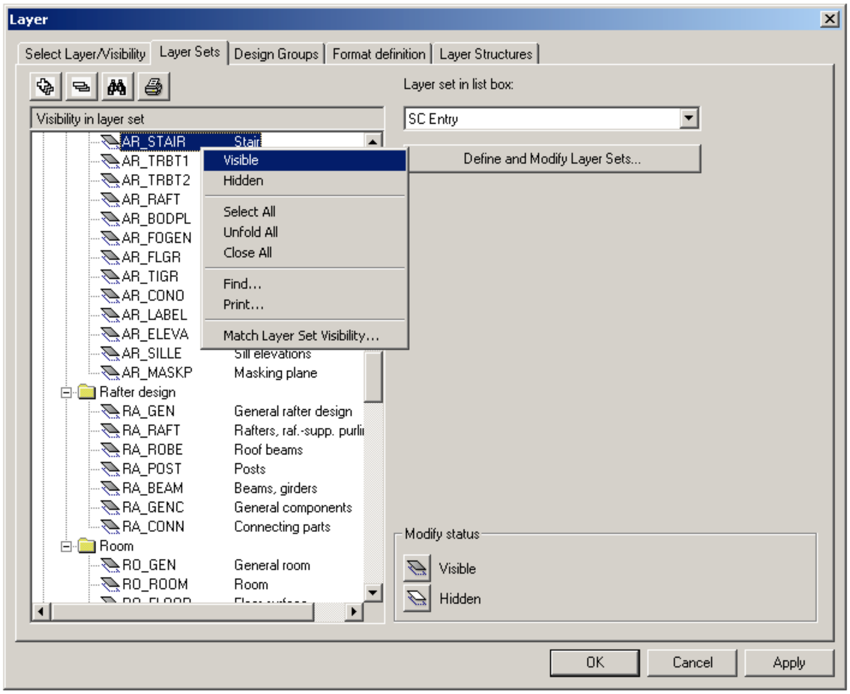
The first layer set **SC Entry** is displayed.

1 As only a few layers are to be visible, start by setting all architectural layers to **Hidden**. To do this, click **Architecture** with the right mouse button and, on the shortcut menu, choose **Hidden** .



2 Press the CTRL key and select the layers which are to be visible in the **SC Entry** layer set (see table below).

3 Click the selection with the right mouse button and, on the shortcut menu, choose **Visible**.



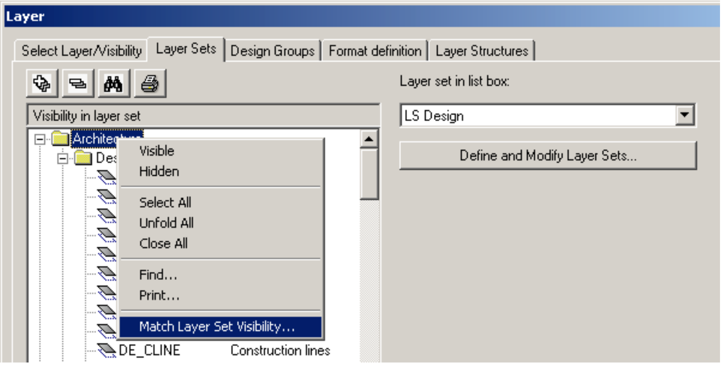
Layer set in list box: SC Entry

AR_STAIR	Stair
AR_TRBT1	
AR_TRBT2	
AR_RAFT	
AR_BODPL	
AR_FOGEN	
AR_FLGR	
AR_TIGR	
AR_CONO	
AR_LABEL	
AR_ELEVA	
AR_SILLE	Sill elevations
AR_MASKP	Masking plane
Rafter design	
RA_GEN	General rafter design
RA_RAFT	Rafters, raf.-supp. purli
RA_ROBE	Roof beams
RA_POST	Posts
RA_BEAM	Beams, girders
RA_GENC	General components
RA_CONN	Connecting parts
Room	
RO_GEN	General room
RO_ROOM	Room

4 Click **Apply** to save the current setting.

5 Select the next layer set in the **Layer set in list box** area and define which layers are to be visible and which hidden in this layer set (see table below).

Tip: You can also start by copying the settings from a layer set you have already defined and customize them.



Layer set in list box: LS Design

DE_CLINE	Construction lines

Category	Layer	Abbrev.	SC Entry	LS Design	Model	SC Rooms
Design	General 1	DE_GEN01	✓	✓		✓
	General 2	DE_GEN02	✓	✓		
	Grid	DE_GRID	✓			
	Furniture	DE_FURN	✓			
	Sanitary	DE_SANY	✓			
Text	Text 1:100	TX_100	✓			
Dimension line	Dimension line 1:100	DL_100	✓	✓		
Architecture	Wall	AR_WALL	✓	✓	✓	✓
	Column	AR_COL	✓	✓	✓	✓
	Slab	AR_SLAB	✓		✓	
	Planes	AR_PLANE	✓			
	Roof	AR_ROOF	✓	✓	✓	
	Stairs	AR_STAIR	✓		✓	✓
	Label	AR_LABEL	✓			
	Elevations	AR_ELEVA	✓			
	Sill height	AR_SILLE	✓	✓		
Room	Room	RO_ROOM	✓			✓

6 When all the layer sets haven been assigned layers, click **Apply** and **OK**.

Training project on the Internet

If you do not want to work through the entire tutorial step by step, the training project is available on the Internet so that you can download it. It contains all the drawing files at different levels of completion so that you can get started wherever you want. For example, you do not need to draw the walls first. Just open the corresponding drawing file and start inserting windows and doors.

Downloading the training project

The data used in the tutorial is provided in the library of the Nemetschek ServicePlus Portal:

http://ServicePlus.Nemetschek.de

- Use your customer number and email address to register. This registration is free of charge and not subject to any conditions.

  After approximately five to ten minutes, you are able to access data and information.
- To download the training project, go to http://ServicePlus.Nemetschek.de → Portal → enter your user data → homepage → library
- The library contains the project, a guide showing how to import the project and an up-to-date version of this document as a PDF-format file.

Note: As a ServicePlus customer, you will find more step-by-step guides on our products in the library. It usually takes one to two working days to make these documents available to ServicePlus customers.

General information on Service Plus is available at the following Internet address:

http://www.nemetschek.de/servicePlus

Unit 4: Building Design

➲ The exercises in this unit require the **Architecture** and **Walls, Openings, Components** modules. Check in **CAD Navigator** to see whether you have licensed these modules.

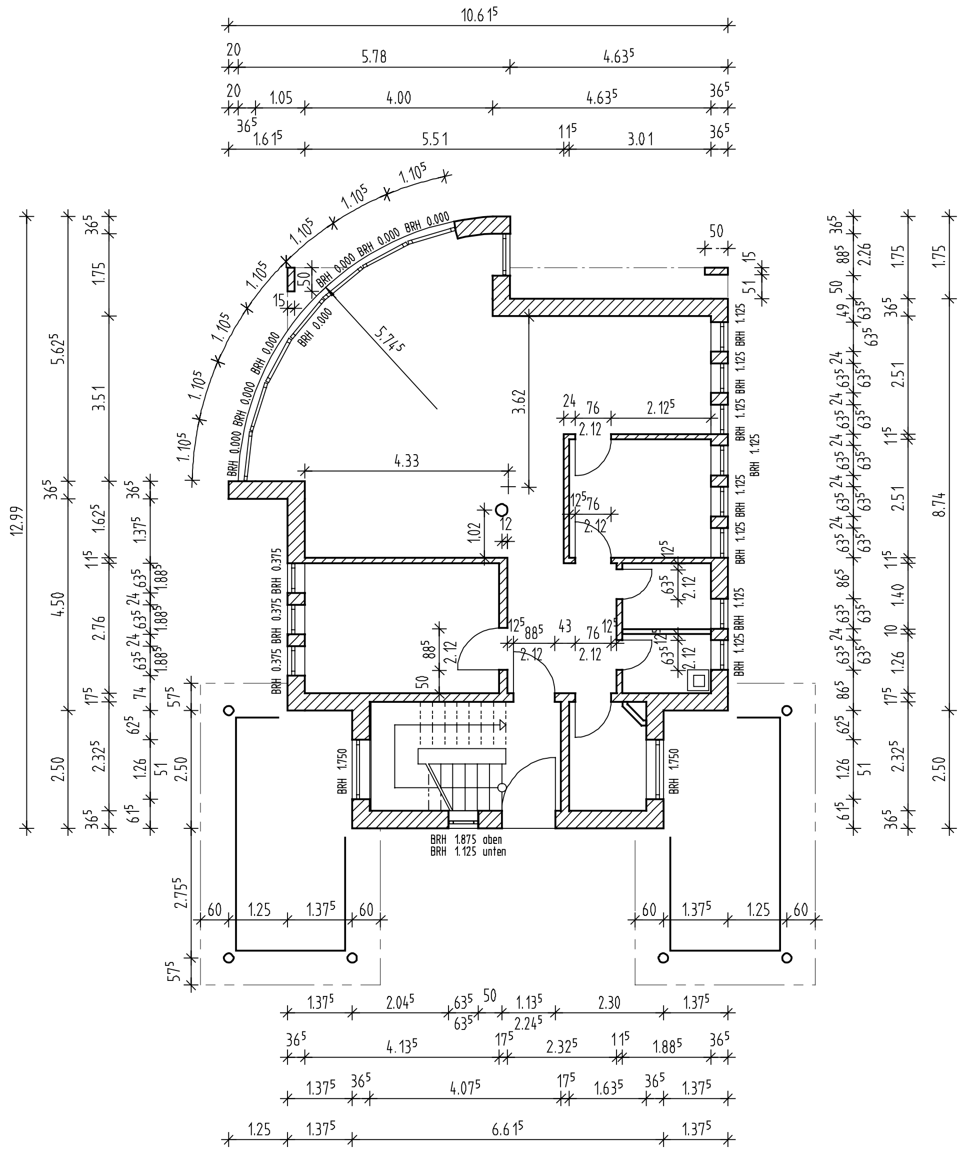
In this unit you will draw a residential building in 3D. The three-dimensional building model will be generated as you work.

You will create the first floor, the top floor and the basement one after the other.

You will learn to use the following, basic architectural tools: Wall, Column, Door Opening, Window Opening and Slab. You will also find out how to apply smart symbols and dimension the floor plan.

You should work your way through the exercises step by step.

Exercise 3: First Floor



Settings

When you work with the architectural modules, there are additional settings that you need to bear in mind – the pen used for component hatching and the material catalog used, for example.
These are located in the options for the architectural modules.

To define basic settings

➲ The **Tutorial** project is selected.

1 Click **Open on a project-specific basis** (**Standard** toolbar)

2 In the **Model** fileset, select the drawing file **111 Ground floor model** and set it to edit mode.

3 Press **OK** to confirm.

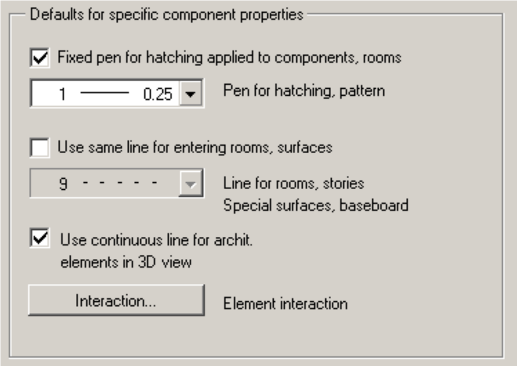
4 In the **CAD Navigator** select the **Architecture** module.

Tip: You can also set the unit of length in the status bar.

5 Click **Options** (**Standard** toolbar), select **Global Options** and navigate to the **Entry** tab. Set the **Unit of length** to **m**. Click **OK** to confirm.

6 Click **Options** again and select **Architecture.**

7 Switch to the **Display** tab and in the **Defaults for specific component properties** area, enable the **Fixed pen for hatching applied to components, rooms** check box and select a pen for the hatching: **1 0.25**



Defaults for specific component properties

☑ Fixed pen for hatching applied to components, rooms

1 —— 0.25 ▾ Pen for hatching, pattern

☐ Use same line for entering rooms, surfaces

9 - - - - - ▾ Line for rooms, stories
Special surfaces, baseboard

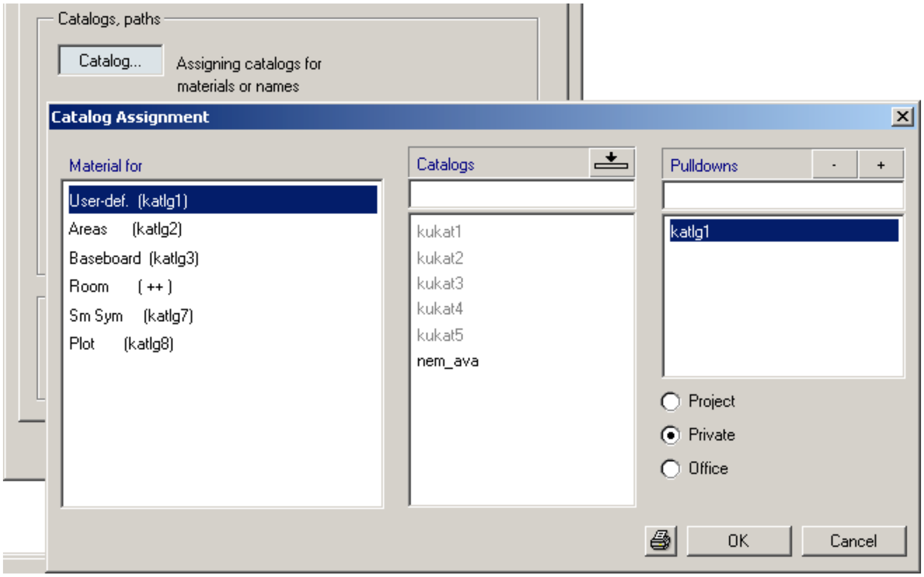
☑ Use continuous line for archit. elements in 3D view

Element interaction

8 Activate the **Use continuous line for archit. elements in 3D view** check box.

We will not use the nem_pos catalog (SirAdos element catalog) in this workbook Instead, we will use custom list boxes whose contents you define yourself.

9 Switch to the **Settings** tab, click **Catalog** in the **Catalogs, Paths** area and select **katlg1** in the **Pulldowns** area.



10 Confirm the catalog assignment and the architecture options with **OK.**

11 Set the **Reference Scale** (on the **View** menu or in the **status bar**) to **100.**

To accurately define the position of a 3D component such as a wall in space, it is necessary to know the height of the component's top and bottom levels. The height can be entered using absolute values – however, there is also an easier approach:

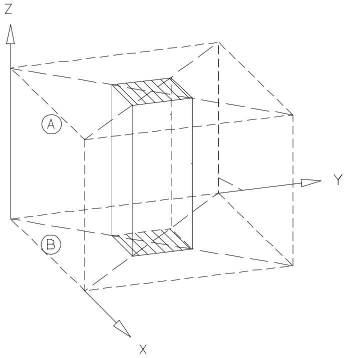
The default reference planes

Each drawing file in Allplan 2005 has an imaginary pair of default reference planes. You can set the height of these planes separately for each drawing file. the default lower plane is set to 0.00 m, and the default upper plane is the height of one floor above it, i.e., 2.50 m (this is the default setting). These invisible default reference planes apply to the entire drawing file.

Imagine two horizontal planes in three-dimensional space, parallel to each other and at different elevations. By associating the height of a wall with the planes, Allplan 2005 will 'stretch' it so that its top and bottom levels are flush with the upper and lower planes, respectively. If you want, you can also enter an offset distance between the wall's top and bottom and the planes.

The advantage of this method is that all architectural elements whose heights are defined relative to the default reference planes can be lengthened or shortened in a single operation by changing the elevation of the planes.

Tip: To change the height setup of the default reference planes, use Default Planes (How) in the **Architecture** module.

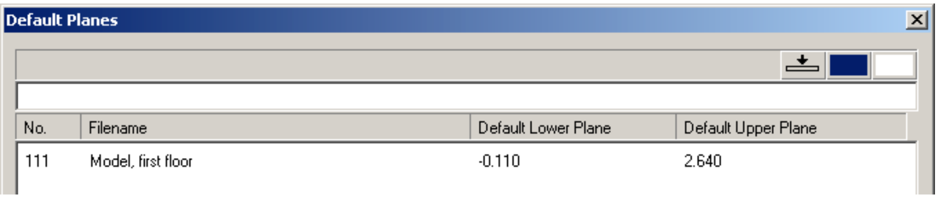


For the first floor in the building we will be assuming the following settings:
The finished floor covering is set to a height of **0**, the height of the unfinished floor will be **-0.11**. This is the height to which we need to set the **lower** default reference plane.
The **top** of the floor slab on the first floor is at **2.64**.

To set the default reference planes

1 Click **Default Planes** (**Roofs and Planes** flyout).

2 Enter the following values in the dialog box:
Default Lower Plane: -0.11
Default Upper Plane: 2.64



No.	Filename	Default Lower Plane	Default Upper Plane
111	Model, first floor	-0.110	2.640

Tip: Using the **Default Planes** tool, you can also define default settings for new drawing files. This can be useful with large buildings if you want to use several drawing files for one story. We will not use this default setting in this workbook.

3 Press **OK** to confirm.

These settings now apply for the current drawing file (111).

Walls

General information

The Wall tool can be used to draw different types of walls:

- **Straight Walls**
  The approach is the same as with lines in the **Draft** module.
- **Rectangular Walls**
  This lets you create four straight walls in a single operation – the approach is the same as with rectangles in the **Draft** module.
- **Curved Walls**
  A polyline is used to approximate the circle. This results in short, straight wall sections that can be addressed as a single entity.
- **Circular Walls**
  This lets you draw walls in the same way as circles in the **Draft** module. You can enter full circles and arcs.
- / **Polygonal Walls**
  Like with curved walls, you can use this to draw walls with an arbitrary number of corners, delimited by an arc. A distinction is made between walls that are “inscribed” and “circumscribed” in/about an imaginary circle.

  Inscribed means that the start and end walls have half the length of a segment. The division is at a tangent to the circle that you entered when defining the geometric outline.

  Circumscribed means that the start and end segments have the length of a normal section. The division is on a secant with the circle that you entered when you defined the geometric outline.
- **Entity-Based Walls**
  This draws walls based on 2D entities (e.g., lines, polylines, splines) or composite elements. The wall is drawn along the donor element. The donor element itself is not affected by the operation.
- **Spline-Based Walls**
  Use this to draw walls as you would a spline in the **Draft** module.

Clicking **Properties** displays a dialog box in which you can define the walls more precisely. Enter values for the height of the wall, its thickness and elevation. You can also define additional properties such as the building trade, material, priority rating, format properties (pen, line, color) as well as the hatching style (or pattern or fill).

Previews always provide information on the construction layers of the wall and its display in the standard views or in animated mode.

Note: To save time, define the materials and other attributes when you enter the walls. Allplan 2005 uses the information you define here for subsequent analyses and reports based on the building model. Of course, you can also assign materials and attributes at a later time. Materials can be transferred directly from applications used for tendering, ordering and billing such as Nemetschek Allright.

Walls are generally drawn like the base 2D entities. For example, you draw a straight wall just as you would a straight line – all the construction aids available when you draw a line are also available when drawing a wall.

The only other thing you need to do is define the offset direction and enter **Properties** for it in the dialog box. The standard approach is to define the height of the wall using reference planes: Define the height of the default reference planes once. All the walls associated with these planes are automatically correct.

Other types of walls

The wall types listed above are complemented by walls with a freeform outline. Moreover, various automation tools are available that you can use to generate single- or multi-tier walls on the basis of lines (sketches, for example), parallel lines (e.g., 2D outlines) or based on rooms that you have already defined, as well as 2D floor plans obtained from scans of drawings. This way, you can quickly convert a 2D design to a complex 3D building model.

Component axis, general information

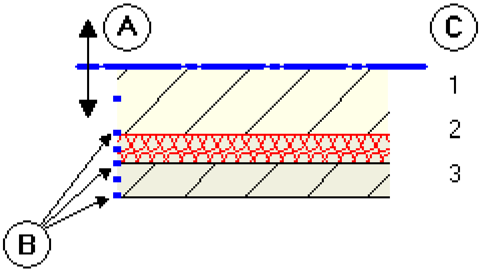
Components are entered along their **component axis**. The wall's direction of extension depends on the position of the component

axis, the direction in which the wall is entered and the position of the first construction layer in the wall.
Click **Rotate about axis** on the **Wall** Context toolbar to change the wall's direction of extension.

You can position the **component axis** as follows:

- Centered in or on the sides of the entire component (wall as a whole)
- Centered in or on the sides of the each construction layer
- At a freely definable distance to a component edge (wall edge)

Small boxes in the preview indicate the positions you can select.



A	Component axis
B	Possible positions on the sides of/centered in the layer or entire wall
C	Number of construction layers

You can place the component axis in several ways:

- **Intuitive**
  Use the mouse to move the axis: the cursor becomes a double arrow, and the component axis will snap to the positions marked by small black boxes. The values displayed on the left of the preview show the distance to the edges.

- **Centered in or on the sides of a construction layer or of the entire wall/upstand**
  In the **Position** column, click the icon of the construction layer or of the entire wall/upstand in which you want to position the axis and select the desired position. The values displayed on the left of the preview show the distance to the edges.
  Left edge of component or construction layer
  Right of component or construction layer
  In the middle of component or construction layer
  Freely definable (for **Total wall** only)

- **Freely definable position by entering a value**
  Click one of the data entry boxes on the left of the preview area and enter any value for the offset of the axis to the wall edge. The program automatically calculates the value for the other side and displays the **Free position** icon in the **Total thickness** area.

Offset direction of components, single-tier walls

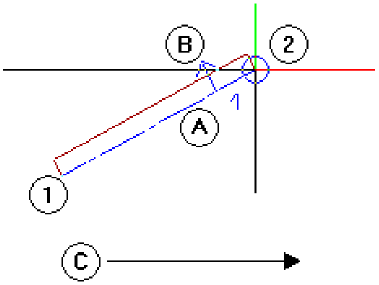
Components are entered along the component axis. Depending on the position of the axis within the component, you can use the direction of extension to specify on which side of the component axis (relative to the direction in which the component is entered) the component is to be drawn. With **Rotate about axis**, you have the option to "tilt" the wall or to reverse the setup of the construction layers.

Tip: Using the offset direction, you can quickly toggle between inner and outer dimensions when entering walls.

The direction is indicated by an arrow and by the position of the first construction layer. This can be enabled/disabled in the **Point Entry Options, Scan, Display** tab.

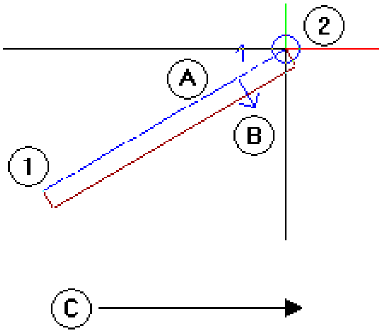
Depending on the position of the component axis, the following options are available:

- Single-tier wall, lateral component axis:



1	Start point of component
2	End point of component
A	Component axis
B	Extension
C	Direction in which component is entered

After clicking **Rotate about axis:**



1	Start point of component
2	End point of component
A	Component axis
B	Extension
C	Direction in which component is entered

- Single-tier wall, centered component axis:
  Clicking **Rotate about axis** does not make any difference.

Designing walls

A 3D wall is always defined by four factors:

- Starting point
- Endpoint
- Offset direction defined by the position of the component axis (= line between the starting and end point) in the wall
- Height or association with the default planes

To ensure that the wall is displayed true-to-scale, you can define its thickness and select a hatching or a fill color for it.
It is also possible to set additional parameters such as a material and building trade.

Straight exterior walls

The exterior walls in the ground floor will be made of **brick** and will be **36.5** cm thick. Start by entering this information prior to drawing the wall.

To set properties

➲ In the **CAD Navigator** select the **Walls, Openings, Components** module.

1 Click **Wall** (**Architectural Components** flyout).

Tip: You can modify the component properties of walls (and other architectural elements) using **Apply Archit. Component Properties** at any time.

2 Click **Properties**.

3 Enter the following information:

- In the **Setup, number of layers** area, enable the wall type 1: wall with a single construction layer.
- In the graphics area, use the cursor to move the component axis to an edge of the wall.

The position of the **component axis** controls the wall’s offset direction: the component axis can be on a side of the wall or anywhere within the wall.

4 Enter the following information in the **Parameters, Attributes** tab:

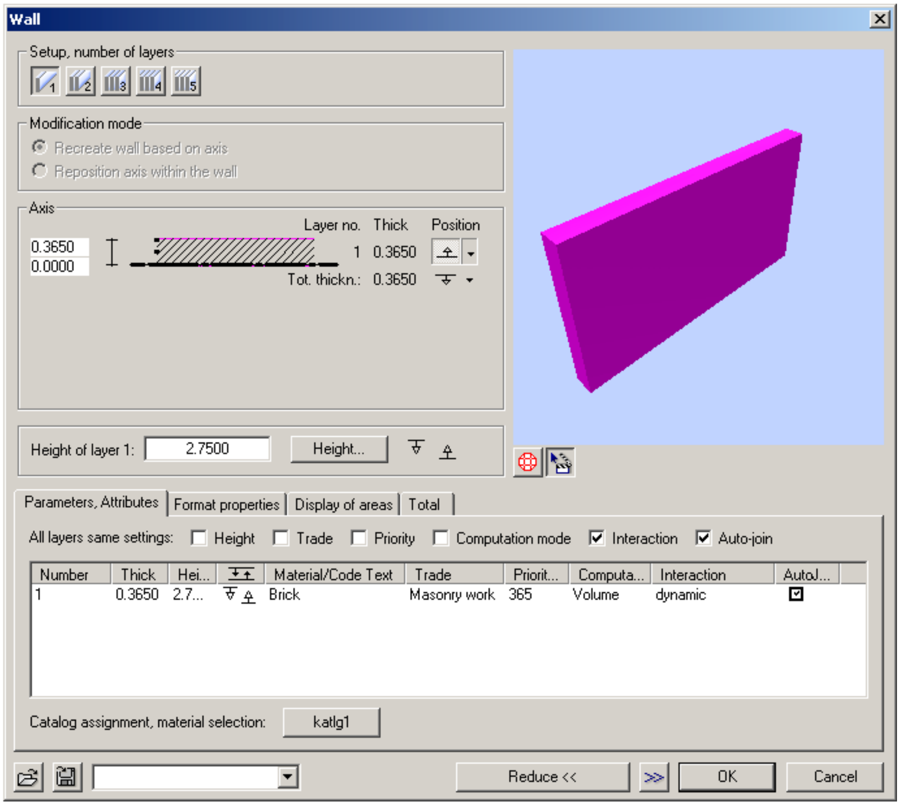
- In the first row, click the **Material/Code Text** column.
- In the list box that appears, click +,
  type **Brick** and press **OK**.
  (This select the entry ’brick’ and adds it to the list.)
- In the same manner, enter a thickness of **0.365**.
- Set **Trade** to **Masonry work**.
- Click the **Priority** column and enter **365**.

Tip: When setting the wall's priority rating:
thickness of wall in mm.

The **priority** rating controls the manner in which components intersect. Components with a lower priority rating have a ’hole’ cut in them where they are intersected by other components. This ensures that these areas are not counted twice in subsequent quantity takeoff operations.

- For the **computation mode** select: **Volume.**
- Set **Interaction** to **dynamic.**
- Enable the **Auto-Join** check box.

The **Wall** dialog box should now look like this:



Wall

Setup, number of layers

Modification mode

○ Recreate wall based on axis

○ Reposition axis within the wall

Axis

0.3650

0.0000

Layer no.	Thick	Position
1	0.3650	
Tot. thickn.:	0.3650	

Height of layer 1: 2.7500

Parameters, Attributes | Format properties | Display of areas | Total

All layers same settings: ☐ Height ☐ Trade ☐ Priority ☐ Computation mode ☑ Interaction ☑ Auto-join

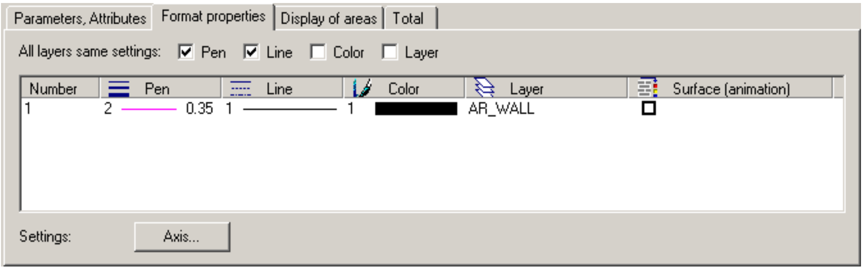
Number	Thick	Hei...		Material/Code Text	Trade	Priorit...	Computa...	Interaction	AutoJ...
1	0.3650	2.7...		Brick	Masonry work	365	Volume	dynamic	☑

Catalog assignment, material selection: katlg1

5 Enter the following information in the **Format properties** tab:

- Select pen (2) **0.35** and linetype **1**.
- Select color **1** (**black**) and the **AR_WALL** layer.
- An **Animation surface** is not necessary at the moment.

The **Format properties** tab should now look like this:



All layers same settings: ☑ Pen ☑ Line ☐ Color ☐ Layer

Number	Pen	Line	Color	Layer	Surface (animation)
1	2 —— 0.35	1 ——	1 ■	AR_WALL	☐

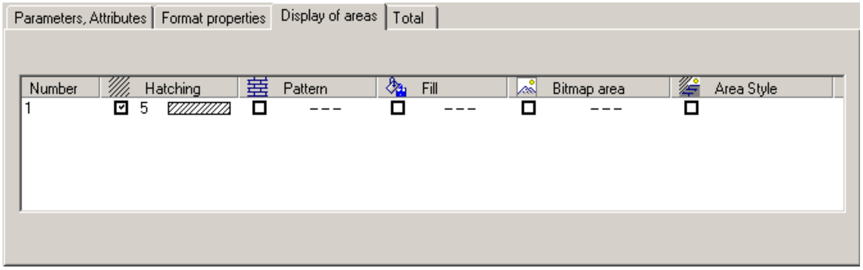
Settings:

Note: The settings in the **Format** toolbar have no effect on the format properties of walls.

6 Enter the following information in the **Display of areas** tab:

- Check the **Hatching** option.
  Click the field below the button and select hatching style number **5**.

The **Display of areas** tab should now look like this:



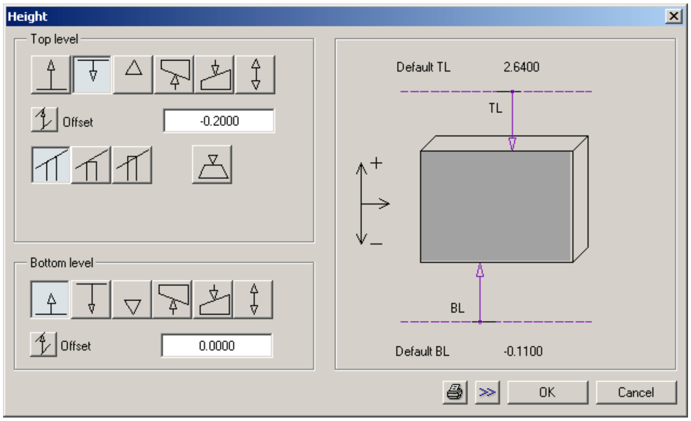
Number	Hatching	Pattern	Fill	Bitmap area	Area Style
1	☑ 5 ▨	☐ ---	☐ ---	☐ ---	☐

Tip: The parameters you set are retained in the dialog box until you change them.

7 Now click the button marked **Setup** and enter settings in the Height dialog box. Set the top and bottom levels of the wall so that they are attached to the upper and lower default reference planes respectively.

- Top level:
  Click **TL relative to upper plane** and enter **–0.2** in the **Offset** box.
  This will cause the top of the wall to be flush with the bottom of the floor slab between the ground floor and first floor, 20 cm below the upper default reference plane.
- Bottom level:
  Click **BL relative to lower plane** and enter **0** in the **Offset** box.

Tip: With walls consisting of multiple construction layers, attach each layer to the default planes separately. This way, you can also define a different offset between each layer and the planes!



Top level: Offset -0.2000

Bottom level: Offset 0.0000

8 Press **OK** to confirm the **Height** and **Wall** dialog boxes.

Tip: For more information on the Wall tool, press

F1

The description of the tool in the online Help is displayed.

Entering data in property sheets

To enter a value, click in the data entry field. Enter the value at the keyboard and press ENTER.

To enter and add values in custom list boxes, click + first.

To apply entries, press **OK**.

To discard entries, press **Cancel** or ESC.

When all the parameters have been set, you can draw the walls.
In this exercise, the values are outside dimensions. Therefore, the wall's offset direction is towards the interior.

To draw straight walls

1 Click the wall type **Straight Wall.**

2 *Define properties or place the start point*
Place the starting point in the workspace.

A preview of the wall should now be visible attached to the crosshairs.

3 Check and define the wall's offset direction:

- In the **Wall** dialog box, you have defined a lateral wall axis (= line you enter).
- The values are outside dimensions (see illustration below).
Start drawing a horizontal wall on the left.
As the starting point is on the outside, the wall's offset direction is to the top (= towards the interior).
- Check the offset direction based on the preview of the wall attached to the crosshairs. The small arrow should point to the top (= inwards).
- If not, click **Rotate about axis** on the **Wall** Context toolbar to reverse the wall's offset direction.

4 Enter the dX length: **1.25.**

Note: If the system prompts you to enter, either click the data entry box or press the TAB key, which takes you to the next data entry box.

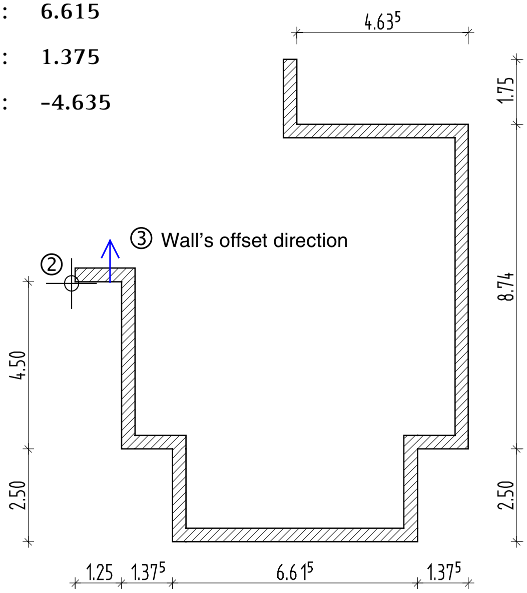
Tip: If you can't see the entire design, go to the lower border of the viewport and click ✳ Refresh.

Tip: You can also quit tools by right clicking a toolbar instead of pressing ESC.

Now draw the next walls as you would a polyline, entering values for the length of the walls along the x and y axes:

5 Enter the following values:

dY : **-4.5** dX : **1.375**
dY : **-2.5** dX : **6.615**
dY : **2.5** dX : **1.375**
dY : **8.74** dX : **-4.635**
dY : **1.75**



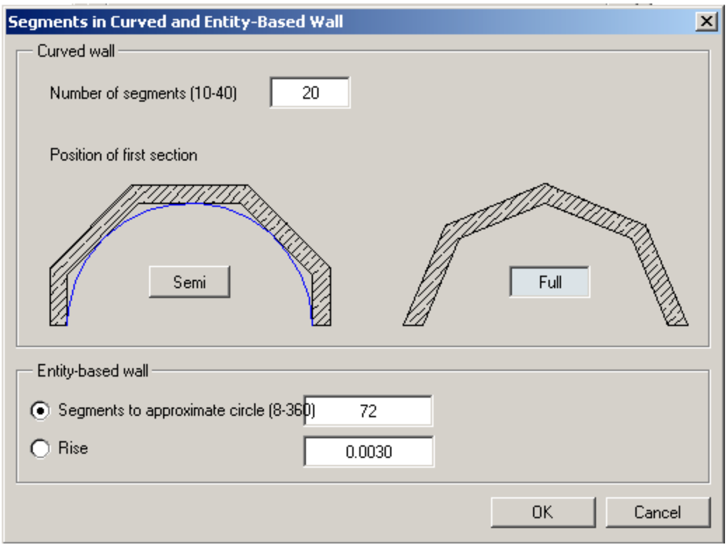
6 Press ESC to finish entering the wall and to quit the tool.

Curved walls

The plan (which is not yet closed) needs to be completed with a curved wall. Think of a curved wall as a wall with a large number of segments. A curved wall may be comprised of up to 40 segments. In this example (a quarter circle), we will not need more than 20 segments.

To define segments in curved and entity-based walls

1. Click **Options** (**Standard** toolbar) and in the dialog box that appears, click **Architecture**.
2. Select the **Entry** tab and click **Division...** in the **Entering walls** area.
3. Set **Number of segments** to **20**.
4. For **Position of first section**, select **Full**.



Segments in Curved and Entity-Based Wall

Curved wall

Number of segments (10-40): 20

Position of first section

Entity-based wall

● Segments to approximate circle (8-360): 72

○ Rise: 0.0030

5. Press **OK** to confirm the dialog boxes.

In addition to the wall's end points and its offset direction (as with a straight wall), all you need to specify are the arc's direction of extension and the radius.

To draw a curved wall

➲ Use to get a close-up view of the area where the curved wall is to be drawn.

1 Double click a wall with the right mouse button. This will automatically activate the **Wall** tool and set the properties to those of the wall you clicked.

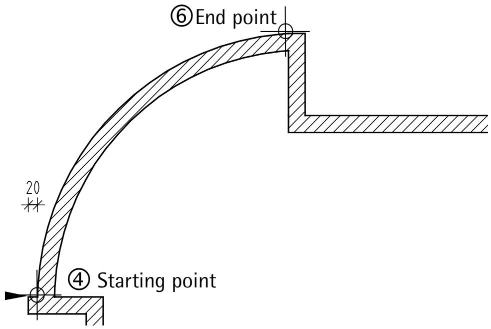
2 Click **Properties**,
change the priority rating to **300** in the **Parameters, Attributes** tab and press **OK** to confirm.

When walls have the same priority, the latest one has priority over the older one. To ensure that the ends of the curved wall do not 'cut off' the ends of the existing straight walls at the points where they meet, the curved wall's priority rating has been set to a value lower than that of the straight walls.

3 Click **Curved Wall.**

4 To place the starting point of the wall, click on the wall line (but **not** on a corner).
The reference point is displayed.

5 If it is not already there, move the reference point onto the corner of the wall on the left and enter an offset of **0.2**.

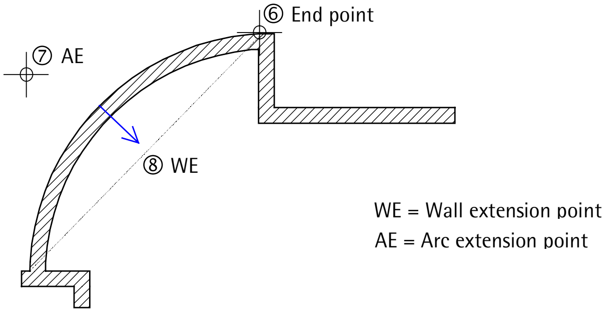


6 Now click the other wall's endpoint.
A straight line is displayed - this will serve as the reference line for the wall's and the arc's offset direction.

Tip: When the wall's offset direction and the arc's extension point are on the same side of the secant, the inside of the wall defines the secant.

When they are on opposite sides, the line on the outside of the wall defines the radius.

7 Place a point so that the arc's offset direction is towards the exterior.



8 The wall's offset direction should be towards the interior. Observe the arrow in the preview and if necessary, change the wall's offset direction by clicking **Rotate about axis.**

9 *Define properties, enter radius or place center of circle*
Enter the radius: **5.745** and press ENTER to confirm.

Tip: Instead of pressing ENTER, you can also click twice in the workspace with the right mouse button to confirm.

10 The outer line of the wall is displayed so that you can check the radius. Press ENTER once again.

11 Press ESC to finish drawing the wall and quit the tool.

See Also
For a summary of shortcut key combinations, see the online Help.

Defining the radius / center of circle

- **Radius**:
  The system will propose the value that was entered last or a value that is equivalent to at least half the distance between the wall's start and end points.

- **Center**:
  As an aid to orientation, a perpendicular bisector is displayed on the secant with the proposed center.

Definition options

- Accept the radius proposed by the system by pressing ENTER.

- Enter a value at the keyboard and press ENTER.

- Point and click: a point on the perpendicular bisector or click another significant point.
  The center then becomes the point at the base of the perpendicular between the point clicked and the perpendicular bisector.
  The value of the radius is displayed in the dialog line; press ENTER to confirm it.

At this stage, it is a good idea to mark and dimension the point at the center of the curved wall in the drawing as we will need this point again during the course of this chapter.

We will assign a special layer to the center of the curved wall so that we will be able to hide it later.

Assigning layers

In the case of point symbols and other design entities like lines, rectangles, circles etc., layers are not assigned in the **Properties** dialog box (as opposed to walls).

> In general, the appropriate layer for the selected tool is activated automatically!
> If it isn't, do the following.

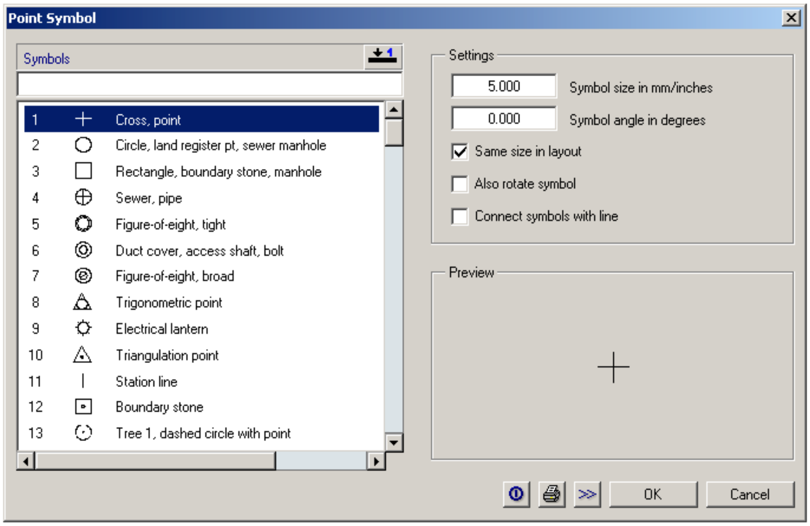
- Open a tool
- Select a layer on the **Format** toolbar
- Draw

After you have opened the **Point Symbol** tool, the first step involves selecting the symbol. The next step is to select a layer. Then you can place the point symbol.

To select the active layer

1 Select a tool; in this example, click **Point Symbol** (**Draft** module, **Create** flyout).

2 Select the first symbol (**1 Cross, point**),
set the **Symbol size** to **5mm**
and enable the **Same size in layout** option.
Press **OK** to confirm.



Point Symbol

Symbols

1	Cross, point
2	Circle, land register pt, sewer manhole
3	Rectangle, boundary stone, manhole
4	Sewer, pipe
5	Figure-of-eight, tight
6	Duct cover, access shaft, bolt
7	Figure-of-eight, broad
8	Trigonometric point
9	Electrical lantern
10	Triangulation point
11	Station line
12	Boundary stone
13	Tree 1, dashed circle with point

Settings

5.000 Symbol size in mm/inches

0.000 Symbol angle in degrees

☑ Same size in layout

☐ Also rotate symbol

☐ Connect symbols with line

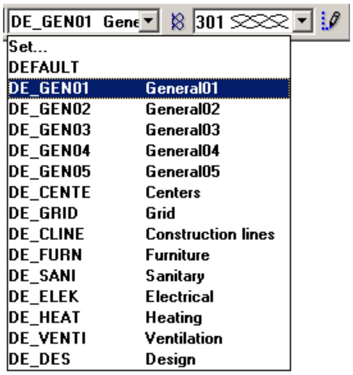
Preview

Tip: To see which layers are already in use, click **Select, Set Layers** on the **Format** menu. Switch to the **Select Layer/Visibility** tab and enable the **List existing layers in open drawing files** option.

3 Click in the **Select, Set Layers** list box (**Format** toolbar).

4 If the layer **DE_GEN01** is available in the quick selection list, click it.

5 If the **DE_GEN01** layer is not presented in the quick selection list, click **Set...** and double-click the layer in the **Layer** dialog box, **Select Layer/Visibility** tab.



DE_GEN01 Gene 301

Set...

DEFAULT

DE_GEN01	General01
DE_GEN02	General02
DE_GEN03	General03
DE_GEN04	General04
DE_GEN05	General05
DE_CENTE	Centers
DE_GRID	Grid
DE_CLINE	Construction lines
DE_FURN	Furniture
DE_SANI	Sanitary
DE_ELEK	Electrical
DE_HEAT	Heating
DE_VENTI	Ventilation
DE_DES	Design

6 Place the symbol on the center.

Dimensioning the point at the center of the curved wall

The dimension lines will also get a special layer so that we will be able to hide them later.

In the case of dimension lines, layers and other format properties like pen, line and color are assigned in the **Properties** dialog box (like with walls or upstands).

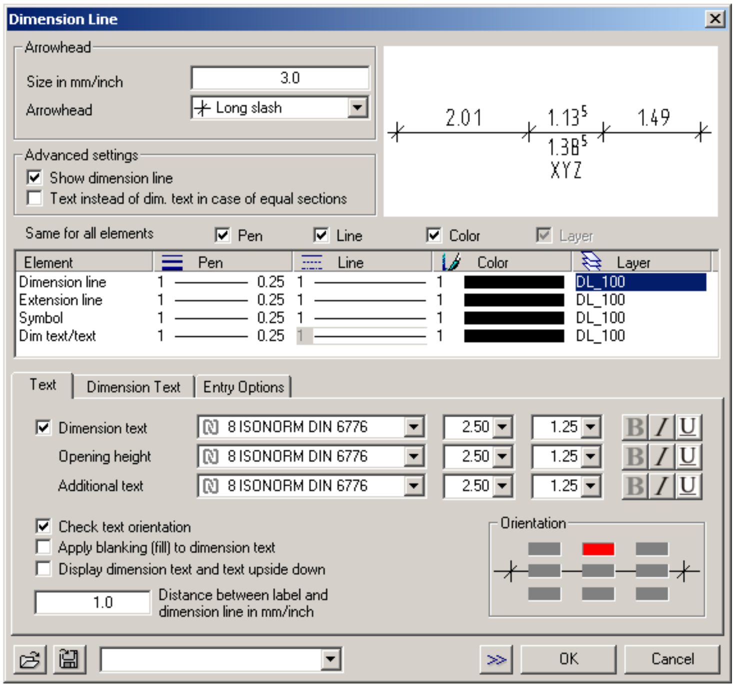
To create horizontal and vertical dimensions

➲ In the **CAD Navigator** select the **Dimension Lines** module.

1 Click **Dimension Line** (**Create** flyout).

2 Click **Properties** and make the following settings:

- Select the layer **DL_100**.
- Select the Nemetschek font
  8 ISONORM DIN 6776 (**Text** tab).



Dimension Line

Arrowhead
Size in mm/inch: 3.0
Arrowhead: Long slash

Advanced settings
☑ Show dimension line
☐ Text instead of dim. text in case of equal sections

Same for all elements ☑ Pen ☑ Line ☑ Color ☑ Layer

Element	Pen	Line	Color	Layer
Dimension line	1 0.25	1	1 ■	DL_100
Extension line	1 0.25	1	1 ■	DL_100
Symbol	1 0.25	1	1 ■	DL_100
Dim text/text	1 0.25	1	1 ■	DL_100

Text | Dimension Text | Entry Options

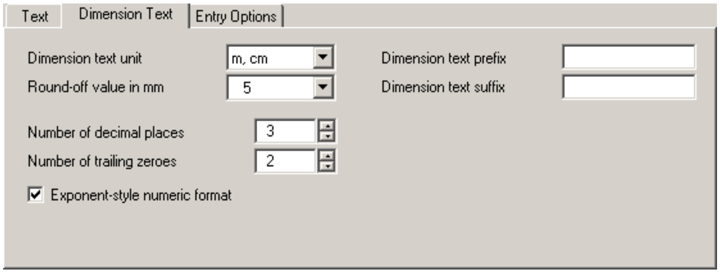
	Font	Height	Width	
☑ Dimension text	8 ISONORM DIN 6776	2.50	1.25	B I U
Opening height	8 ISONORM DIN 6776	2.50	1.25	B I U
Additional text	8 ISONORM DIN 6776	2.50	1.25	B I U

☑ Check text orientation
☐ Apply blanking (fill) to dimension text
☐ Display dimension text and text upside down
1.0 Distance between label and dimension line in mm/inch

Orientation

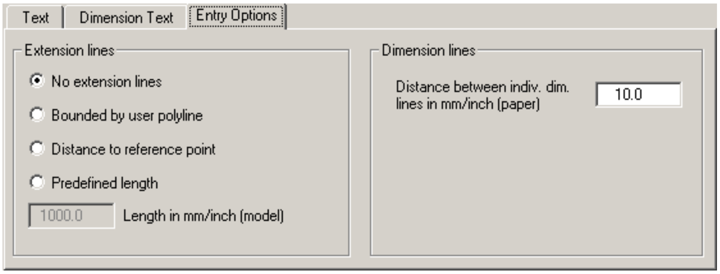
>> OK Cancel

- Set the dimension text unit to **m, cm** (**Dimension Text** tab).



Dimension text unit: m, cm
Round-off value in mm: 5
Number of decimal places: 3
Number of trailing zeroes: 2
☑ Exponent-style numeric format
Dimension text prefix:
Dimension text suffix:

- Select the **No extension lines** setting (**Entry Options** tab).



Extension lines
● No extension lines
○ Bounded by user polyline
○ Distance to reference point
○ Predefined length
1000.0 Length in mm/inch (model)

Dimension lines
Distance between indiv. dim. lines in mm/inch (paper): 10.0

- Enter the other settings as shown above.

3 Press **OK** to confirm the settings and dimension the point at the center of the curved wall using **horizontal** and **vertical** dimension lines.

To dimension the radius

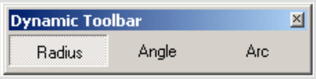
1 Click **Curve Dimensioning** (**Create** flyout) to dimension the curved wall.

2 Activate the layer **DL_100** (**Format** toolbar).

3 In the **Properties** set the dimension text unit to **m, cm.** Set the other parameters like for the horizontal and vertical dimension lines.

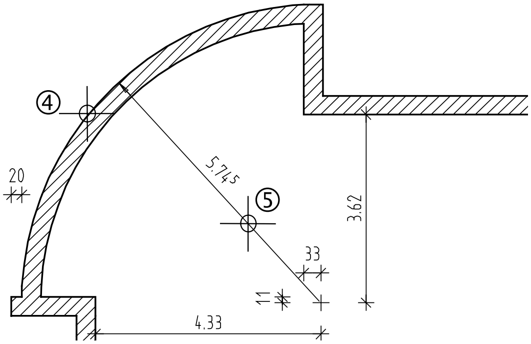
4 Click the exterior line of the wall and on the **Dynamic toolbar** select the **Radius** option.

In **View** menu → **Toolbars** you can specify whether the **Dynamic toolbar** is integrated in the status bar or whether it is to float over the workspace when you activate a tool.



Floating

Docked at bottom right in the status bar



5 Click a point through which the dimension line is to pass and press ESC twice to quit the tool (or click the right mouse button when the cursor is positioned over a toolbar or flyout).

Turning layers on and off

As the dimensioning information is not required for the time being, we can turn off the dimension line layer.

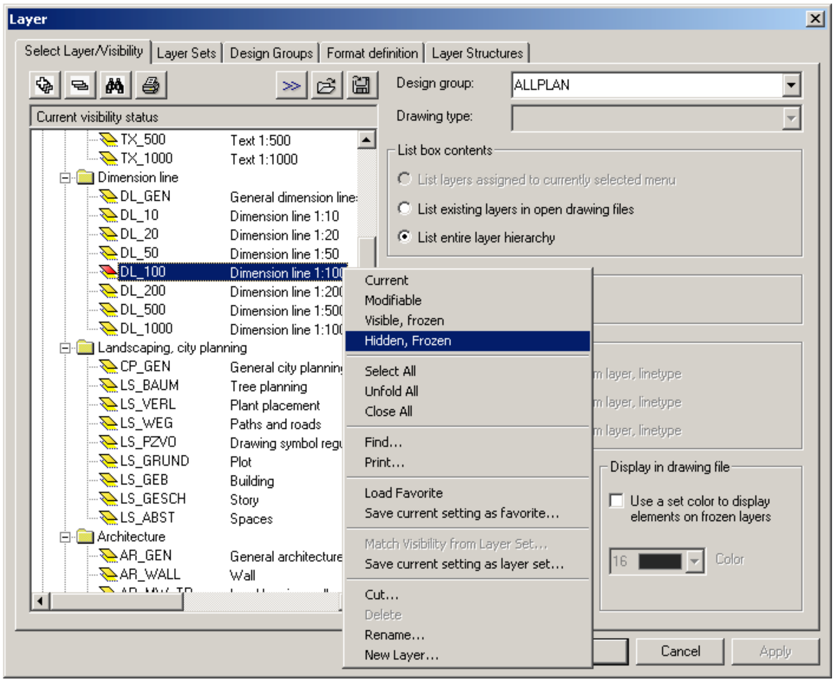
Tip: When you have **not** activated a tool, you can also activate the **Layer** dialog box by double-clicking with the right mouse button in the workspace.

To hide layers

1 Click **Select, Set Layers** on the **Format** menu and then select **Set....**

2 Select **List entire layer hierarchy.**

3 Click with the right mouse button on the layer **DL_100 Dimension line 1:100** and select **Hidden, frozen.**


Layer
Select Layer/Visibility
Layer Sets
Design Groups
Format definition
Layer Structures
Current visibility status
TX_500 Text 1:500
TX_1000 Text 1:1000
Dimension line
DL_GEN General dimension line
DL_10 Dimension line 1:10
DL_20 Dimension line 1:20
DL_50 Dimension line 1:50
DL_100 Dimension line 1:100
DL_200 Dimension line 1:200
DL_500 Dimension line 1:500
DL_1000 Dimension line 1:1000
Landscaping, city planning
CP_GEN General city planning
LS_BAUM Tree planning
LS_VERL Plant placement
LS_WEG Paths and roads
LS_PZVO Drawing symbol regu
LS_GRUND Plot
LS_GEB Building
LS_GESCH Story
LS_ABST Spaces
Architecture
AR_GEN General architecture
AR_WALL Wall
Design group: ALLPLAN
Drawing type:
List box contents
○ List layers assigned to currently selected menu
○ List existing layers in open drawing files
● List entire layer hierarchy
Current
Modifiable
Visible, frozen
Hidden, Frozen
Select All
Unfold All
Close All
Find...
Print...
Load Favorite
Save current setting as favorite...
Match Visibility from Layer Set...
Save current setting as layer set...
Cut...
Delete
Rename...
New Layer...
m layer, linetype
Display in drawing file
☐ Use a set color to display elements on frozen layers
16
Color
Cancel
Apply

4 Press **OK** to confirm.

Layers can be set to visible in the same way.

The **current** layer (displayed on the **Format** toolbar) cannot be hidden.
In this case, select a different layer first e.g. the Default layer.

What to do when elements are no longer visible?

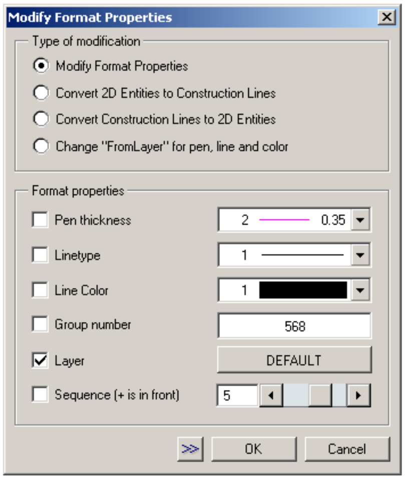
- On the **Format** menu, click **Select, Set Layers** and make all the layers visible.

- If the elements are still not visible, then this may be because the selected user group does not have the necessary privileges. In this case, in the **Layer** dialog box in the **Current design group** list box, select a user group with all rights or contact your system administrator and ask him/her to assign you a user group.

Which layer is the element on?

- You can find out which layers individual elements are on by turning each individual layer on using the **Select, Set Layers** tool on the **Format** toolbar.
- You can find out which layer an element is on by clicking the element with the right mouse button and selecting **Format Properties.**
  All the properties including the layer are displayed.
  You can even change the layer of the element currently selected. But the layers of associated components (e.g. window openings in walls) are not changed in this process. We recommend that you use **Modify Format Properties.**

- You can change the layer assignments of one or several elements using the **Modify Format Properties** (**Edit** flyout) tool. This tool modifies the layers of associated elements, too.



Modify Format Properties

Type of modification
● Modify Format Properties
○ Convert 2D Entities to Construction Lines
○ Convert Construction Lines to 2D Entities
○ Change "FromLayer" for pen, line and color

Format properties
☐ Pen thickness 2 0.35
☐ Linetype 1
☐ Line Color 1
☐ Group number 568
☑ Layer DEFAULT
☐ Sequence (+ is in front) 5

Interior walls

For the interior walls we will start by matching all the properties of an exterior wall. We will then modify the thickness, computation mode and priority rating.

To create interior walls

➲ The **Walls, Openings, Components** module is active.

1 Double click an exterior wall with the right mouse button.

This activates the **Wall** tool and gets the element's properties at the same time. The association with the planes (for the height) for example, is no longer necessary.

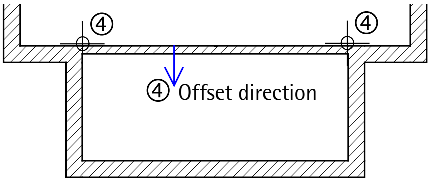
2 Click **Straight Wall**.

3 Modify the **Properties** in the **Parameters, Attributes** tab:

- Thickness (m): **0.175**
- Priority: **175**
- Computation mode: **Area**

and press **OK** to confirm.

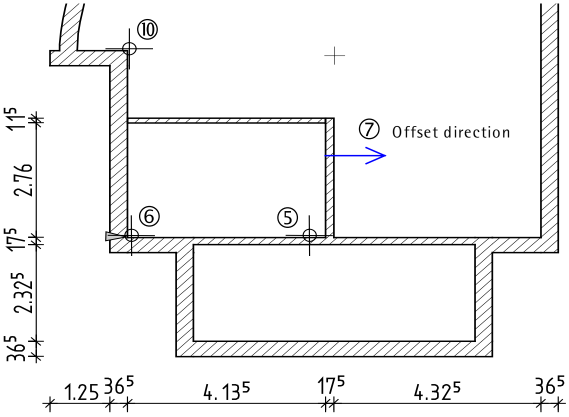
4 *Define properties of place the start point*
Draw the first interior wall by clicking the inside corners. Observe the wall's offset direction in the preview and, if necessary, change the it by clicking **Rotate about axis**.



Note: If new walls are fitted in between two existing walls or if the new walls end at wall points you have already defined, you do not have to press ESC to finish entering the walls.

5 To place the starting point of the next wall, click on the top line of the new wall. The reference point is displayed.

6 Move the reference point onto the corner and enter the distance between the reference point and the start of the wall: **4.135.**



7 Define properties of place a point
Enter the length of the wall:
dX: **0**
TAB
dY: **2.76**; offset direction right.

8 Modify the **Properties (Parameters, Attributes** tab):

- Thickness (m): **0.115**
- Priority: **115**

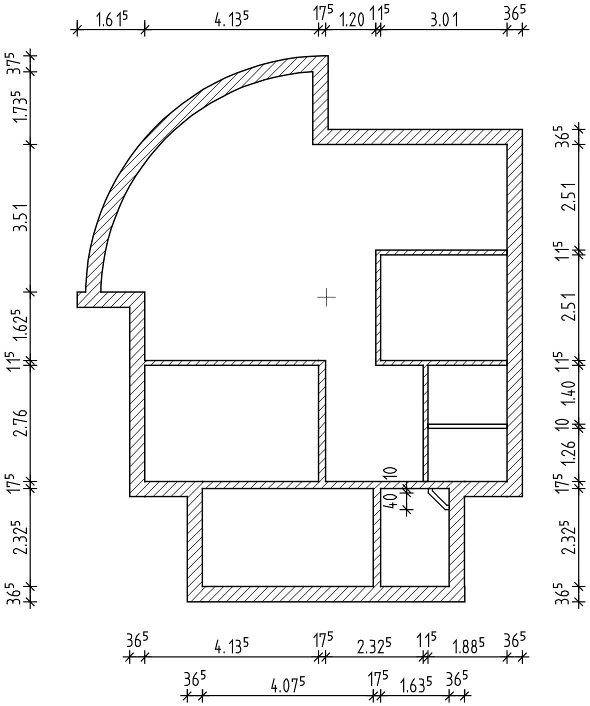
and press **OK** to confirm.

9 On the **Dynamic toolbar**, click **Ortho Constraint.**
If the program expects you to make an entry for the y direction, just enter **0** for dY in the dialog line.

10 Click the corner of the wall (see the illustration above) to define the wall's end point.

11 Draw the other interior walls (see figure).
Careful with the 10 cm thick wall!
You also need to change the material to Plasterboard, the building trade to Dry construction work and the computation mode to Linear. You should also disable hatching.

Tip: Instead of pressing ESC, you can also click the right mouse button when the cursor is positioned over a toolbar.

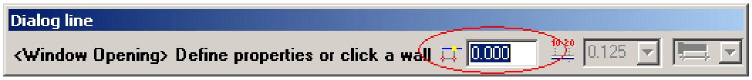


12 Press ESC to quit the tool.

Entering architectural elements using reference points

When you insert an opening in a wall, for example, or join an interior wall with an exterior wall, you need to click a wall. The point you click should be near to where the new element is to begin.

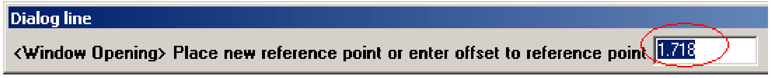
Note: If you want to use this approach, a value of 0.00 must be entered for the offset in the dialog line.



Dialog line

<Window Opening> Define properties or click a wall 0.000 0.125

The distance to the nearest reference point (e.g., start of wall, wall corner, side of an opening) is presented in the dialog line.



Dialog line

<Window Opening> Place new reference point or enter offset to reference point 1.718

The reference point is displayed as an arrow in the construction line color. The point you clicked (where the new element is to begin) is marked by a square in the construction line color. The tip of the arrow points to the point you clicked.

Tip: For precision drafting you do **not** need to click **exactly** where the new element is to begin. Just enter the precise value in the dialog line.

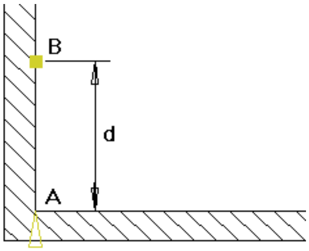


Fig.: entering architectural elements using reference points

A	Reference point; arrow points toward the new element's origin
B	Start (origin) of new element; set by clicking on the wall
d	Distance to reference point – displayed in the dialog line

You can use the distance to the reference point as follows:

- Accept the value in the dialog line by pressing ENTER.
- Enter a new value in the dialog line and press ENTER to confirm.
- To change the position of the reference point – because the distance to another corner on the wall is a known value – just click the other point. The new distance is displayed in the dialog line.

Note: Allplan 2005 always defaults to the nearest reference point.

A note: walls with multiple construction layers

Walls with multiple construction layers are defined in the same manner as simple walls with a single construction layer. However, the following differences apply:

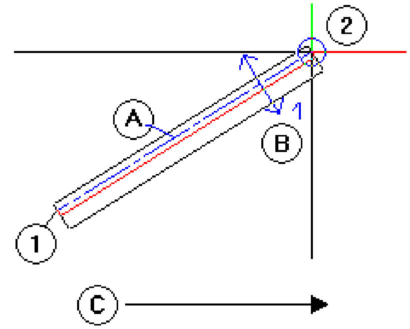
- The material, thickness, building trade, format properties and display mode (hatching, pattern and fill) have to be defined separately for each layer. To do this, the **Parameters, Attributes, Format Properties** and **Display** tabs include one line per construction layer.
- The **height** and **priority** are also entered layer by layer (depending on which check boxes are active in the **All layers same settings** area on each tab).
- You can set different layers for each construction layer (**Format properties** tab).
- The component axis can be positioned freely; for example, centered in each construction layer (**Preview** area).
- Pay attention to the manner in which walls/construction layers intersect, which is controlled by the priority rating.
- You can assign a different priority rating to each construction layer.

Offset direction of components, multi-tier walls

You have already encountered the offset direction of components; this topic was already covered in the section entitled “Offset direction of components, walls with a single construction layer”. In the case of multi-tier walls, the position of the component axis is particularly important when the axis is not set to a side of the component edge but centered in the component or off-center. Special attention should be paid to the position of the first construction layer which is also displayed in the preview.

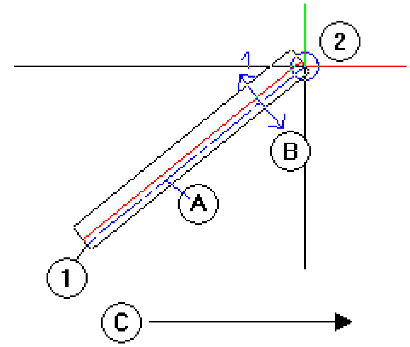
Depending on the position of the component axis and the number of the construction layers, the following options are possible:

- Multi-tier wall, lateral component axis within the component (between layer 2 and layer 3):



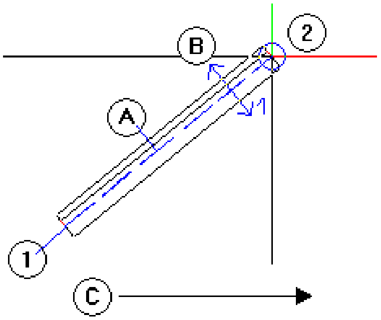
1	Start point of component
2	End point of component
A	Component axis
B	Extension to both sides of the component axis not centered, first layer on the right
C	Direction in which component is entered

After clicking **Rotate about axis:**



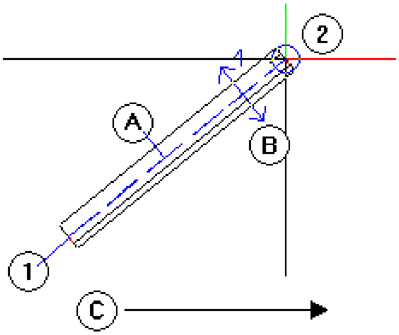
1	Start point of component
2	End point of component
A	Component axis
B	Extension to both sides of the component axis not centered, first layer on the left
C	Direction in which component is entered

- Multi-tier wall, component axis centered in the component:



1	Start point of component
2	End point of component
A	Component axis
B	Extension to both sides of the component axis first layer on the right
C	Direction in which component is entered

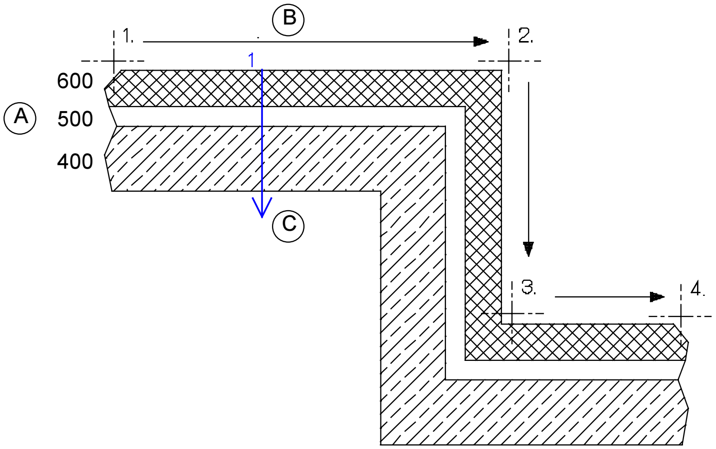
After clicking **Rotate about axis:**



1	Start point of component
2	End point of component
A	Component axis
B	Extension to both sides of the component axis first layer on the left
C	Direction in which component is entered

Priority rating with multi-tier exterior walls

If the first construction layer in a multi-tier wall represents the exterior side, it should be given the highest priority rating – this will ensure that the manner in which the various tiers intersect at corners is calculated correctly.



Key:

1 – 4	Direction in which straight wall is entered
A	Exterior wall's priority ratings: Tier 1 = 600 Tier 2 = 500 Tier 3 = 400
B	Exterior side
C	Offset direction to the side (in this case to the right)

Figure: Priority rating with multi-tier exterior walls

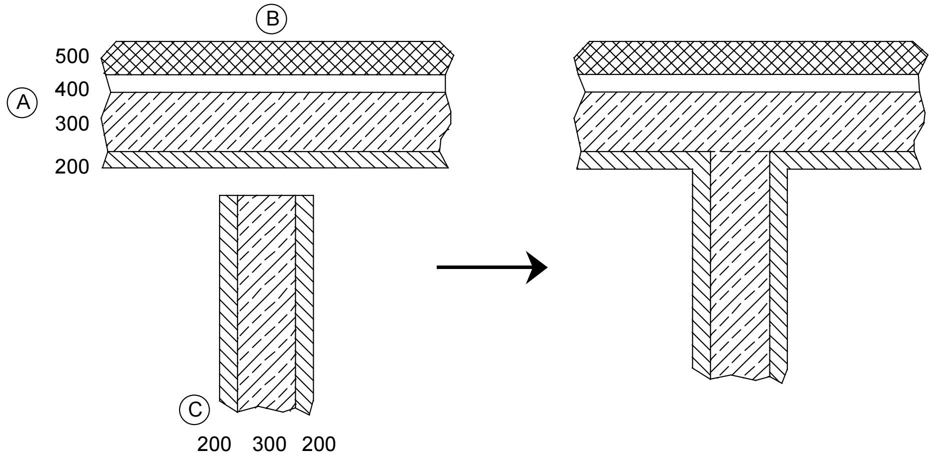
Priority rating at T-connections

To obtain correct results with T-connections, assign the same priority rating to the construction layers that are to intersect.

This applies both to connections obtained as you draw and connections that arise as a result of the

Join Walls and

Join Wall with Line tools.



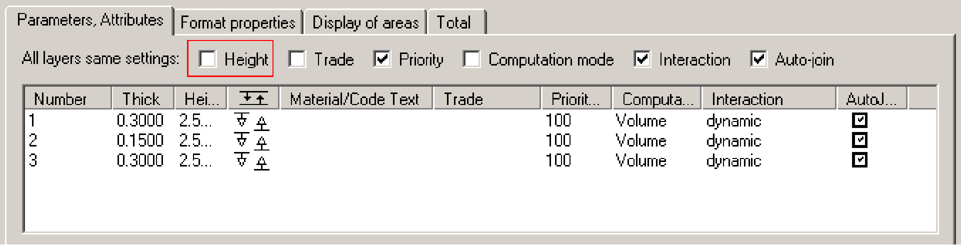
Key:

A	Exterior wall's priority ratings: Tier 1 = 500 Tier 2 = 400 Tier 3 = 300 Tier 4 = 200
B	Exterior side
C	Priority ratings of interior wall: Tier 1 = 200 Tier 2 = 300 Tier 3 = 200

Figure: Priority rating at T-connections

Multi-tier walls with different height settings

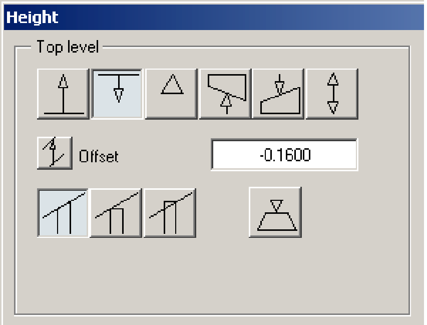
The height of multi-tier walls is defined in the same way as single-tier walls. If individual construction layers are to be lower (because of a floor slab, for example), check that the **Height** option in the **All layers same settings** area (**Parameters, Attributes** tab) is disabled. You can then assign a different height to each of the construction layers in the wall.



All layers same settings: ☐ Height ☐ Trade ☑ Priority ☐ Computation mode ☑ Interaction ☑ Auto-join

Number	Thick	Hei...		Material/Code Text	Trade	Priorit...	Computa...	Interaction	AutoJ...
1	0.3000	2.5...				100	Volume	dynamic	☑
2	0.1500	2.5...				100	Volume	dynamic	☑
3	0.3000	2.5...				100	Volume	dynamic	☑

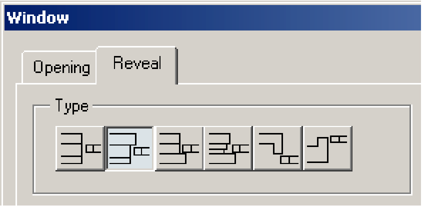
Associate the height of the individual construction layers with the upper or lower default reference plane and, for the layers that are lower, enter the thickness of the slab as a negative value in the **Offset** box.



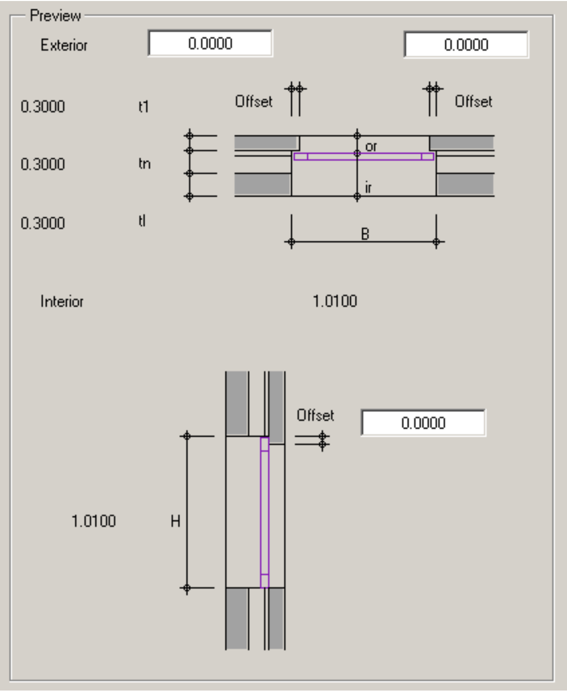
Offset -0.1600

Windows and door openings in walls with multiple construction layers

To insert window and door openings in multi-tier walls, proceed as you would with single-tier walls. In the **Properties** dialog box, you also need to switch to the **Reveal** tab.



Here – depending on the number of construction layers defined but at least two layers– you can choose from different styles and enter values for the **Offset**.



Exterior 0.0000 0.0000

0.3000 t1

0.3000 tn

0.3000 tl

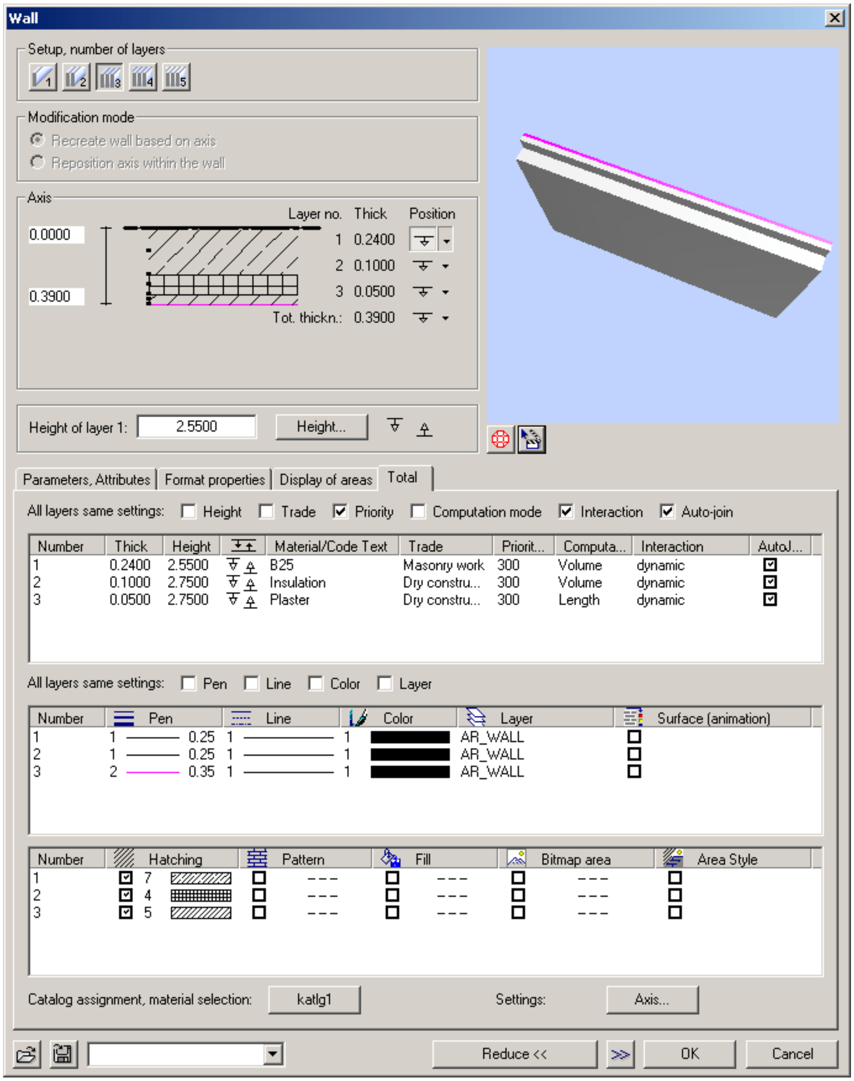
Interior 1.0100

Offset 0.0000

1.0100 H

Example: a wall with multiple construction layers, each with a different height

Settings for the wall parameters:



○ Recreate wall based on axis
○ Reposition axis within the wall

0.0000
0.3900

Layer no.	Thick	Position
1	0.2400	▽
2	0.1000	▽
3	0.0500	▽
Tot. thickn.:	0.3900	▽

Height of layer 1: 2.5500

All layers same settings: ☐ Height ☐ Trade ☑ Priority ☐ Computation mode ☑ Interaction ☑ Auto-join

Number	Thick	Height	▽ △	Material/Code Text	Trade	Priorit...	Computa...	Interaction	AutoJ...
1	0.2400	2.5500	▽ △	B25	Masonry work	300	Volume	dynamic	☑
2	0.1000	2.7500	▽ △	Insulation	Dry constru...	300	Volume	dynamic	☑
3	0.0500	2.7500	▽ △	Plaster	Dry constru...	300	Length	dynamic	☑

All layers same settings: ☐ Pen ☐ Line ☐ Color ☐ Layer

Number	Pen	Line	Color	Layer	Surface (animation)
1	1 ——— 0.25	1 ——— 1	■	AR_WALL	☐
2	1 ——— 0.25	1 ——— 1	■	AR_WALL	☐
3	2 ——— 0.35	1 ——— 1	■	AR_WALL	☐

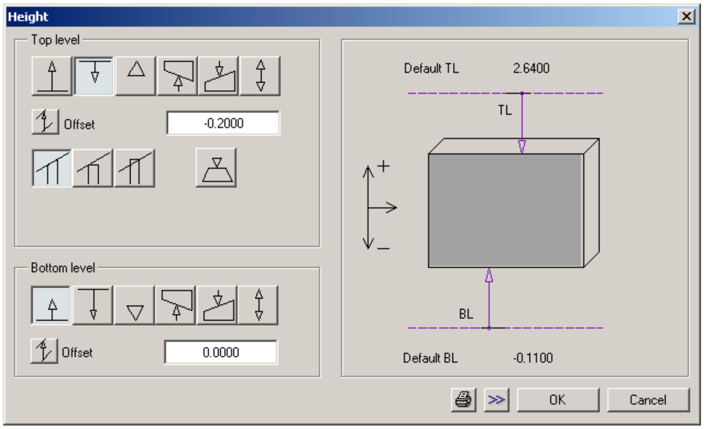
Number	Hatching	Pattern	Fill	Bitmap area	Area Style
1	☑ 7 ▨	☐ ---	☐ ---	☐ ---	☐
2	☑ 4 ▦	☐ ---	☐ ---	☐ ---	☐
3	☑ 5 ▨	☐ ---	☐ ---	☐ ---	☐

Catalog assignment, material selection: katlg1

Settings: Axis...

Height setup for layer 1:

- **TL relative to upper plane,** Offset: **–0.2**
- **BL relative to the lower plane,** Offset: **0**



Top level: Offset -0.2000

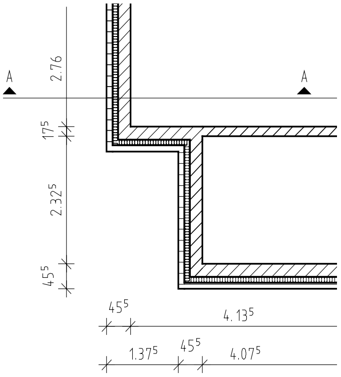
Bottom level: Offset 0.0000

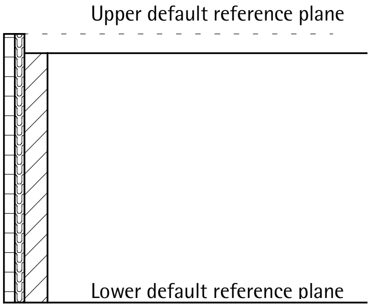
Default TL 2.6400

Default BL -0.1100

Height setup for layers 2 and 3:

- **TL relative to upper plane,** Offset: **0**
- **BL relative to the lower plane,** Offset: **0**





Plan View Section

➲ If necessary, undo the changes above for the exercises that follow.

Views and Viewports

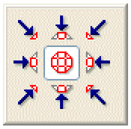
Refresh
Zoom Section
Pan
Regen
Reduce View
Enlarge View
Scroll Left, ...

Plan
Rear Left Iso.
Rear Elev.
Rear Right Iso.
Left Elev.
Right Elev.
Front Left Iso.
Front Elev.
Front Right Iso.

3D View
Navigation Mode
Previous View
Next View
Save, Load View
Always on Top (on)
Always on Top (off)

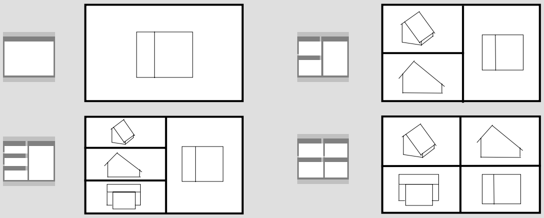
Hidden Line Image
Activate Section
Copy to Clipboard

When working with walls and other components, you can get an impression of how the building looks in 3D space at the click of a mouse button. Each viewport has its own set of viewing tools in the lower viewport border.



With Allplan 2005 you can display a number of different views on screen simultaneously and work in all of them. Each viewport can contain a section, the entire design or an isometric view.
You can select from one of the standard viewport arrangements provided and then modify it to suit your needs.

Select the screen arrangement on the **Window** menu.



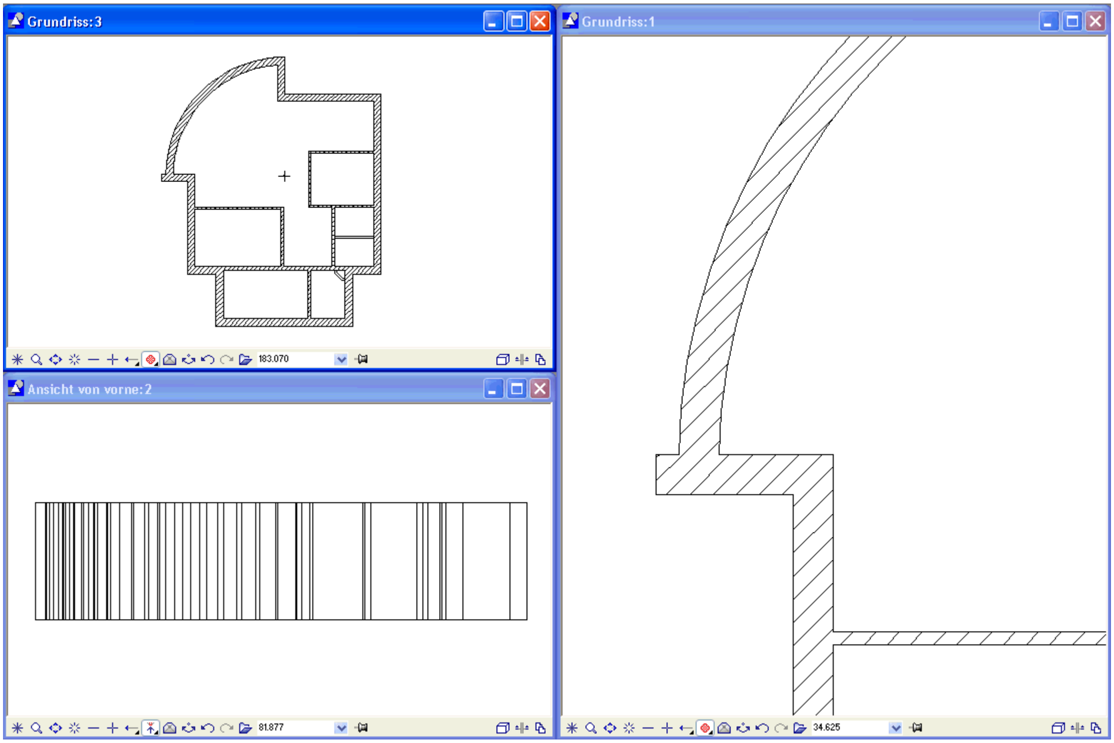
Each viewport has icons in its lower border. These were covered in the ”Basics” unit.

The following exercise will help you understand how the viewports work.

How to set viewports: detailed view and full view

1 On the **Window** menu, click **3 Viewport**.

2 Click on **Plan View** in the viewport at top left.



3 Click on **Zoom Section** in the viewport at top right and define a section by clicking two diagonally opposite points with the left mouse button.

Using this approach, you can work on details in your design while still displaying the entire model/floor plan in another viewport.

Axis Grid

We will now create an axis grid. This will help in the process of positioning the columns in the exercise that follows.

To create an axis grid

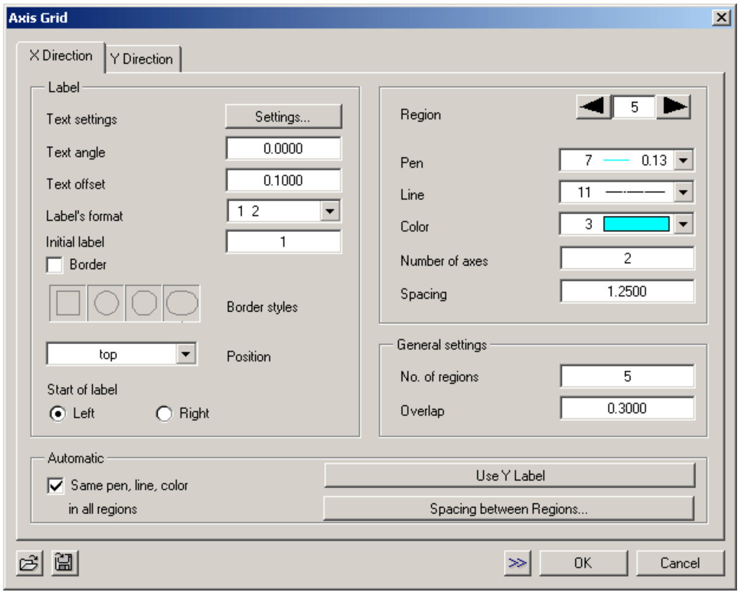
➲ Open drawing file 1 (grid) and set 111 to edit mode. In the **CAD Navigator** select the **Advanced Draft** module.

Tip: In the **Global Options**, **View** tab, you can configure the program to display all the elements in reference drawing files using a single color. In addition, you can select a color .

1 Click **Axis Grid** (**Create** flyout).

2 Set the following parameters in the **X Direction** tab:

- **Pen** 7 0.13
- **Line** 11 —·—·—
- **No. of regions** 5
- **Overlap** 0.3
- In the **Automatic** area, select the check box **Same pen, line, color in all regions.**



Axis Grid

X Direction | Y Direction

Label

Text settings: Settings...

Text angle: 0.0000

Text offset: 0.1000

Label's format: 1 2

Initial label: 1

☐ Border

Border styles

Position: top

Start of label: ● Left ○ Right

Region: 5

Pen: 7 0.13

Line: 11

Color: 3

Number of axes: 2

Spacing: 1.2500

General settings

No. of regions: 5

Overlap: 0.3000

Automatic

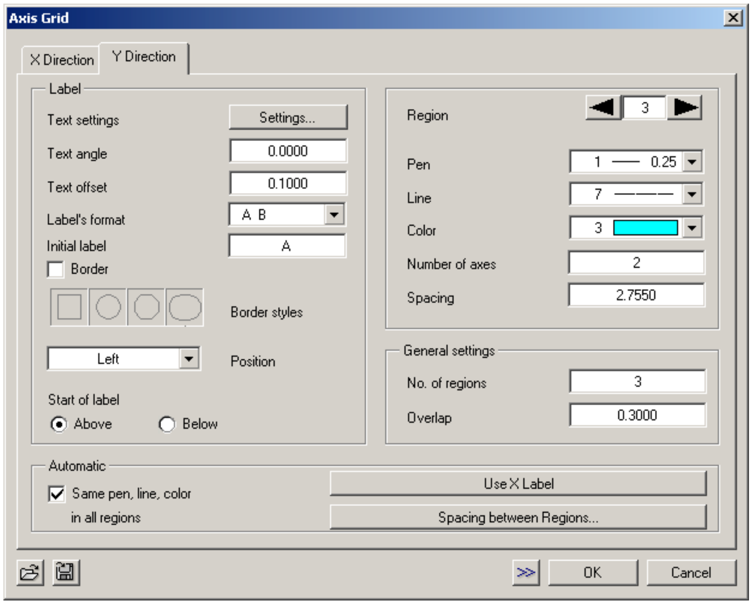
☑ Same pen, line, color in all regions

This creates five regions. We will now define a different value between the gridlines in each region.
With the ”Overlap 0.3” setting each axis projects beyond the grid by this value (see the illustration at the end of this exercise).

3 In the **Region** area click the arrow pointing towards the right. This lets you select the regions so that you can define the spacing between lines as follows:

Region	1	2	3	4	5
Number of axes	1	1	1	1	2
Spacing	1.25	1.375	6.615	1.375	1.25

4 On the **Y Direction** tab, select the label format **A B**, set the **pen**, **line** and **overlap** so that they are the same as in the **X Direction** tab and create **3 regions**.



Text settings: Settings...
Text angle: 0.0000
Text offset: 0.1000
Label's format: A B
Initial label: A
☐ Border
Position: Left
Start of label: ● Above ○ Below
Region: 3
Pen: 1 0.25
Line: 7
Color: 3
Number of axes: 2
Spacing: 2.7550
No. of regions: 3
Overlap: 0.3000
☑ Same pen, line, color in all regions

5 In the **Region** area click the arrow pointing towards the right again. This lets you select the regions so that you can define the spacing between lines:

Region	**1**	**2**	**3**
Number of axes	1	1	2
Spacing	9.4	2.5	2.755

6 Press **OK** to confirm and in the **Select, Set Layer** list box on the **Format** toolbar, select the layer **DE_GRID**.

7 Now you can specify on the Dynamic toolbar whether you want to display the grid lines as 2D or 3D lines.
If required, click **2D Line**.

8 *Click to define its location in the workspace*
Position the grid somewhere on the left, near the top of the floor plan.

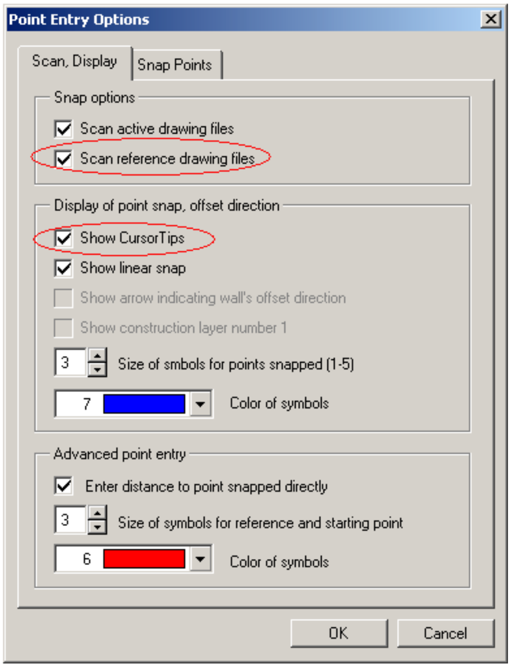
9 *Place point, click reference line or enter a rotation angle*
Confirm the value **0.00** proposed by the system by pressing ENTER (or enter the value).

10 Click **Move (Edit** flyout) and select the grid by clicking it.

To place the grid directly over the floor plan, you can use the following point snap mode settings:

11 Click in the workspace with the right mouse button and select + **Point Entry Options** on the shortcut menu.

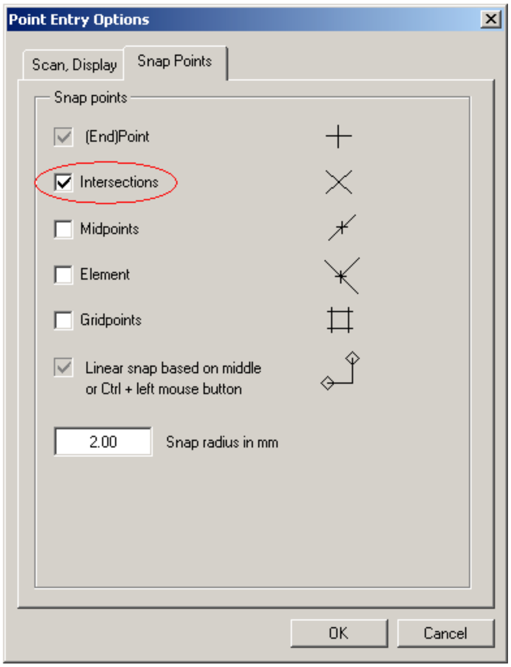
- Select the **Snap Points** tab, activate the **Intersections** check box and disable all the other point snap options.
- Switch to the **Scan, Display** tab, enable the **Show CursorTips** option and make sure that both the **Scan active drawing files** and **Scan reference drawing files** settings are active.



Snap options
☑ Scan active drawing files
☑ Scan reference drawing files

Display of point snap, offset direction
☑ Show CursorTips
☑ Show linear snap
☐ Show arrow indicating wall's offset direction
☐ Show construction layer number 1
3 Size of smbols for points snapped (1-5)
7 Color of symbols

Advanced point entry
☑ Enter distance to point snapped directly
3 Size of symbols for reference and starting point
6 Color of symbols

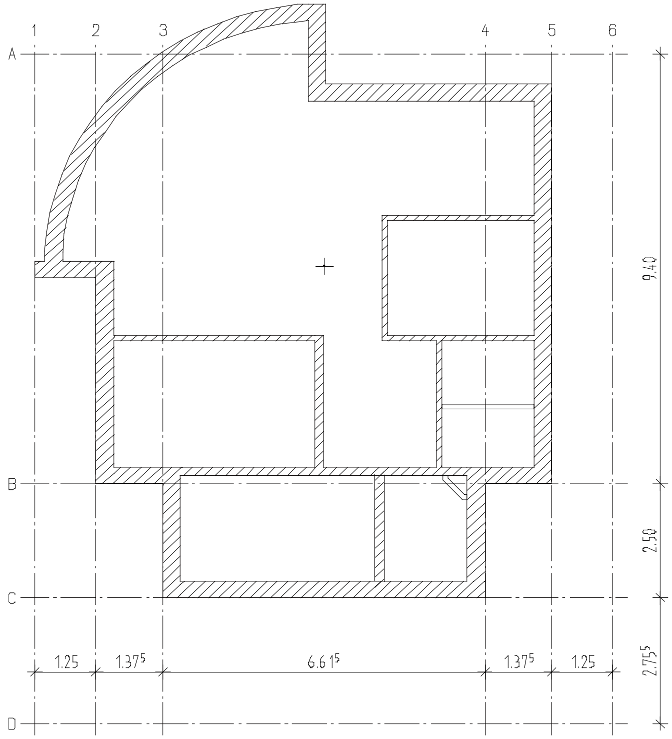


Snap points
☑ (End)Point
☑ Intersections
☐ Midpoints
☐ Element
☐ Gridpoints
☑ Linear snap based on middle or Ctrl + left mouse button
2.00 Snap radius in mm

Tip: Zoom in on a corner of the building using 🔍 Zoom Section.

12 *Place a point (from point) or enter the dx vector ... – To point*
Click a suitable intersection point on the grid and position it on an appropriate corner of the building.

Tip: The grid – like the title block earlier – can also be created using just lines and parallel lines.



13 Dimension the grid as shown above.
Please make sure that you use the **DL_100** layer.

14 We do not need the display of the dimension lines in the next steps. Hide them.
To do this, click in the **Select, Set Layers** list box (**Format** toolbar), select **Set...**, right-click the **DL_100** layer and select **Hidden, frozen**.

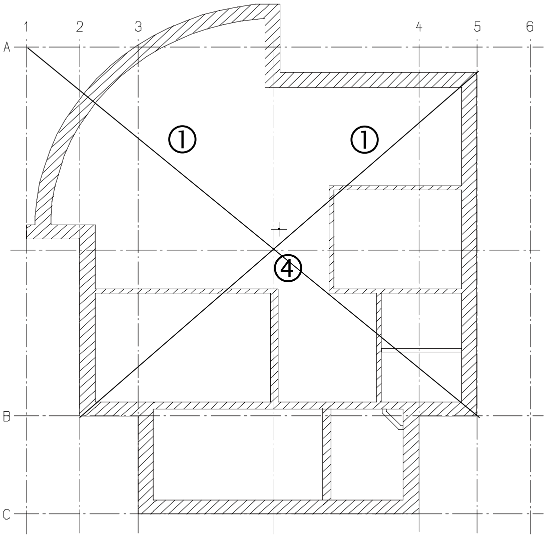
If the grid doesn't turn out as shown here, you can always alter it using **Modify Axis Grid** (**Edit** flyout). The procedure is the same as for modifying the grid. The only difference is that you do not have to place it.

Now only the gridlines for the round column inside are missing. You can define the position graphically.

To draw additional gridlines

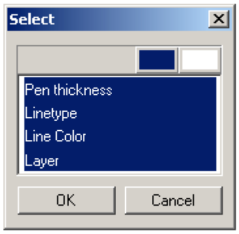
➲ The current layer is **DE_GRID**.

1 Enable the **Construction Line** mode (**Format** toolbar) and use the **Line** tool to create two diagonals.



2 Switch **construction line** mode off again.

3 Click **Copy** (**Format** toolbar), click **All** in the Select dialog box to select all options in one step and click an existing grid line.
Thus, the layer, color, pen thickness and linetype settings of the grid are copied to the **Format** toolbar.



Draw a horizontal and a vertical line through the point where the diagonal lines intersect:

4 Click **Parallel Lines** (**Draft** flyout), select a gridline and click the point of intersection.

5 Press ESC to finish.
You can delete the temporary diagonal lines.

Columns

Now you can draw the columns: the rectangular columns and interior column on drawing file 111, the carport columns on 112. The approach is the same as for entering walls: start by defining the component parameters, then place the element in the drawing file.

Tip: You can also use the Column tool to make any other column-shaped element - for example, table legs, lamp posts, fencing.

To place columns

- Set drawing files **1 Grid** and **111 Ground floor model** to reference mode and make drawing file **112 Ground floor carport** current.
- Set the **Default Planes** for drawing file **112** as follows:
  Height (bottom): **-0.11**
  Height (top): **2.64** (like drawing file 111).

1 Click **Column** (**Architectural Components** flyout).
Check that the layer **AR_COL** is selected. If it isn't, activate it via the **Format** menu or toolbar.

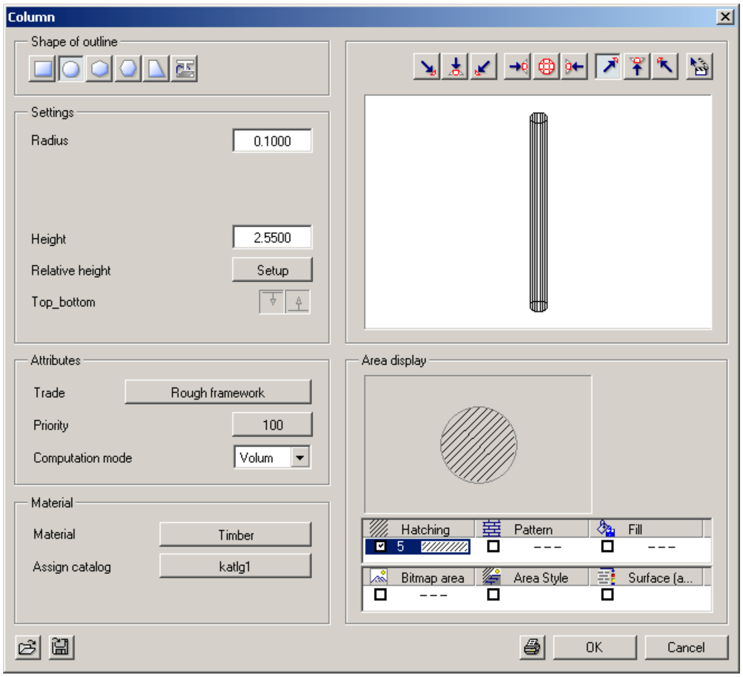
2 Click **Copy** (Format toolbar), disable the **Layer** option in the **Select** dialog box and click **OK** to confirm the dialog box.
Now click a wall line. This copies the line's settings (pen **(2) 0.35** and linetype **1**).

3 Click **Properties** and enter the parameters as shown below.

4 Check the way the **height** of the column is set (it should be set the same way as the walls:

- **TL relative to upper plane** at an offset of **–0.200**
- **BL relative to lower plane** at an offset of **0**

and then press **OK** to confirm the dialog boxes.



Radius 0.1000

Height 2.5500

Relative height Setup

Top_bottom

Trade Rough framework

Priority 100

Computation mode Volum

Material Timber

Assign catalog katlg1

Hatching ☑ 5

Pattern ☐ ---

Fill ☐ ---

Bitmap area ☐ ---

Area Style ☐

Surface (a... ☐

5 On the **Column** toolbar, set the column's anchor point so that it is **centered** - . The point snap tool is currently set to Intersections from the last exercise.

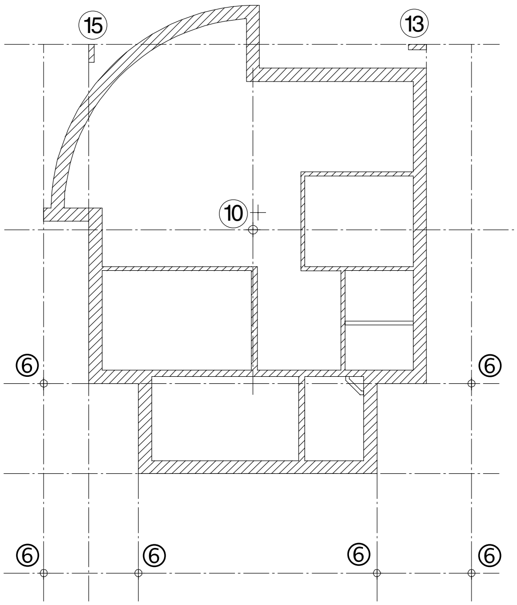
6 Place six columns for the carports on the points where the gridlines intersect and press ESC to quit the tool.

7 Click **Open on a project-specific basis**,
make drawing file 111 current and
set drawing files 1 and 112 to reference mode.

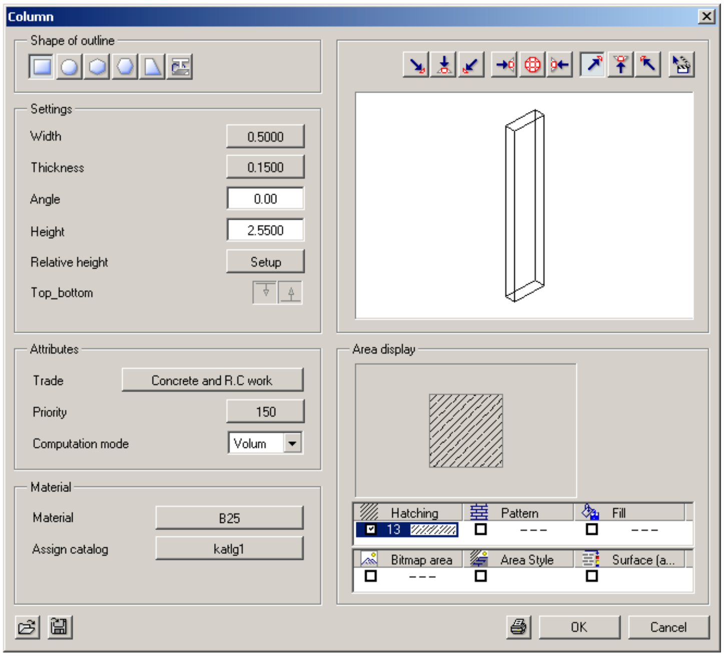
8 Click **Column** (**Architectural Components** flyout).

9 Click **Properties** and
modify the radius: **0.125**.

10 Place another column on the point of intersection near the middle of the building.



11 Click **Properties** and change the component parameters as shown below:


Column

Shape of outline

Settings

Width	0.5000
Thickness	0.1500
Angle	0.00
Height	2.5500
Relative height	Setup
Top_bottom	

Attributes

Trade	Concrete and R.C work
Priority	150
Computation mode	Volum

Material

Material	B25
Assign catalog	katlg1

Area display

Hatching	Pattern	Fill
☑ 13 ▨	☐ ---	☐ ---

Bitmap area	Area Style	Surface (a...
☐ ---	☐	☐

12 Set the column anchor point to **top right.**

13 Place the column on the point where the gridlines intersect at top right.

You can also rotate the column profile.

14 Change the angle in **Properties: 90.**

15 Place the column on the point of intersection at top left.

16 Additional point snap options are required for the steps that follow: Click in the workspace with the right mouse button and select ＋ **Point Entry Options** on the shortcut menu.

- In addition to the **Intersections** option, enable the **Element** and **Midpoints** check boxes in the **Snap Points** tab.
- The settings on the **Scan, Display** tab remain unchanged.

17 Press ESC to quit the **Column** tool.

18 Click **Open on a project-specific basis** and close drawing files 1 and 112 again.
Only drawing file 111 **Ground floor model** should now be open.

The round, exterior carport columns are now no longer visible as the relevant drawing file is now closed.

Openings

The procedure for creating an opening – be it a door, window, niche or recess – is always the same. The differences lie in the property settings you can make.
Like in the ’real’ world, there is an inherent association between walls and openings in Allplan. When you move a wall, for example, its openings will move too.

Openings also provide the space for **smart symbols**.
As the name implies, a smart symbol is an ’intelligent’ symbol that adapts to its openings dynamically.

In the following exercise you will be using smart window symbols and door swings for the doors.

Doors

In our project, all the doors in the ground floor are single doors. The front door is **2.135 m** high. The doors inside are **2.01 m**.
We will not insert smart symbols yet – only the door swing will be shown. The procedure for creating door openings also applies to all other kinds of openings.

Entering openings

- Place the first side of the opening
- Enter properties and set the height
- Enter the width of the opening

You only have to make the settings for the opening once if you want to create a series of identical openings. The properties and the height information are stored by the system until you redefine them.

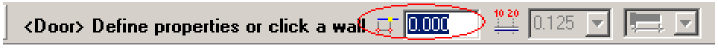
To draw doors

1 Click **Door** (**Openings** flyout).

2 Click **Select, Set Layers** (**Format** menu) and activate the layer AR_WALL.

3 Click a point on the bottom of the exterior wall at the bottom to place the first side of the door.

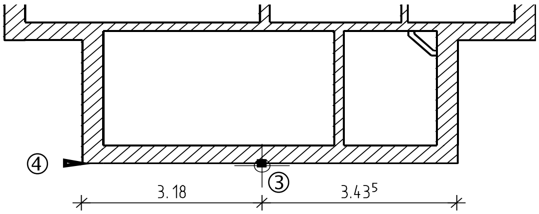
Note: Please make sure that you enter a value of **0.000** for the **Offset to reference point** in the dialog line; otherwise, you cannot use this entry option. Alternatively, you can also enter the desired distance and click the corner of the wall.



<Door> Define properties or click a wall 0.000 0.125

The reference point is represented by an arrow and the distance is displayed in the dialog line.

4 If the reference point is not displayed on the corner as shown below, click on the corner to move it there.

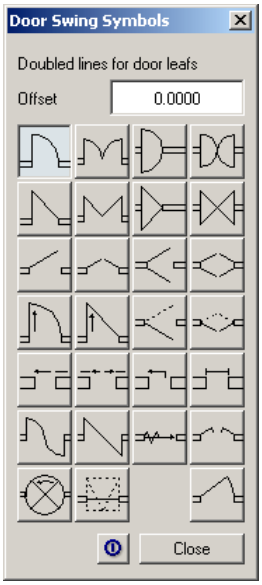


5 Enter the offset: **3.18** (reference point on the left) or **3.435** (reference point on the right).

6 Click **Properties**.

7 Select the rectangle for the type.

8 Click the **door swing** icon and select the single swing door style.



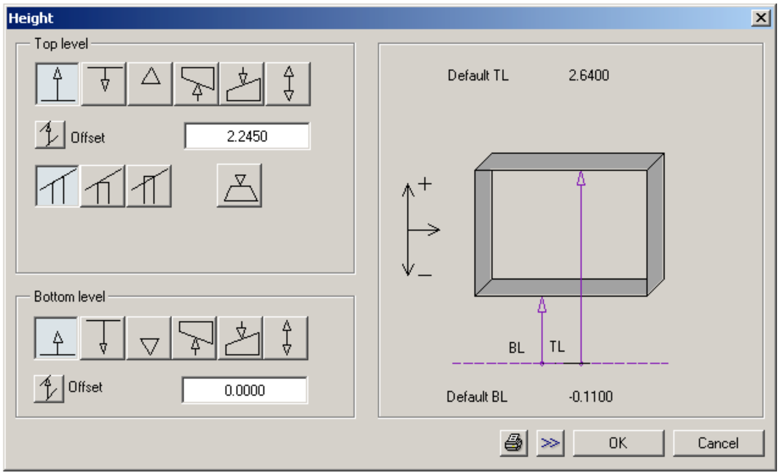
Tip: You can modify door swings very easily: activate the **Door** tool and click in the door opening. Select a different door swing in the dialog box that appears. The old one is deleted automatically.

Make sure that you have enabled the correct layer.

9 Click **Setup.**

This is where you set the height of the top and bottom levels of the door opening.

Note: The top level of the door opening is also attached to the lower default reference plane. This ensures that the height of the door will not change, even if the height of the story is modified.



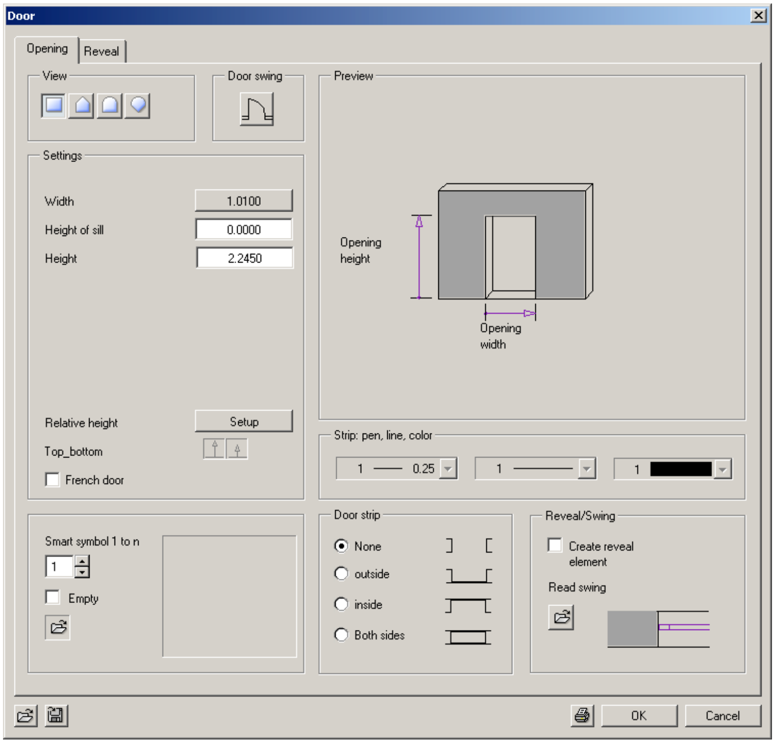
10 In the **Top level** area, click **Relative to lower plane** and enter the following unfinished dimension:
Door height + floor covering: 2.135 m+ 0.11 m: **2.245** m.

11 In the **Bottom level** area, click **Relative to lower plane** (offset: 0.00) and press **OK** to confirm.

12 Clear the check boxes for **Create reveal element** and **Smart symbol.**

The **Door** dialog box should now look like this:

Tip: The value for the width of the opening displayed in the dialog box is only a suggested value and can be corrected. This means you can quickly create a series of openings of different widths using the same properties.



Door

Opening | Reveal

Settings

Width 1.0100

Height of sill 0.0000

Height 2.2450

Relative height Setup

Top_bottom

☐ French door

Strip: pen, line, color: 1 0.25 | 1 | 1

Door strip: ● None ○ outside ○ inside ○ Both sides

Reveal/Swing: ☐ Create reveal element

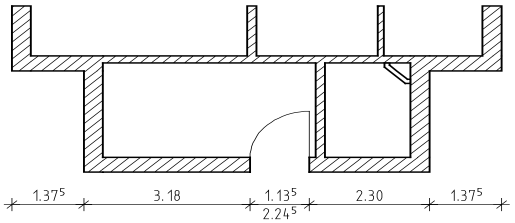
Read swing

Smart symbol 1 to n: 1

☐ Empty

13 Press **OK** to confirm.

14 *Enter offset to end point*
Enter the width of the opening in the dialog line: **1,135.**



15 Specify the direction of the door swing.
The preview is displayed attached to the crosshairs.

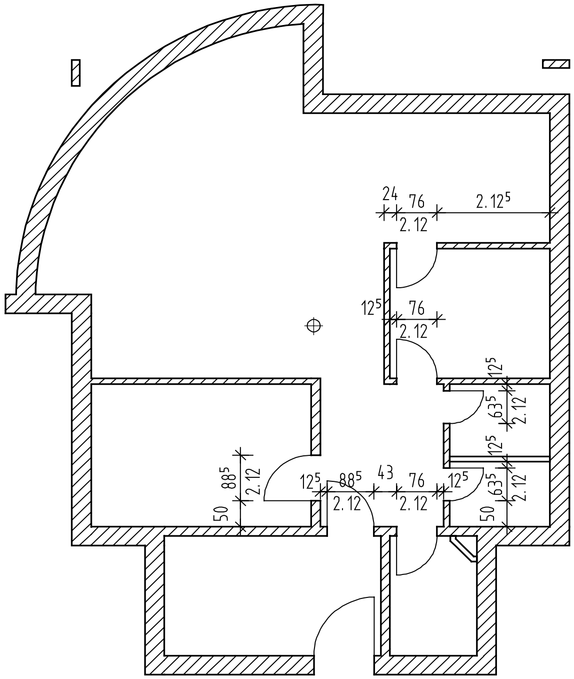
Tip: To quickly check the design visually in 3D space, switch to a standard isometric view, then click followed by in the border of the viewport.

Now place the interior doors. These are to have a different height!

16 Click **Door** again, place the door opening in an interior wall, click **Properties** and select **Setup**.

17 Click **TL relative to lower plane**, enter **2.12** and press **OK** to confirm both dialog boxes.

18 Now insert all the interior doors.
Make sure that the offsets and the width of the openings are correct.



19 Press ESC to quit the tool or
click with the right mouse button when the cursor is positioned over a toolbar.

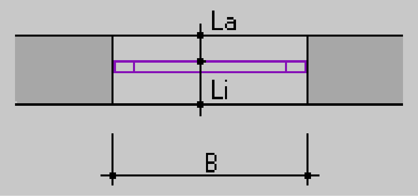
Windows

Next, we will insert openings together with smart window symbols. Some of the openings will be wider and higher than the others and the height of the sill in each opening is also different.

Tip: You can modify the reveal later if necessary using the **Define / Modify Reveal** tool (**Modify** flyout).

The **reveal** defines the position of the smart window symbol in the opening. The use of precise measurements is not only important for ensuring that the elements are displayed correctly on screen - it is also critical if the reports and analyses you generate later are to be accurate.
The system's built-in checker will also check that the sum total of the values you enter for the reveal matches the thickness of the wall.

Reveal



La: Outer reveal

Li: Inner reveal

B: Width of opening (unfinished structure)

Smart symbols

A **smart symbol** is an intelligent design object which automatically adapts to the size of the opening in which it is inserted. The way these symbols appear on the screen is scale-dependent.
At a scale of 1:100, for instance, the element is displayed as a mere outline whereas at a scale of 1:10, the element is displayed in greater detail. Smart symbols are saved like symbols and can be placed in any drawing file at any time.

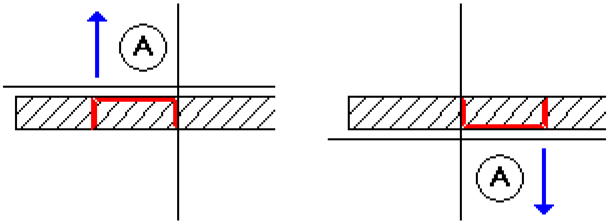
In the following exercise you will use a smart symbol from the Nemetschek library in the Standard folder. Note: this will only work if you have actually installed the basic symbols.

Using the **Smart Window and Door Symbols** tool (smart symbol designer), you can create your own smart door and window symbols. Detailed information is provided in unit 7 "Smart Symbols".

Direction in which openings are entered (windows and doors)

If you define different values for the inner and outer depth of the reveal or if you want to insert window or door openings in multi-tier walls, it is important that you pay attention to the direction in which you enter the opening:

- The point on the wall you click always defines the exterior side of the opening.
- The preview of the opening, which is displayed attached to the crosshairs, is closed on the outside and open on the inside.
- If you need, you can use **Anchor Point** to change how the opening is attached to the cursor in the preview before you insert the opening in the wall: this makes it easier to use existing corners or wall junctions when you enter openings based on reference points.



A wall line clicked = exterior side of opening

In order to display the smart window symbols in greater detail, we will temporarily select a larger scale.

To create window openings

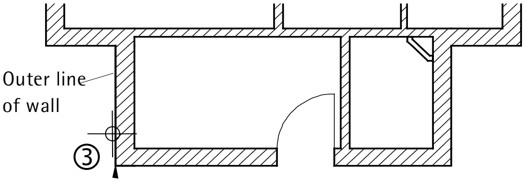
Tip: If you need, you can change how the opening is attached to the cursor on the toolbar and you can click another corner to move the arrow marking the reference point.

1 Click **Scale (status bar)** and set the reference scale to **1:50**.

2 Click **Window Opening** (**Architectural Openings** flyout) and, if necessary, activate the layer **AR_WAll**.

3 *Define properties or click a wall*
Place a point for the first side of the opening on the exterior wall and correct the distance to the corner: **0.615**.

It is important that you click the outer line of the wall as the smart window symbol will use this later for orientation.



4 Click **Properties**.

5 Select the rectangular window and activate the **Create reveal element** check box.

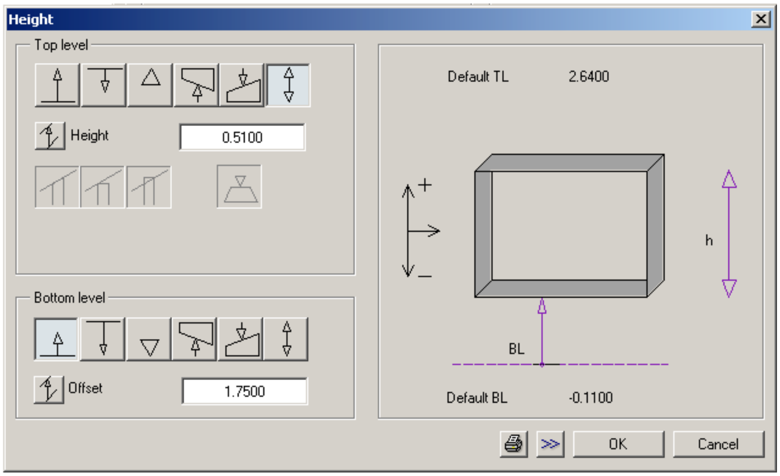
6 In the **Sill** area, select the **Both sides** option and in the **Sill: pen / line / color** area, select pen 2 (0.35) and line 1.

Set the height of the top and bottom levels of the window opening.

7 Click **Setup**.

8 Click

- **Absolute component height** in the **Top level** area and enter **0.51** (corresponds to the height of the opening).
- **BL relative to lower plane** in the **Bottom level** area and enter an **offset** of **1.75**.



Height

Top level

Height 0.5100

Bottom level

Offset 1.7500

Default TL 2.6400

Default BL -0.1100

9 Press **OK** to confirm.

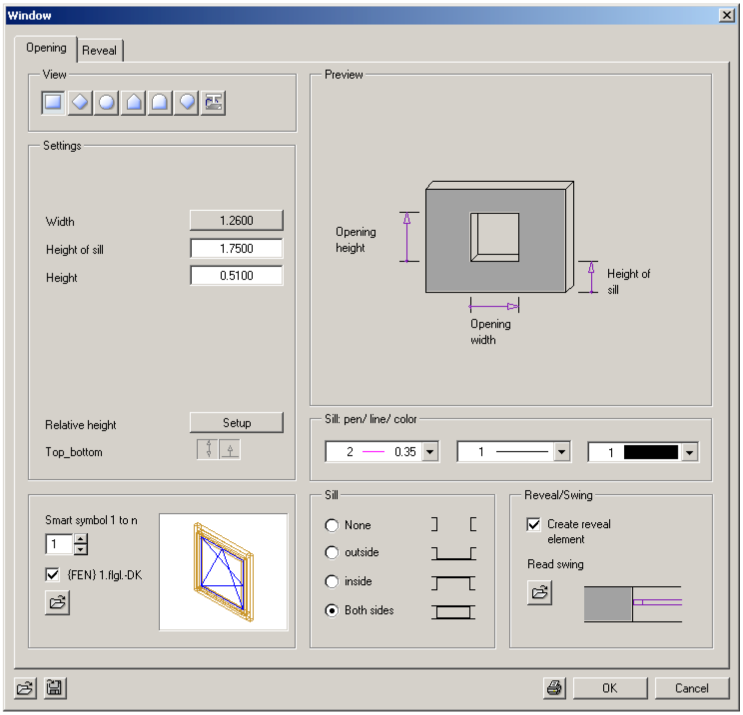
10 Activate the check box for the **Smart symbol**.

11 In the **Styles** folder, select **Smart symbol**, click **Basic symbols** and select a window with a single casement by double-clicking it or by clicking **OK**.

Tip: Select one of the standard views to see the smart symbols in 3D.

Tip: The value for the **Height of sill** is displayed in the **Window** dialog box.
This is the relative height of the sill based on the distance between the sill and the reference plane or a reference element.

The **Window** dialog box should now look like this:


Window

Opening | Reveal

Settings

Width 1.2600

Height of sill 1.7500

Height 0.5100

Relative height Setup

Top_bottom

Sill: pen/ line/ color: 2 0.35 | 1 | 1

Smart symbol 1 to n: 1

☑ {FEN} 1.flgl.-DK

Sill

○ None

○ outside

○ inside

● Both sides

Reveal/Swing

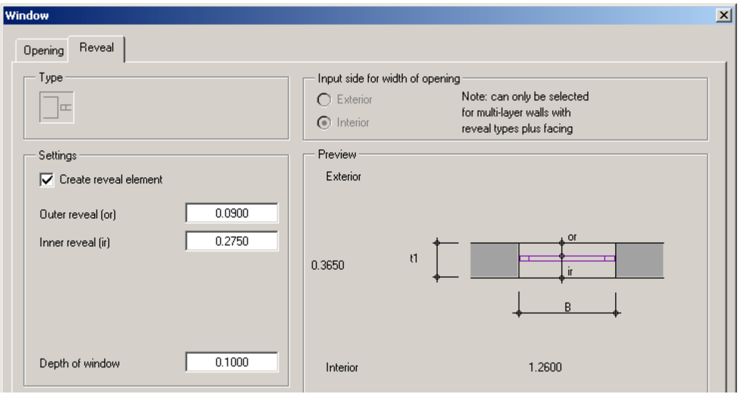
☑ Create reveal element

Read swing

12 Switch to the **Reveal** tab.

13 Set the reveal as follows:

- Outer reveal : **0.09**
- Depth of window : **0.10**


Window

Opening | Reveal

Type

Input side for width of opening

○ Exterior

● Interior

Note: can only be selected for multi-layer walls with reveal types plus facing

Settings

☑ Create reveal element

Outer reveal (or) 0.0900

Inner reveal (ir) 0.2750

Depth of window 0.1000

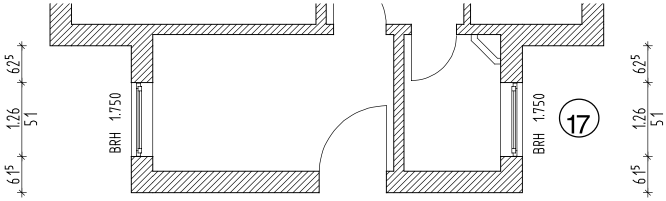
14 Press **OK** to confirm.

15 Enter the width of the opening in the dialog line: **1.26**.

The window opening is created and the smart window symbol is drawn in.
If the window opening was defined relative to the wall's outside line, the smart symbol is positioned correctly.
Please make sure that the opening symbol points to the interior side of the wall. If required, use **Zoom Section** to enlarge the view of the window opening.
To change the position of the smart symbol, just click a corner of the window opening.

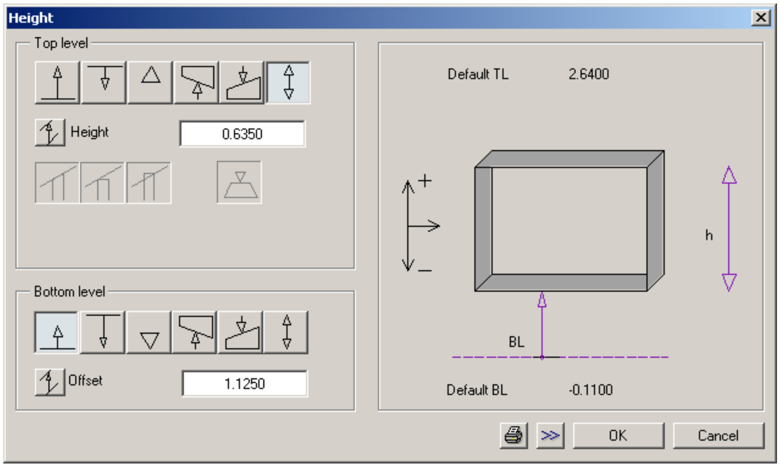
Tip: The smart window symbols used include symbols representing the sash opening directions.
If required, check the position of the smart symbols in a 3D View.

16 When you have positioned the smart symbol correctly, click with the right mouse button in the workspace to confirm your settings.



17 Draw a window using exactly the same settings in the opposite wall.

18 Set the next point for a window opening in the **exterior wall on the right** and, in **Properties**, click **Setup** and change the height parameters for the **top** and **bottom level** (height of sill) as follows:



Height 0.6350

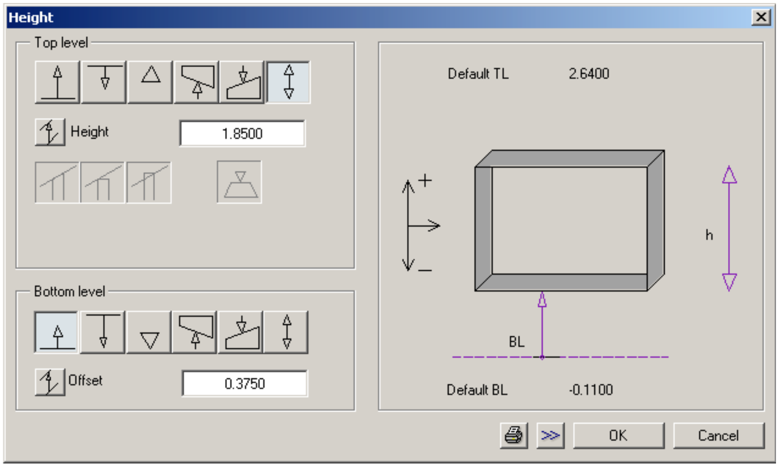
Offset 1.1250

Default TL 2.6400

Default BL -0.1100

Use the same settings to draw additional window openings in the exterior wall on the right.

19 Draw more window openings in the **exterior wall on the left.** Change the height parameters for the bottom level again:



Height 1.8500

Offset 0.3750

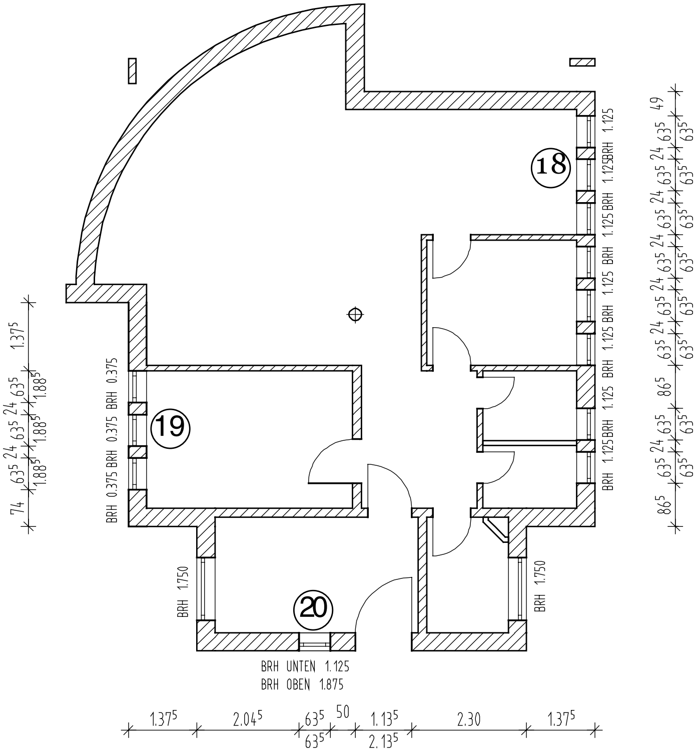
Default TL 2.6400

Default BL -0.1100

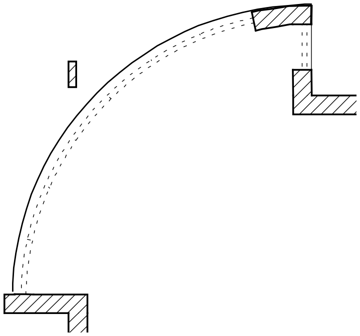
Draw two window openings above each other in the front entrance.

20 To do this, create two openings in the same place but with different settings for **BL relative to lower plane**:
First opening: **1.125** ; second opening: **1.875**.
The component height in each case is **0.635**.

(See illustration.)



Now insert windows in the curved wall and in the adjacent straight wall.



In the case of curved walls, the line used to represent the reveal is always centered because of the curve. When the **Reveal** option is deactivated, it is not possible to tell the ”architectural opening” apart from a ”gap” in plan.

Openings in curved walls may be created so that the reveal edges are radial or parallel (set this in the **Architecture Options**). For this building, we will use the default - **Radial.**

For the purposes of the exercise, we will start by creating the window openings without smart symbols – these can be inserted later, in the exercise following this one.

To insert window openings in curved walls

➲ The **Window Opening** tool should still be active. If it isn’t, activate it now.

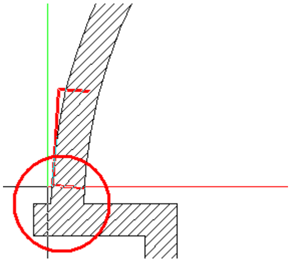
1 Use **Zoom Section** to get a close-up view of the bottom left of the curved wall.

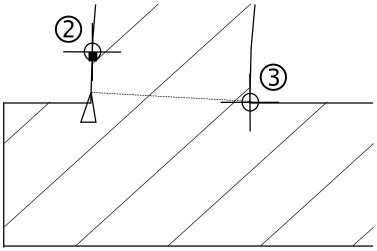
2 Click the line representing the outside of the curved wall.

- Make sure that the system does not snap to a point (see Tip)!
- Pay attention to the direction in which you enter the opening: the closed side of the preview has to point towards the outside. If required, use to select another **transport point.**

Tip: If the arrow indicating the nearest reference point is not displayed, you have most likely snapped to the start of one of the segments in the curved wall. In this case, press ESC, zoom in even closer and try again.

To help you, switch on + **Show CursorTips** in **Point Snap.**
This CursorTip "O" should be displayed (free point).



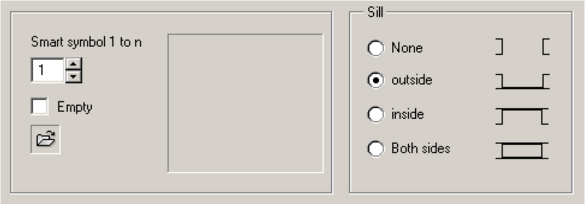


3 Click the inside corner of the curved wall.

In the view showing the corner in detail, you should notice how the reference point has moved.
A perpendicular has been dropped from the corner to the line representing the outside of the wall.

4 Enter the offset: **0**

5 Click **Properties**, disable the check box for **Smart Symbol** and set the **Sill** to **outside**.



Smart symbol 1 to n: 1

☐ Empty

Sill

○ None

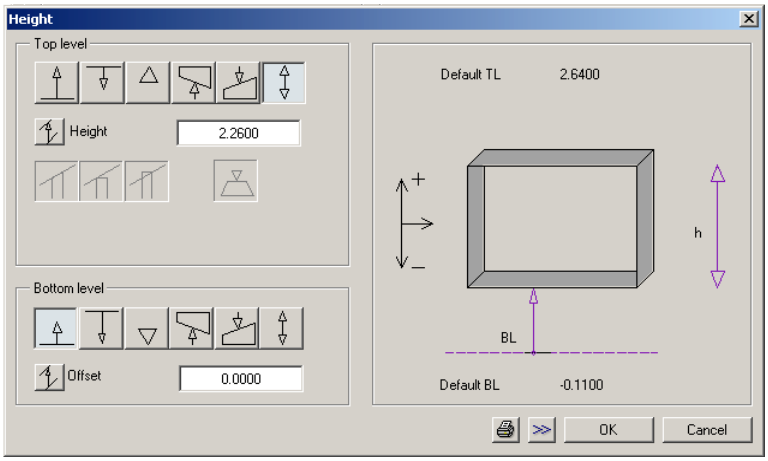
● outside

○ inside

○ Both sides

6 Click **Setup** and enter the following values:

- **Absolute component height: 2.26**
- **BL relative to the lower plane: 0**



Height

Top level

Height 2.2600

Bottom level

Offset 0.0000

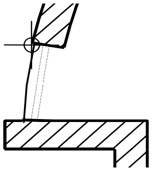
Default TL 2.6400

Default BL -0.1100

7 Press **OK** to confirm the dialog boxes.

8 *Define properties, place point or enter offset to endpoint*
Enter the width of the opening: **1.105**

9 *Allplan does not take the inner or outer reveal into account on circular openings! Do you want to hide this message?*
When you click **Yes**, this message is suppressed until you exit Allplan. Click **No** if you want this message to be displayed as a reminder.



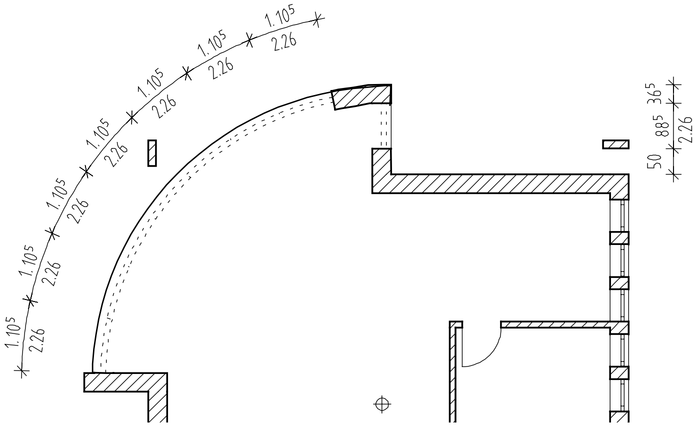
10 *Define properties or click a wall*
Point exactly on the endpoint of the first opening and confirm the **Offset to Reference Point** = 0.000 displayed in the dialog line by pressing ENTER. Approve the width of the opening (**1.105**) displayed in the dialog line and continue to create more windows.

Tip: This opening requires a high degree of precision when clicking points. Zoom in as close as you can and click the points exactly to avoid the risk of snapping to a point in a segment of the circle.

11 Repeat these steps to create five more openings so that a large opening (made up of 7 openings) is generated.

12 Insert another opening in the short wall that meets the top of the curved wall. Please check that the **Sill** is still set to **outside.**

13 *Define properties, place point or enter offset to endpoint*
Enter the width of the opening: **0.885**



14 Press ESC to quit the tool.

Defining the reference point

To change the position the small arrow representing the nearest significant reference point, you can

- set another point on the wall or
- click a point beyond the wall - the reference point will move to the point on the wall that is perpendicular to the point you clicked.

The reference point arrow indicates the direction in which the distance between it and the small square is measured. This value is always a positive value, regardless of the axis direction.
By entering a negative value, it is possible to mirror the direction of measurement.

Now we will insert the smart window symbols in the openings.

To insert a smart symbol

➲ The drawing file **111 Ground floor model** should be open.
The reference scale is still set to 1:50.

1 Click **Insert Smart Symbol in Opening** (**Architectural Openings** flyout).

2 Click **Smart Symbol** on the **Dynamic toolbar** and select the window with the single casement you used beforehand. (OK). Instead, you can also click a smart window symbol you have already inserted to copy it.

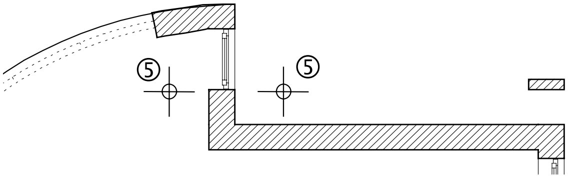
Tip: Use the tools at bottom right to see the smart symbol in different views.

Using Smart Symbol Designer you can create and save your own smart symbols.

3 First click the opening in the straight wall. It is best to click between the lines used to represent the reveal.
The smart symbol is inserted.

4 Zoom in to get a close-up view of the window and to check the position of the smart symbol. To define the window's direction of opening, click the exterior of the opening.

5 When you have positioned the smart symbol correctly, click in the workspace with the right mouse button to confirm your settings.
The smart symbol is inserted and placed on the layer of the opening (AR_WALL).



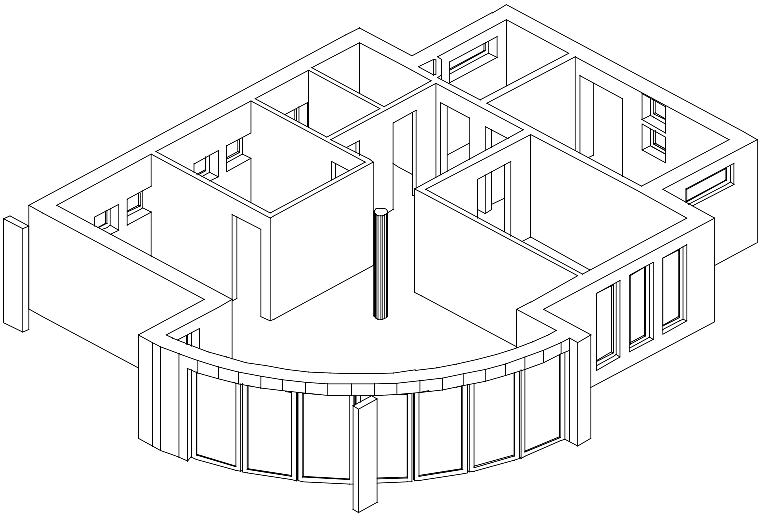
6 Click the first opening in the curved wall and insert the smart symbol.

7 Insert the smart symbol in the other window openings.
You will notice gaps between the smart symbols in the curved wall. This is because the smart symbol was defined in such a way that there is an offset between the details displayed and the edge of the reveal. You can see how the edges of the reveal in the curved wall are radial. The alternative to this is a custom smart symbol.

8 Press ESC to quit the tool.

9 Set the reference scale back to 1:100.

Design in rear left isometric view:



Chimney

We now need to insert a chimney for the heating system in the basement. You can do this using the **Chimney** tool.

To place a chimney

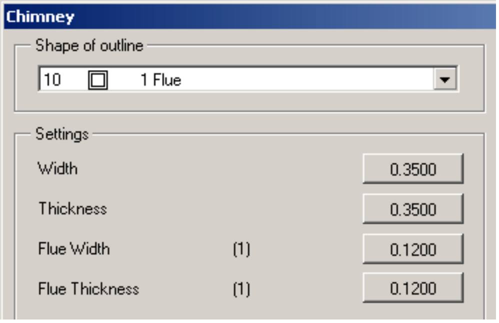
➲ Drawing file **111, Ground floor model** is active.

1 Click **Chimney** (**Architectural Components** flyout).

2 Use **Select, Set Layers** to select the layer **AR_CHIMN** (**Format** toolbar).

3 Click **Properties** and select the chimney type **10**.

4 Enter the values as shown:



Chimney

Shape of outline

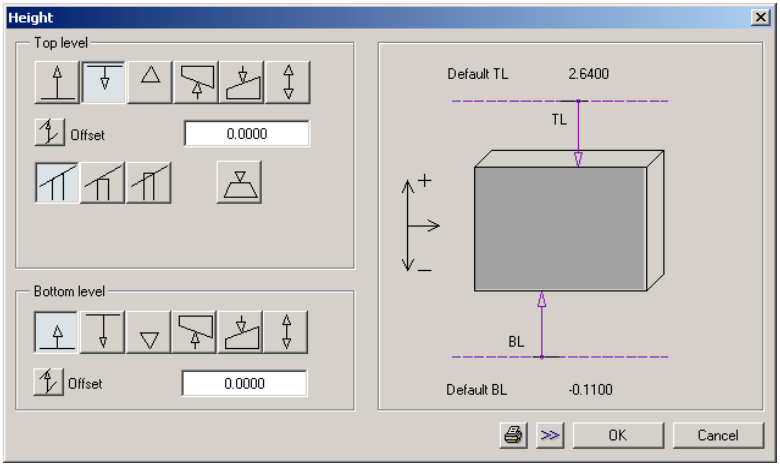
10 ☐ 1 Flue

Settings

Width		0.3500
Thickness		0.3500
Flue Width	(1)	0.1200
Flue Thickness	(1)	0.1200

5 Assign the trade, material and computation mode and set Hatching to Off.

6 Define the height.
The chimney is to pass through the slab. The top level is thus flush with the finished floor in the attic.



Height

Top level

Offset 0.0000

Bottom level

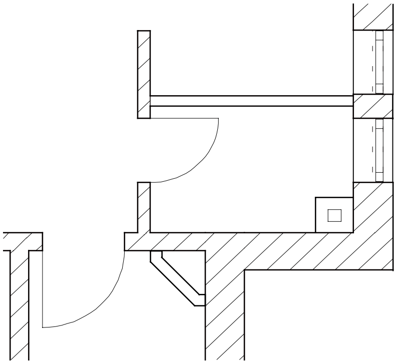
Offset 0.0000

Default TL 2.6400

Default BL -0.1100

7 Press **OK** to confirm the dialog boxes and set the transport point to **bottom right**.

8 Place the chimney in the bottom right wall corner and press ESC to quit the tool.



Design Check

Using context-sensitive object mode, you can switch straight to animation mode.

For the animation, the **Display** setting in the Window Control Panel needs to be set to at least 32,768 colors.

To check the design in animation mode

➲ Make drawing file **111** current and open drawing file **112** in edit mode.

1 Click **Select, Set Layers** (**Format** menu) or double-click with the right mouse button in the empty workspace.

2 Switch to the **Layer Sets** tab, select the layer set **Model** in the list box and press **OK** to confirm.

3 Click in an empty area of the workspace with the right mouse button and select **Animation Window – Entire Model** on the shortcut menu (or press **F4**).

The model is calculated by the system and you can now navigate through the building using the mouse.

In this mode, movement of the mouse is constrained to an imaginary sphere.

- Left mouse button:
  camera on the surface of the sphere about the object
- Middle mouse button:
  turns the camera right, left, up or down
- Right mouse button:
  zooms forwards or backwards

4 To quit animation mode, close the window.

Completing the Design

To complete the plan of the ground floor, we will add the outline of a slab over the columns, finish the carports and draw in the furniture. This can all be accomplished using the 2D drafting tools. It is a good idea to keep 2D information and architectural components in separate places. Consequently, we will use the layer 'DE_GEN01' for 2D designs.

First, we need to complete the outline of the slab over the columns so that the slab extends beyond the walls. We will use a different pen and linetype to do this. The outline of the slab is placed on the layer DE_GEN01.

To draw the outline of the slab

Tip: To select layers, you can also use the shortcut **CTRL+4**.

When you have not activated a tool, just double-click in the empty workspace wit the right mouse button.

➲ In the **CAD Navigator** select the **Draft** module.

1 On the **Format** menu, click **Select, Set Layers** and switch to the **Select Layer/Visibility** tab.

2 Click in the **Current visibility status** list box with the right mouse button and select the **Match Visibility from Layer Set...** command on the shortcut menu.

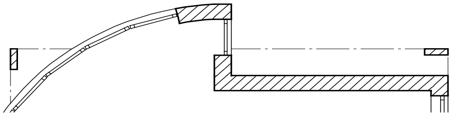
3 Select the layer set **LS_Design** and press **OK** to confirm the **Layer** dialog box. This sets all the layers in the **LS_Design** layer set to visible.

4 Click **Line** (**Draft** flyout).

5 Activate the layer **DE_GEN01** (**Format** toolbar) and select Pen (7) **0.13** and Linetype **11**.

6 On the Dynamic toolbar, click **Ortho Constraint** and draw the floor slab using the columns as a guide.

The easiest way to join the lines with the edge of the sill is using **Intersect 2 Entities** (**Modify** flyout).



Carports

To display the outline of the slab for the carports, we will also use 2D drafting tools. The data will also be saved in drawing file 112 and on layer DE_GEN01 as a 2D design.

To draw parallel lines

➲ The **Draft** module is open.
Open drawing file **112** and set **111** to reference mode.

1 Click **Offset Polyline** (**Draft** flyout) and activate the layer **DE_GEN01** if it is not already active.

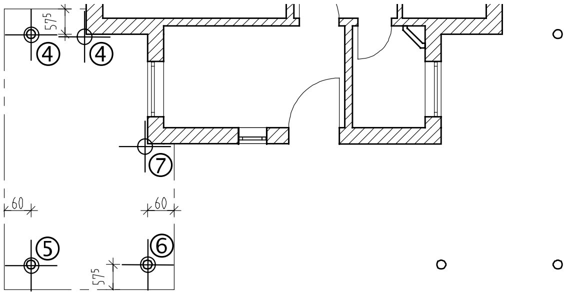
Tip: Offset Polyline:
click **Left** and **Right** on the Dynamic toolbar to specify on which side the polyline is to be drawn.

2 *Number*: **1**
Offset: **0.575** (ENTER!)

3 Select pen (8) **0.18** and linetype **8** for the outline of the carport (**Format** toolbar).

4 Click the corner of the house and then the center of the column. A preview of the parallel line used to ‘enclose the entities’ is displayed at the specified offset.

5 Change the offset to **0.6** and click the center of the column at bottom left.



6 Change the offset to **0.575** and click the center of the next column.

7 Change the offset to **0.6**, click the corner of the house and press ESC to finish drawing the polyline.

8 Draw another parallel offset polyline at an offset of **–0.15**. Select pen (2) **0.35** and linetype **1** and the same series of points.

The second carport will be created by first mirroring and then copying the first one.
In this exercise you will also learn to use the filter tools. You can use these to selectively activate elements in an area.

To mirror and copy the carport

1 Click **Mirror and Copy** (**Edit** flyout).

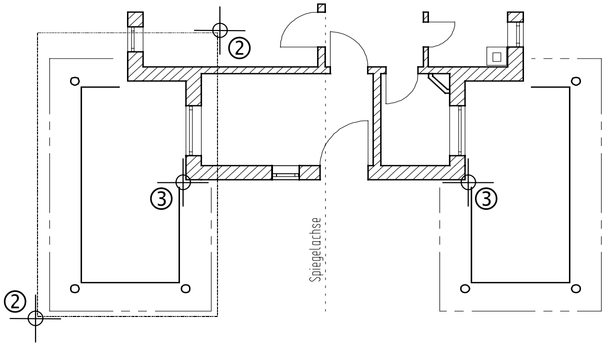
Select the polylines you just drew.

2 In the **Filter Assistant** toolbar, click **Filter elements based on element type** and select **Line**. Enclose the carport in a rectangular selection window.

The polylines are displayed in the selection color.

The center of the façade at the front of the building will serve as the first point for the mirror axis.

3 Click in the workspace with the right mouse button and select **Midpoint** on the shortcut menu. Click the two corners at the front of the house. A preview of the mirror axis is attached to this point.



The mirror axis needs to be parallel to the y axis.

4 *2. 2nd point of mirror axis:*
Press the TAB key to go to the **Y Coordinate** and enter a **dY** value that is not equal to 0 (ENTER).
The second carport is drawn.

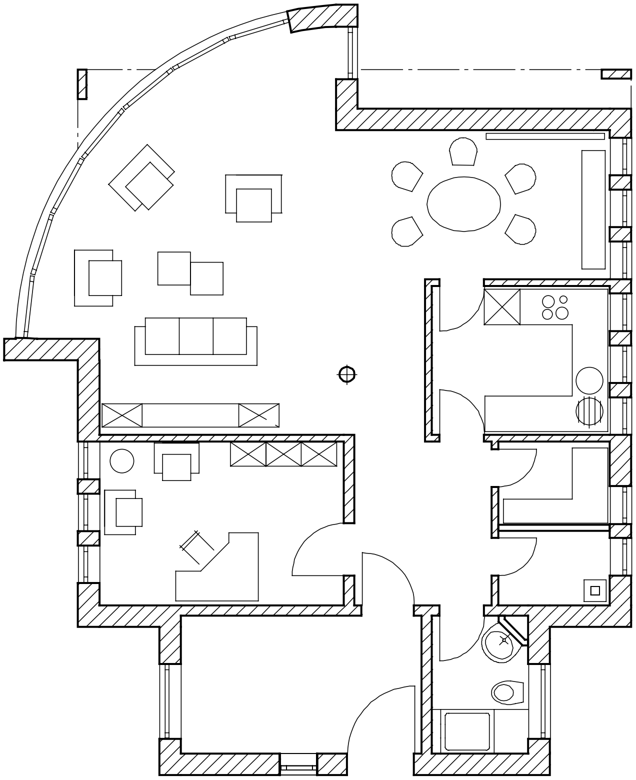
5 Press ESC to quit the tool.

Furniture

You can draw the furniture for the ground floor yourself.

The furniture is drawn using the tools in the **Draft** module on the **DE_FURN** layer. Sanitary objects are drawn separately on the **DE_SANY** layer. This way, individual layers can be conveniently transferred to the specialist planner.
If you have installed the ”2D Architecture” and ”Basic Symbols” catalogs, you can also use the furniture symbols in there.

When furnished, the ground floor might look like this:



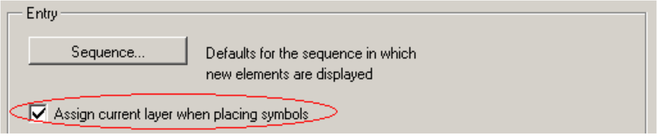
Symbols and layers

When you place symbols, they usually get the layer on which they were drawn. The elements in a symbol can also reside on different layers. When you use symbols provided by partner offices, the layers of the symbols are usually unknown.

To obviate the need for changing layers frequently, we will now change the default settings for symbols specified under **Global Options** and enable the **Assign current layer when placing symbols** option. When this option is enabled, all symbols get the layer that is currently active, regardless of the layer(s) on which they were drawn.

To specify the layer for symbols

1 Click **Options** (**Standard** toolbar), select **Global Options**, switch to the **Entry** tab and enable the **Assign current layer when placing symbols** option.



Entry

Defaults for the sequence in which new elements are displayed

☑ Assign current layer when placing symbols

2 Click **OK** to confirm.

Modifying layers

Symbols that have been drawn on the wrong layer, for example, can be moved to a different layer at any time. To find out how to assign a different layer to these elements, see the following section.

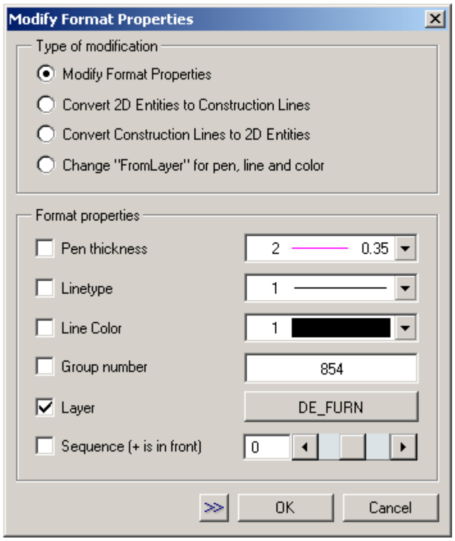
Note: Symbols are saved as entity groups in Allplan. An entity group is a group of elements which can be addressed and manipulated as a whole. To address a symbol or group in a single step, click the symbol the middle and then left mouse button. This mouse button combination selects entity groups.

Tip: You can modify an individual element's layer using **Format Properties** on the shortcut menu. Associated elements (e.g. window openings in walls) are not modified.

To modify layers

1 Click **Modify Format Properties** (**Edit** flyout).

2 Click the **Layer** button,
double click to select the layer **DE_FURN** or activate it via the shortcut menu and confirm.



Type of modification
● Modify Format Properties
○ Convert 2D Entities to Construction Lines
○ Convert Construction Lines to 2D Entities
○ Change "FromLayer" for pen, line and color

Format properties
☐ Pen thickness 2 0.35
☐ Linetype 1
☐ Line Color 1
☐ Group number 854
☑ Layer DE_FURN
☐ Sequence (+ is in front) 0

3 Select the symbols to be placed on the **DE_FURN** layer.
To do this, open the **Brackets** and click each symbol using the **middle** followed by the **left** mouse button.
Then close **Brackets** again.

Dimensions and Labels

Dimensioning and labeling tools were already covered in unit 2, “First Steps“.

Dimension Walls, a more advanced tool provided in the **Wall, Openings, Component** module, is employed for dimensioning architectural elements. This tool will create complete, associative dimension line blocks.
‘Associative’ means that all dimension lines are updated automatically to reflect any changes you make as you go along.

Dimension lines, sill height and elevation specifications are each assigned to a separate layer. Having all the elements in the same drawing file ensures that the associativity is not lost.
The dimension lines for the building are in drawing file 111. The carport dimensions are in drawing file 112.

You will find an illustration of the dimensioned floor plan at the end of this chapter.

Dimensioning walls

In the following exercise you will create associative dimension line blocks for the walls.

Tip: To get a better view, you can turn off the furniture and sanitary layers using **Select, Set Layers.**

To dimension walls

➲ Make drawing file **111** current and set **112** to edit mode.

1 Click **Dimension Walls** (**Architectural Components** flyout).

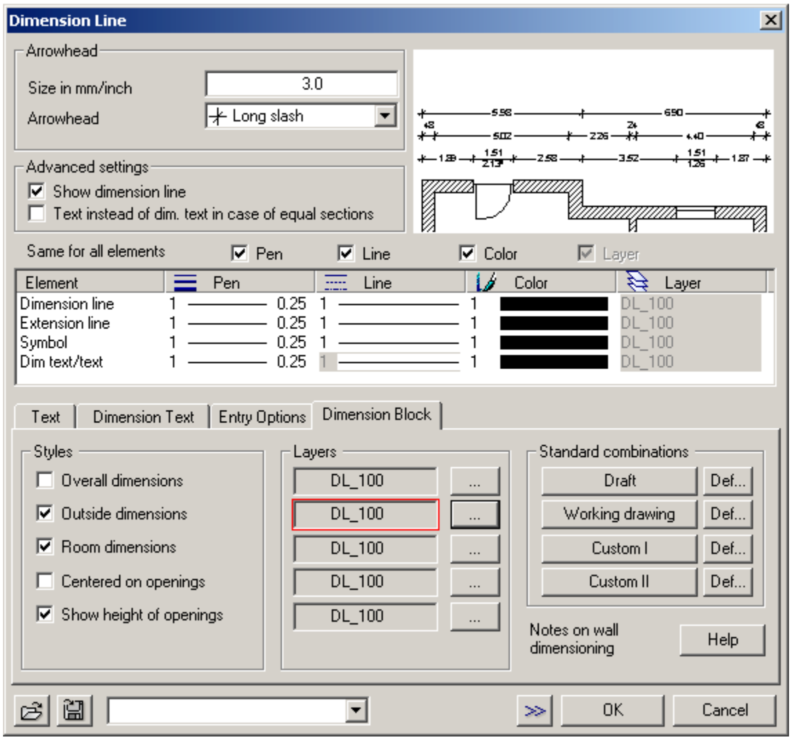
2 Click **Properties.**

3 Leave the settings from the last dimensioning operation for **Arrowhead**, for the **Format properties** and in the **Text, Dimension Text** and **Entry Options** tabs.

4 Select the **Dimension Block** tab and select the following check boxes for the vertical dimensions:

- Outside dimensions
- Room dimensions
- Show height of openings

5 Each dimension string type can be assigned its own layer. Assign the layer **DL_100** to all dimension strings.



Dimension Line

Arrowhead

Size in mm/inch: 3.0

Arrowhead: Long slash

Advanced settings

☑ Show dimension line

☐ Text instead of dim. text in case of equal sections

Same for all elements ☑ Pen ☑ Line ☑ Color ☑ Layer

Element	Pen	Line	Color	Layer
Dimension line	1 0.25	1	1 ■	DL_100
Extension line	1 0.25	1	1 ■	DL_100
Symbol	1 0.25	1	1 ■	DL_100
Dim text/text	1 0.25	1	1 ■	DL_100

Styles

☐ Overall dimensions

☑ Outside dimensions

☑ Room dimensions

☐ Centered on openings

☑ Show height of openings

Layers: DL_100, DL_100, DL_100, DL_100, DL_100

Tip: You can save four dimension string combinations as standard combinations.

6 Press **OK** to confirm.

7 Click the vertical exterior walls you want to dimension on the right.
The walls will appear in the selection color as you select them. Make sure you select them all.

8 Right click in the workspace with the right mouse button to confirm. (Adjacent interior walls will also be dimensioned automatically.)

9 *Active wall line as direction element*
Click a vertical line on the edge of one of the walls selected to define the direction of dimensioning.

10 Place the dimension block in the workspace.

11 If necessary, change settings for the dimension block in **Properties** and dimension the other walls.

12 Make drawing file **112** current, open drawing file **111** in the background and dimension the carports.

Before placing the dimension line block, you can use **Flip Dimensions** on the Dynamic toolbar. With **Offset to drop-in point On/Off** you can automatically enter a distance between the dimension line block and the crosshairs – this value is then used for the spacing between the individual dimension lines in the block. You can thus append the next dimension line block ”seamlessly”.

You can customize the dimension blocks. In the **CAD Navigator** select the **Dimension Lines** module for this.

- **Add Dim. Line Point** (**Modify** or **Dimension Lines** flyout)
- **Del Dim. Line Point** (**Modify** or **Dimension Lines** flyout)
- To alter height specifications, use **Change Height Spec** (**Modify** flyout). This tool is required to change the height specification for the window openings in the entrance.
- To dimension the openings in the curved wall, use **Curve Dimensioning** (**Create** flyout). When you do this, you will have to work carefully as the points to be dimensioned - the endpoints of each opening, which also serve as the start point of the next opening - are not visible on the outside edge of the sill. However, the points do exist and can be dimensioned.

Sill height

You can use the **Sill Height Spec** and **Elevation Spec** tools to label your design or just as a means of checking that the elements you entered were created correctly.
These tools will create ”intelligent” labels i.e., labels that will update automatically to reflect any changes you make.
The openings can only be clicked in plan view.

Note: The exponent-style numeric format is based on the setting you have made in the **Dimension Line Parameters, Dimension Text** tab.

To calculate the sill height automatically

➲ Open drawing file **111** again.

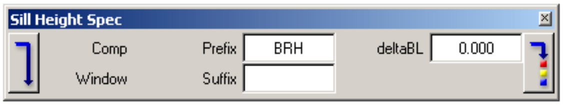
1 Click a corner of the window opening you want to label with the right mouse button and select **Sill Height Spec** on the shortcut menu. (Alternatively: on the **Architectural Openings** flyout and then a point on an opening).

2 Activate the layer **AR_SILLE**.

3 Select **Vertic** on the **Dynamic toolbar** for the direction of lettering.

4 Click **Prefix** on the Context toolbar and enter the following: **BRH**. (This will appear **in front of** the value).

Tip: For the sill height specification to be based on finished dimensions, enter the height of the floor finish in the **Delta BL** field.



Sill Height Spec

Comp

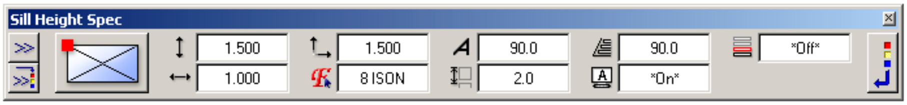
Window

Prefix BRH

Suffix

deltaBL 0.000

5 Switch to the text parameters and set the values as shown.



Sill Height Spec

1.500

1.000

1.500

8 ISON

90.0

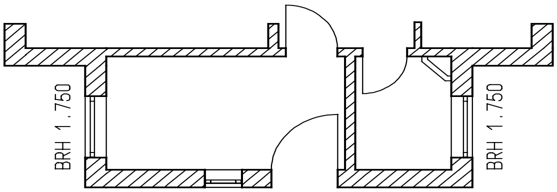
2.0

90.0

On

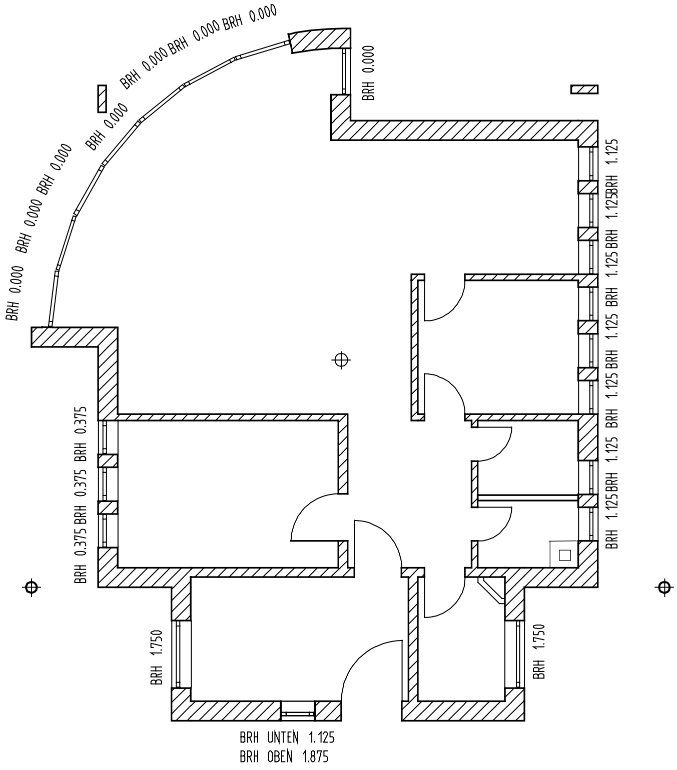
Off

6 Place the label beside the window.
The height from the lower default reference plane to the sill is measured.



7 Create labels for the other window sills. Check the text orientation each time.
On the curved wall, set the text direction to **Angle** and click a line on a smart symbol to match its angle.

Tip: In the case of openings that are above each other, only the top one is identified. The only way to enter the height of the sill in the lower one is to switch to the tools in the **Text** flyout. When entering the sill height manually, use >> to match the text parameters from an existing text.

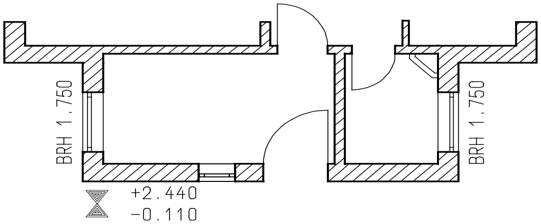


8 Press ESC to quit the tool.

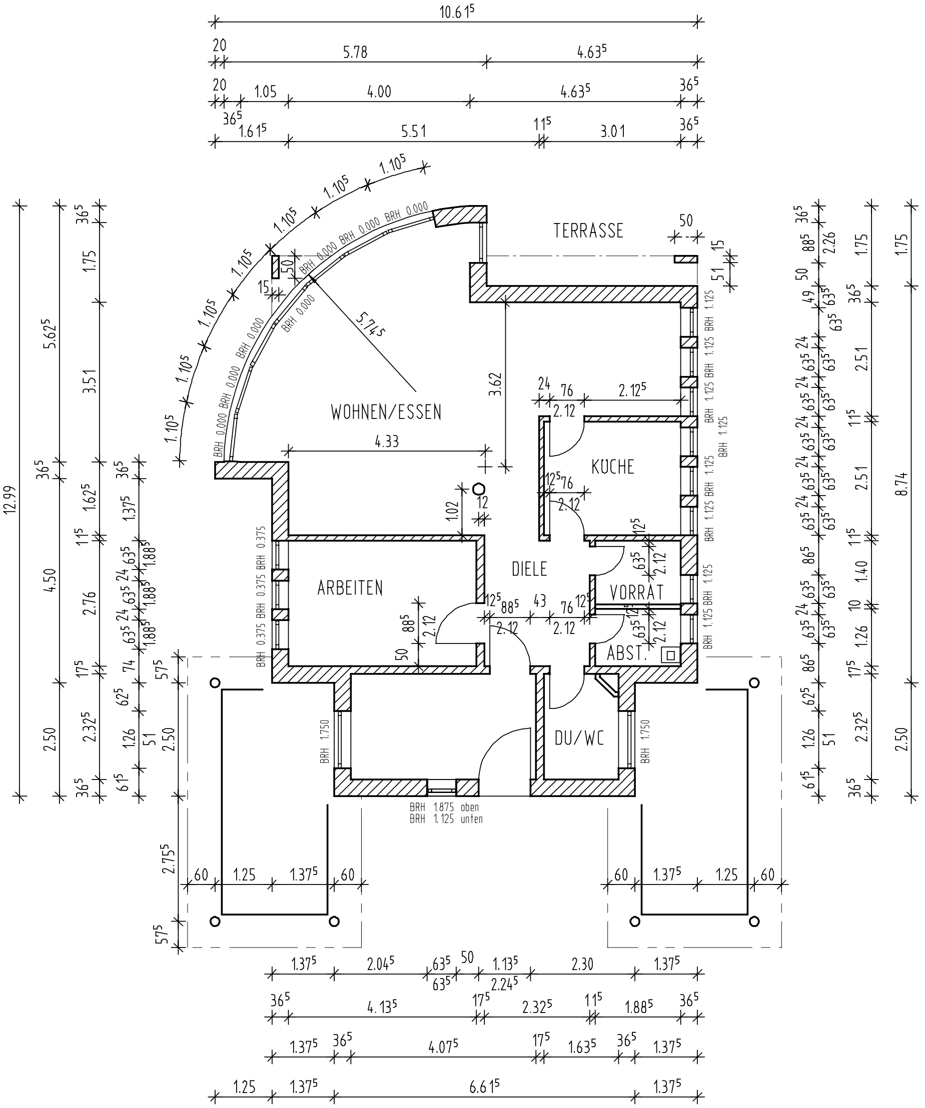
You can use **Align Text** (basic tools, **Text** flyout) to align the vertical BRH labels. Press F1 for detailed information on this tool. Similarly, you can place elevation specifications in the drawing file using **Elevation Spec** (**3D Modification** flyout or shortcut menu). With this tool, you can also define the symbol used for the upper and lower elevation marks.

The following illustration shows the elevation specifications for a wall.

Tip: Check that the correct layers are turned on.



After dimensioning and labeling, the floor plan for the ground floor should look like this.
The room identifiers are on the layer **TX_100**.



Stair Outline

In the exercise that follows, we will again be using tools that were covered in the unit ”First Steps”.

To draw the stair outline

➲ Drawing file **111** is active.

1 Activate the layer **DE_GEN02** and use **Line**, **Rectangle** and **Parallel Lines** (**Draft** flyout) to draw the stringers and the steps.

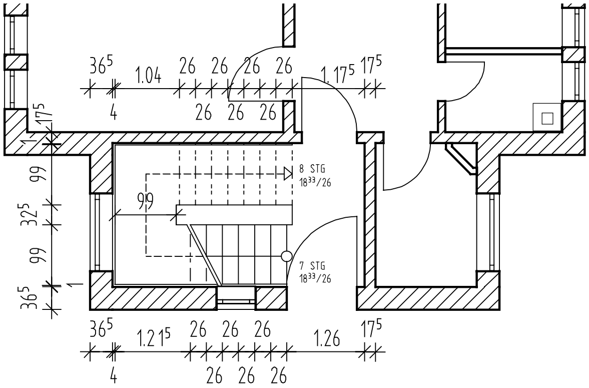
2 Use **Perpendic. Bisector** (**Create** menu → **Draft**) and **Line** to draw the line of travel.

3 Use **Line**, **Circle** and **Del Segment of Line** (**Draft** flyout**)** to draw symbols for the top and bottom of the stair.

4 Use **Line** to draw two section lines and delete redundant line segments with **Del Segment of Line**.

5 Change the linetype using **Modify Format Properties** (**Edit** flyout) and **Brackets**.

Tip: If you switch to the **Draft** module, you will find **all** the tools in the module in the **Create** and **Modify** flyouts.



Check the distance to the walls. To do this, use the **Point snap and offset entry** feature, which was covered in the “First Steps” unit.

Slab

The ground floor now needs a slab. As with walls, start by entering the properties and then draw the outline of the slab.

To set the slab's properties

Tip: The **Slab** tool can be applied in a wide range of situations – from the design of floor slabs to foundations.

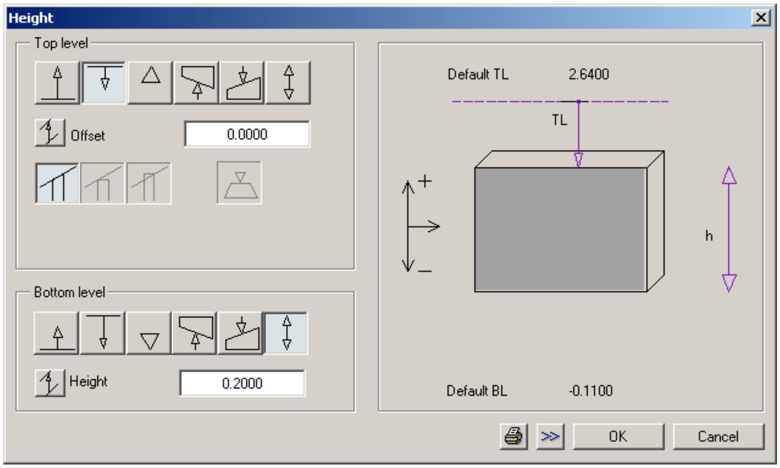
➲ Drawing file **111** is active and drawing file **1** is open in edit mode.
If not already active, use **Select, Set Layers** to select the layer set **SC Entry**. (This way, the grid layer should be visible.)

1 Click **Slab** (**Architectural Components** flyout) and activate the layer **AR_SLAB**.

2 Select pen (2) **0.35** and linetype **1** (**Format** toolbar).

3 Click **Properties**.

4 Set the height as follows:



Offset 0.0000

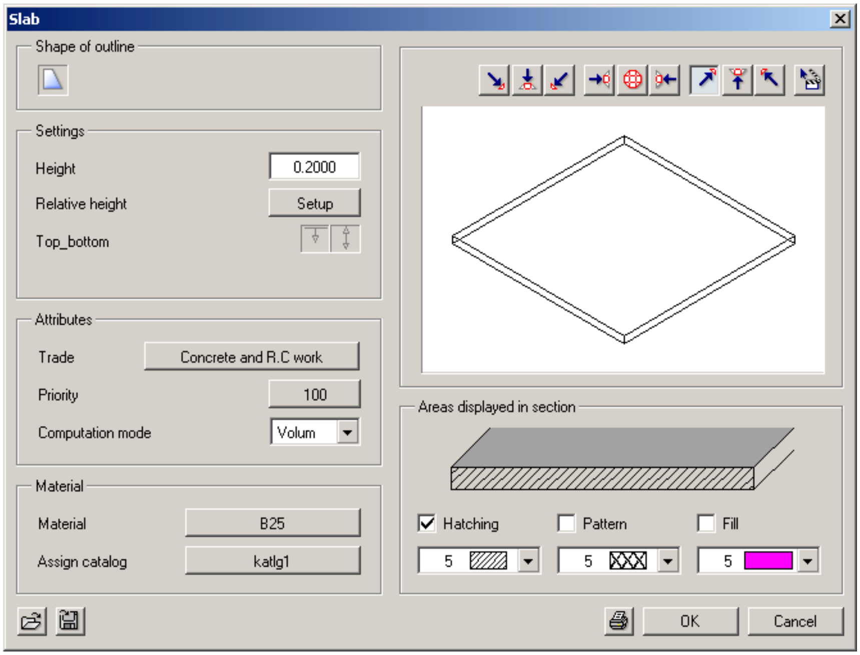
Height 0.2000

Default TL 2.6400

Default BL -0.1100

The top of the slab is flush with the upper default reference plane. The thickness of the slab can be entered as a component height. The upper default reference plane is flush with the unfinished floor on the first floor.

5 Press **OK** to confirm and enter the other properties as shown in the following illustration.



Slab

Shape of outline

Settings
Height 0.2000
Relative height Setup
Top_bottom

Attributes
Trade Concrete and R.C work
Priority 100
Computation mode Volum

Material
Material B25
Assign catalog katlg1

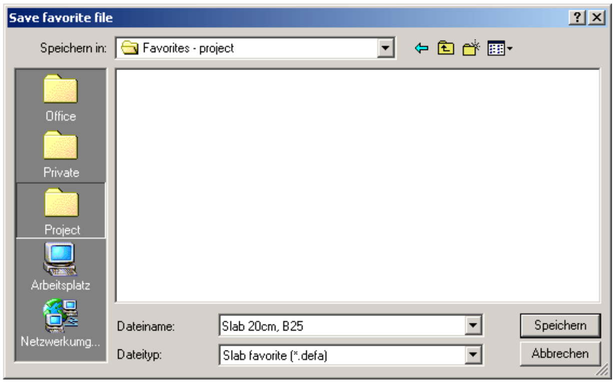
Areas displayed in section
☑ Hatching 5
☐ Pattern 5
☐ Fill 5

As is the case with all element settings, the settings in Slab tool's property sheet do not have to be entered from scratch each time. You can save combinations of settings as favorites under a name of your choice.

To save component properties as a favorite

➲ The **Slab** tool is still active and the dialog box is open. If not, activate the tool and click **Properties**.

1 In the bottom left corner of the dialog box, click 💾.



Speichern in: Favorites - project

Dateiname: Slab 20cm, B25

Dateityp: Slab favorite (*.defa)

2 Click the **Project** folder, enter a name of your choice and click **Save** to confirm.

The next time you need a slab with these settings, click and then the name of the file:
The values in the dialog box will change automatically.

Now we will define the position of the slab. The layers on which the corners will serve to define the delimiting points along the outline of the slab will be useful for this.
To trace the outline of the slab along the shape of the curved wall, we will use the additional polyline entry tools provided in the program.

General polyline entry tools

You can use these tools to enter or map any outline.

Polygonize entire element: the start point also serves to specify the direction. In the case of circles and curves, you also need to enter a value for the number of segments in the circle or arc/curve.

Define portion of element to be polygonized: generates a polyline based on a portion of an element. The portion is defined using a ‘from’ and a ‘to’ point.

Reference point: identifies a point on the element as the starting point for the new element. This starting point is determined by clicking a point on the element and entering an offset value between it and the nearest significant point (displayed as an arrow).

Find closed polylines: click a point on a polyline and the system will detect the entire boundary.

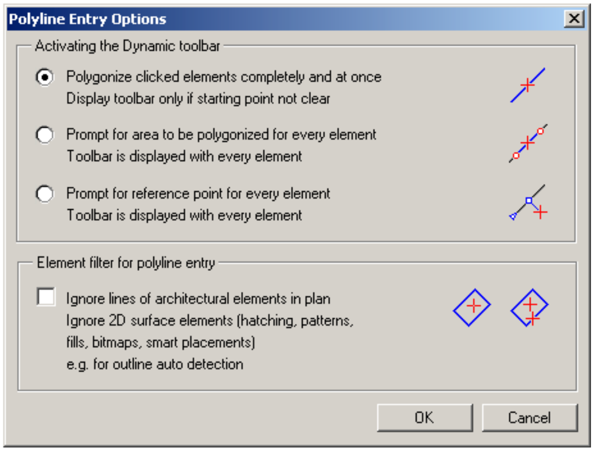
To force the polyline along the outline of the wall, you first need to get a close-up view of that area. To facilitate the process, the polyline defining the slab outline is entered in several steps but in one go.

To enter the outline of the slab

➲ The **Slab** tool should still be active.
Click in an empty area of the workspace with the right mouse button and select **Point Entry Options** on the shortcut menu (**Point Assistant**), enable the **Show CursorTips** option in the **Scan, Display** tab and the **Intersections** option in the **Snap Points** tab.

1 Click **Option** on the Dynamic toolbar, check the settings and click **OK** to confirm.

The settings should look like this:



Polyline Entry Options

Activating the Dynamic toolbar

● Polygonize clicked elements completely and at once
Display toolbar only if starting point not clear

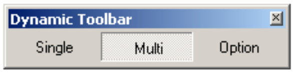
○ Prompt for area to be polygonized for every element
Toolbar is displayed with every element

○ Prompt for reference point for every element
Toolbar is displayed with every element

Element filter for polyline entry

☐ Ignore lines of architectural elements in plan
Ignore 2D surface elements (hatching, patterns, fills, bitmaps, smart placements)
e.g. for outline auto detection

2 Click **Multi** on the Dynamic toolbar to enter the polyline defining the outline of the slab in several steps.



Tip: When you make an error, you can correct it at once. The number of undo steps is unlimited.
Just click **Undo** on the Dynamic toolbar.

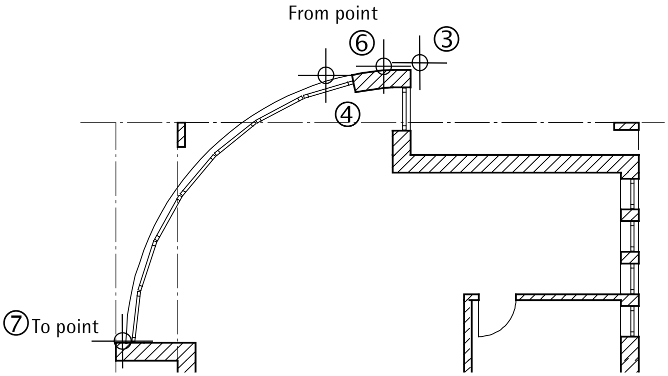
3 Use **Zoom Section** to get a close-up view of the area with the curved wall and click the first wall corner.

4 Click the arc.

5 On the Dynamic toolbar, click **Entire Element.**
Using this tool you can integrate an entire element, in this example it is the arc, into an outline polygon in a single step.

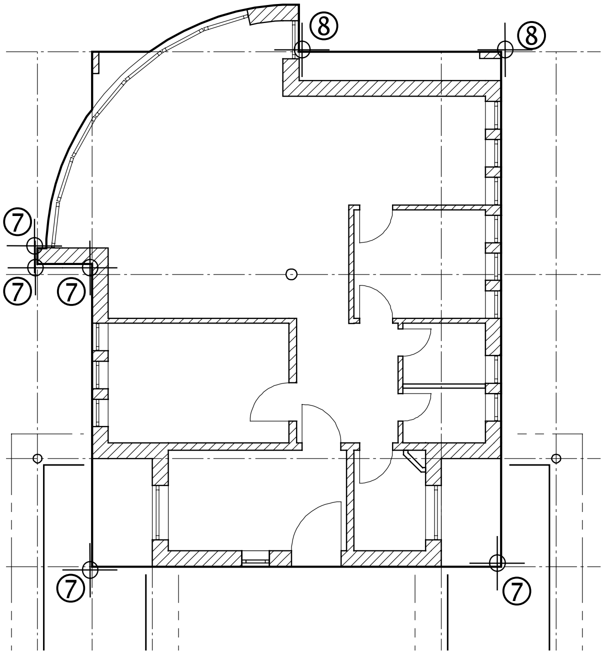
6 *From point*
Click the end of the curved wall (at the top).
Observe the CursorTips displayed with the crosshairs.

The entire arc is integrated in the polygon in a single step. The projecting part of the slab in the area of the column is entered in the next step.

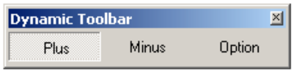


7 Change the viewpoint and use the corners and grid points to define the remaining points for the outline of the slab. The slab should rest exactly on the walls.

8 Click the corner of the column and the point of intersection between gridline and wall.



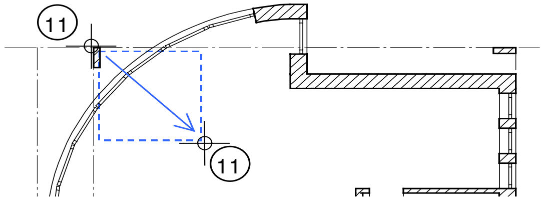
9 A section of the slab in the area of the column in front of the curved wall is still missing.
Click **Plus** on the Dynamic toolbar to integrate this section into the polyline.



10 Use 🔍 **Zoom Section** to zoom in on the area around the column and the curved wall.

11 Click the top left corner of the column, then click a diagonally opposite point within the curved wall and press ESC:

The rectangular section of the slab is created.



12 Press ESC to close the outline and quit the tool.

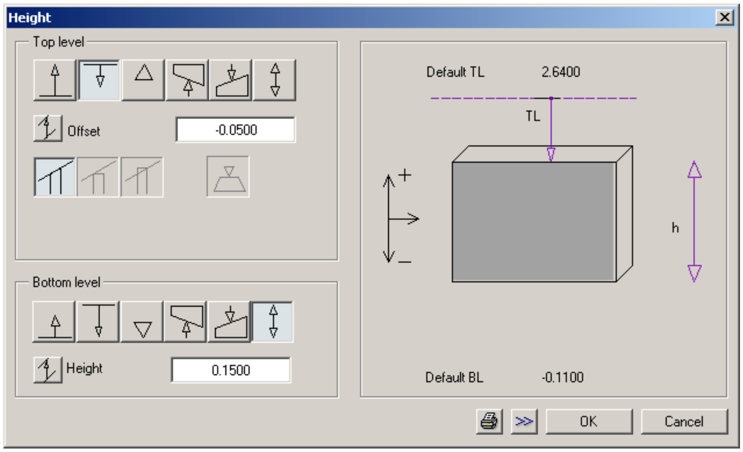
The carport slabs will be drawn on drawing file 112.
These slabs are located immediately below the slab between the ground and first floor but are thinner and will be assigned a different material.

To draw the roofs over the carports

➲ Make drawing file **112** current and set **111** to edit mode.

1 Click **Slab** (**Architectural Components** flyout) again.

2 Change the **Properties**, including the **height**.

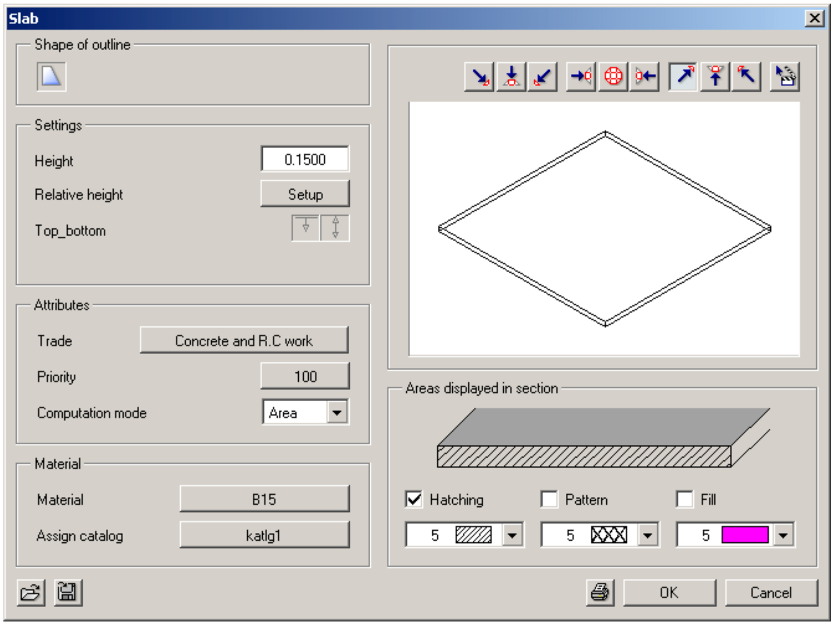


Offset -0.0500

Height 0.1500

Default TL 2.6400

Default BL -0.1100



Settings

Height 0.1500

Relative height Setup

Top_bottom

Attributes

Trade Concrete and R.C work

Priority 100

Computation mode Area

Material

Material B15

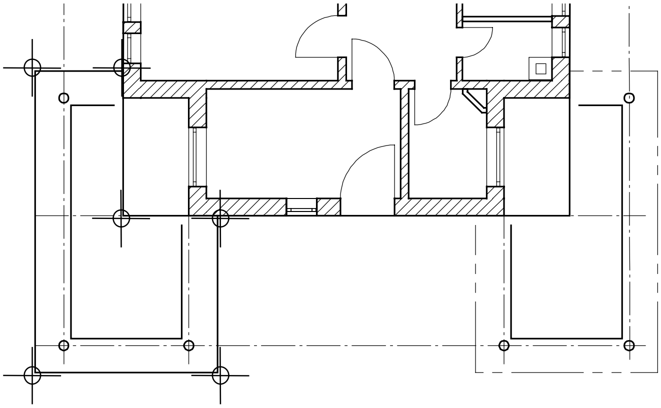
Assign catalog katlg1

☑ Hatching ☐ Pattern ☐ Fill

5 5 5

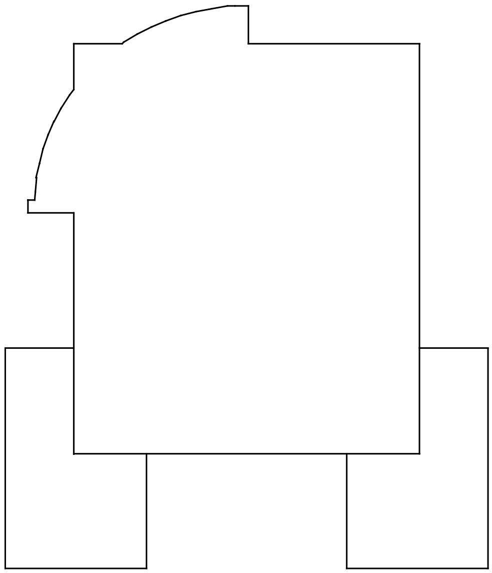
3 Zoom in on the area around the carports.

4 Click the corners of the roof outline one after the other and press ESC to close the polyline.



5 Draw the roof for the second carport in the same way.

6 Press ESC to quit the tool. Below is a **Hidden Line Image** of the floor plan as it should now look:



Slab opening

Part of the chimney may also be visible as its top level now intersects exactly with the top level of the slab. We will now insert openings in the slab for the chimney and to provide access to the first floor.
Height settings are not required for openings in slabs as they always pierce the slab in its entirety.

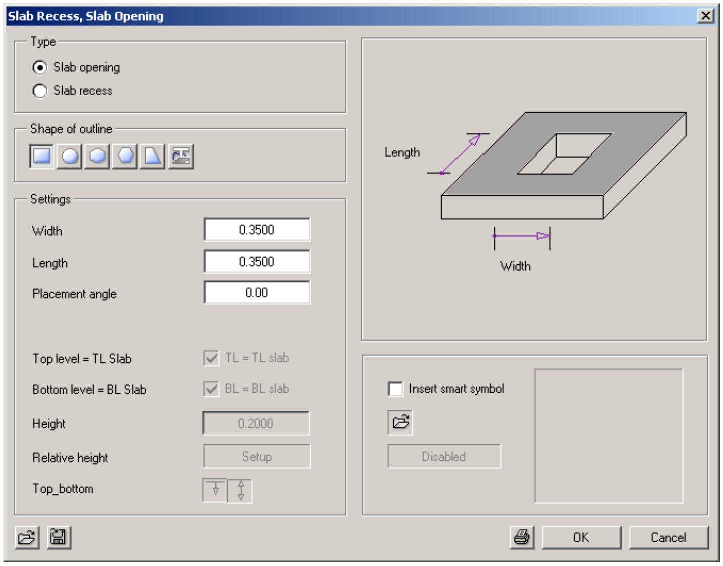
To draw a rectangular slab opening

1 Click **Slab Recess, Opening** (**Architectural Openings** flyout).

2 Click the ground floor slab.

3 Click **Properties.**

4 Select the icon for a **rectangular** opening and enter **0.35** for the length and width of the opening.



Slab Recess, Slab Opening

Type
● Slab opening
○ Slab recess

Settings
Width 0.3500
Length 0.3500
Placement angle 0.00
Top level = TL Slab ☑ TL = TL slab
Bottom level = BL Slab ☑ BL = BL slab
Height 0.2000
Relative height Setup
Top_bottom

☐ Insert smart symbol

5 Set the transport point to **bottom right** and click the bottom right corner of the chimney.

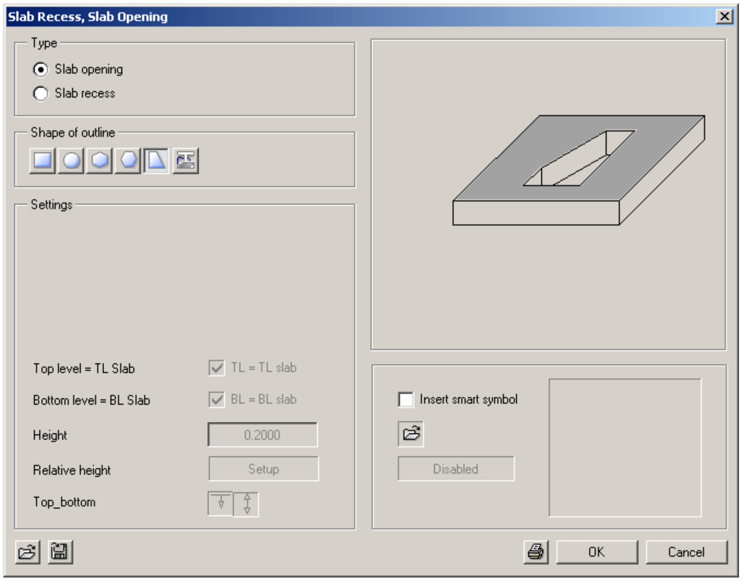
We will use a freeform opening for the stairs. By opening the drawing file with the stair outline in reference mode, you will find it easy to enter the outline of the opening.

To draw a free-form slab opening

➲ The tool should still be active. Make the layer **DE_GEN02** with the stair outline visible.

1 Click **Properties.**

2 Select the icon for a **freeform** opening.



Slab Recess, Slab Opening

Type
● Slab opening
○ Slab recess

Shape of outline

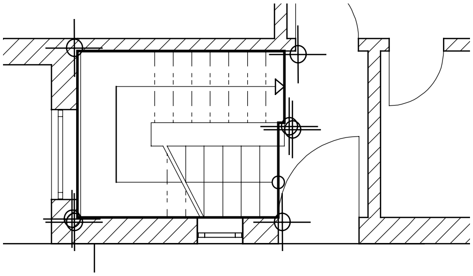
Settings

Top level = TL Slab ☑ TL = TL slab
Bottom level = BL Slab ☑ BL = BL slab
Height 0.2000
Relative height Setup
Top_bottom

☐ Insert smart symbol
Disabled

3 Zoom in on the area around the stair.

4 Click the points on the boundary of the stair outline one after the other. To do this, click **Ortho Constraint** on the Dynamic toolbar. The last point you click should coincide with the first.

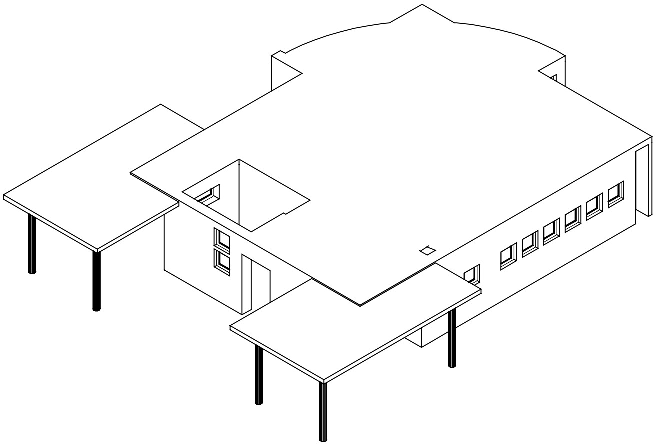


5 Press ESC to quit the tool.

Click ↖ **Front Right Iso.** and make a hidden-line image. The ground floor should now look like this:

Tip: Slab recesses

Slab openings and slab recesses are created in the same way.
Difference: **slab recesses may have their own height setup as they** do not pierce the slab entirely.



Exercise 4: First Floor

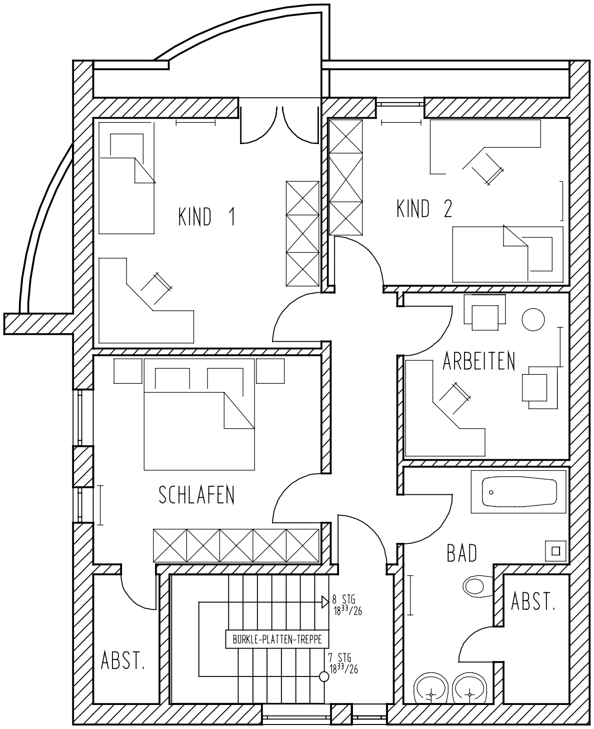
In this exercise you will make the first floor by copying the ground floor to relevant drawing files for the first floor and then raising these by the height of one story. You will find out about some of the tools that you can use to make alterations to the floor plan.

Objective

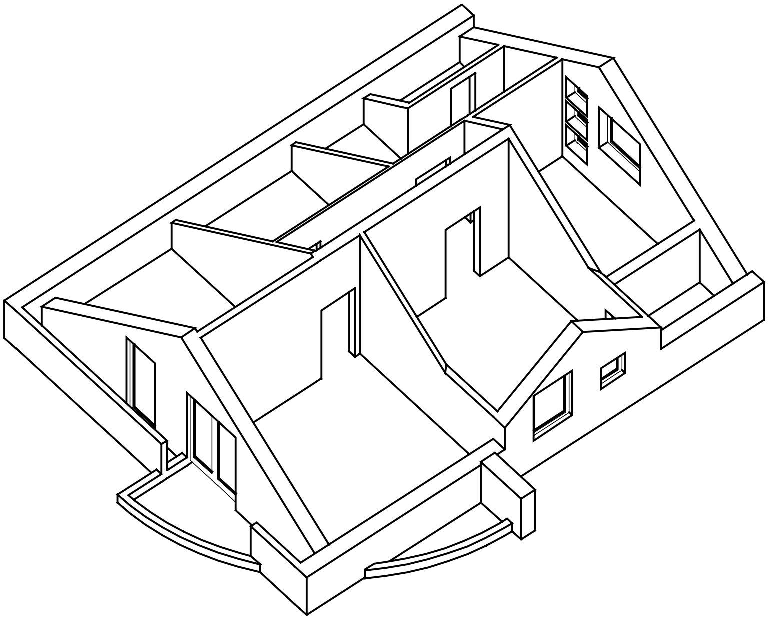
When you design the other floors in a building, you can

- Draw the elements from scratch or
- **Copy and modify**: Copy elements from an existing floor to new drawing files and then make alterations.

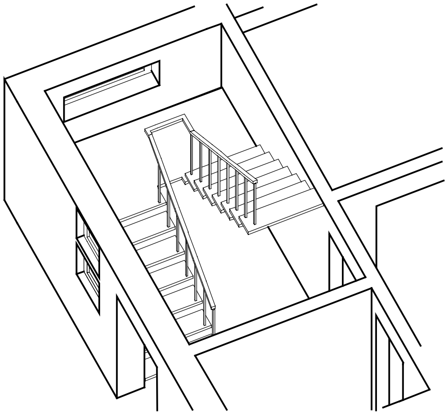
In this tutorial, you will be employing the 'copy and modify' method.



Floor plan of first floor



Isometric view of the first floor (without a roof)



Half-turn stair from the ground floor to the first floor

We will begin by copying the drawing file 111 with the ground floor model to drawing file 121 (the roof model).

To copy a drawing file

➲ You should still be in the **Walls, Openings, Components** module.

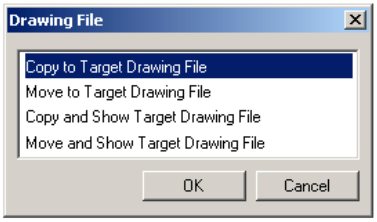
1 Click **Open on a project-specific basis** and make drawing file **111 Ground floor model** current. Close all the other drawing files.

2 On the **Format** menu, click **Select, Set Layers**, make the following layers visible:
DE_GEN02, **AR_WALL**, **AR_COL** and **AR_CHIMN**
and hide all the other layers.

3 On the **File** menu, click **Copy/Move Elements between Files...**
.

Tip: You can also copy parts of a drawing file to another. Use the Filter Assistant to do this.

4 Click **Copy to Target Drawing File.**

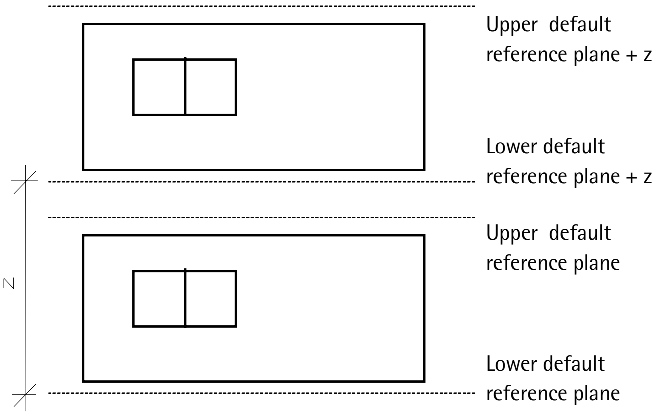

Drawing File
Copy to Target Drawing File
Move to Target Drawing File
Copy and Show Target Drawing File
Move and Show Target Drawing File
OK
Cancel

5 In the **Select File** dialog box, select the drawing file **121**, **Roof model** and press **OK** to confirm.

Tip: You can also move and copy drawing files by dragging and dropping them in ProjectPilot.

6 *Select the element(s) you want to copy to file 121*
Click **All** on the Dynamic toolbar or click twice with the right mouse button in the workspace (**do not** double click!!).
This confirms and copies all the visible contents.

Components and planes on copied drawing files can be raised to the height of the next story using the **Raise File** tool.


Upper default reference plane + z
Lower default reference plane + z
Upper default reference plane
Lower default reference plane
Z

To raise drawing files along the z-axis

➲ In **CAD Navigator** activate the **Architecture** module and open and select drawing file **121, Roof model** using **Open on a project-specific basis.**

1 On the **Window** menu, click **3 Viewports** so you can better observe the changes on screen as they happen.

2 Click **Raise File** (**Modify** flyout).

3 *Enter a value by which to raise the file parallel to the z-axis* When prompted for the value by which to raise the drawing file parallel to the z-axis, enter: **2.75** (difference in height between the unfinished floor downstairs and the unfinished floor upstairs (on the first floor)).

You can see the elements rise in the isometric and elevation view.

4 On the **Window** menu, click **1 Viewport.**

Modifying the first floor

When you use the CAD system, you will often use the extensive range of modification tools provided.
When modifying, it is important to make a distinction between the following:

- Changes you make to element properties and their height settings using **Apply Archit. Component Properties** (analogous to creation method). Please note that this can only be done with components of the same type (only walls, for example).
- Changes you make to components of different types using **Change Archit. Properties**. You can use this tool to modify element properties and their height settings (e.g. height and/or material of walls and columns) in a single step.
- You can modify individual elements using **Properties** on the shortcut menu.
- Changes that you can make using tools on the **Edit** and **Modify** flyouts for altering the shape of elements in the xy plane.

To change architectural elements along the z-axis, use:
Change Archit. Properties,
Apply Archit. Component Properties or
Properties on the shortcut menu.

We will start by deleting redundant design elements. We can do this by using the architectural filters.

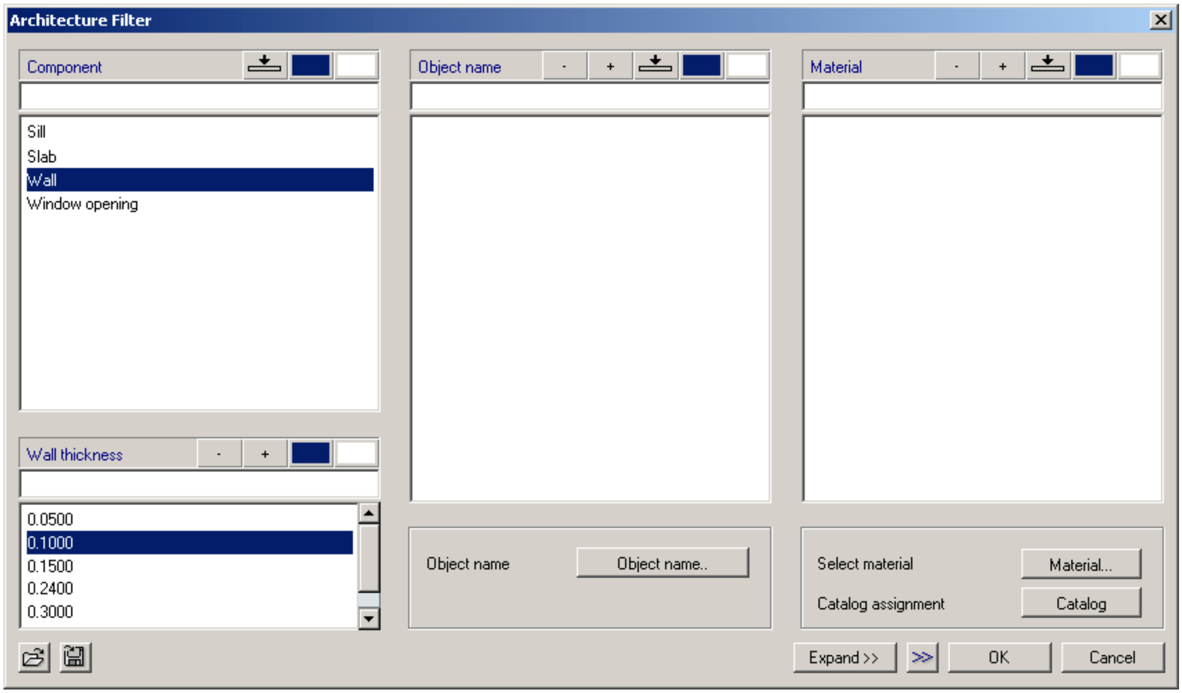
To selectively delete design elements

➲ You should still be in the **Architecture** module.
Use **Select, Set Layers** to select the layer **DE_GEN02** (stair outline).

1 Click **Delete** (**Edit** flyout).

2 In the **Filter Assistant**, click **Filter archit. elements based on element type.**

3 Only the elements that are actually available in the drawing file are presented for selection in the **Architecture Filter.**
Select **Wall** and thickness **0.100.**
If the thickness value is not displayed in the list, just enter it as a value in the dialog line.

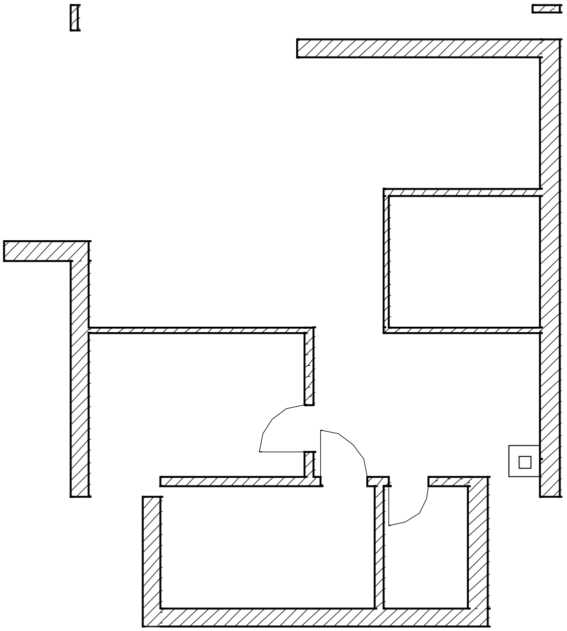


4 Enclose the entire design in a rectangular selection window. The elements selected for filtering are immediately deleted.

5 Use the **Window opening** filter to delete all the windows.

6 Now delete the round columns, the curved wall, the vertical section of wall at the top, the short vertical wall sections at the bottom and some of the doors.

Now your plan should look like this:



7 Press ESC to finish deleting and to quit the ✕ **Delete** tool.

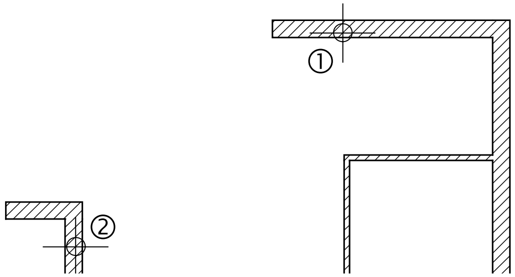
Walls that are not parallel can be joined using the **Join Walls** tool. We will use this tool now to close the open corners.

Tip: You cannot join curved walls with other walls.

To join walls

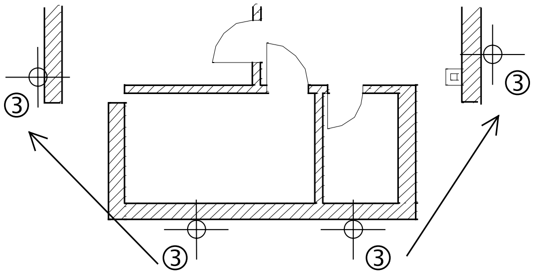
1 Using the right mouse button, click the horizontal wall at the top and on the shortcut menu, click **Join Walls**.

2 Click the exterior wall on the left.



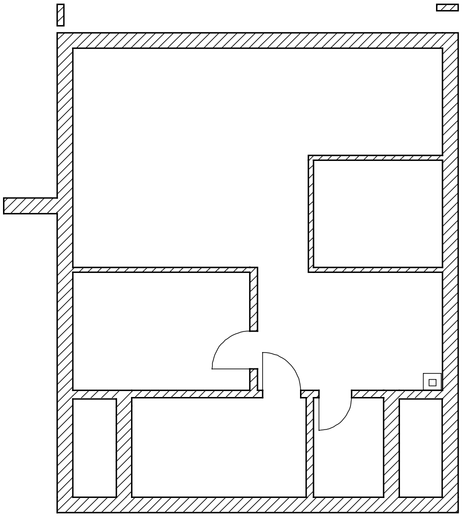
Tip: To enter the width of a joint, enter the width at the keyboard when the system prompts you.

3 Click the exterior wall at the bottom and join it with the left exterior wall; click it again and join it with the exterior wall on the right.



4 Now join the interior walls at the bottom with the exterior walls. Do not forget to join the old exterior wall at bottom left with the interior wall you have just lengthened.

Now your floor plan should look like this:



5 Press ESC to quit the tool or click with the right mouse button when the cursor is positioned over a toolbar.

6 Extensive modifications of this kind might lead to small errors or inaccuracies. Thus, it is a good idea to recalculate the architectural elements:

- Click **Restore 3D View** (**Modify** flyout). This tool is provided in almost all the modules in the Architecture family.
- On the Dynamic toolbar, click **All**.

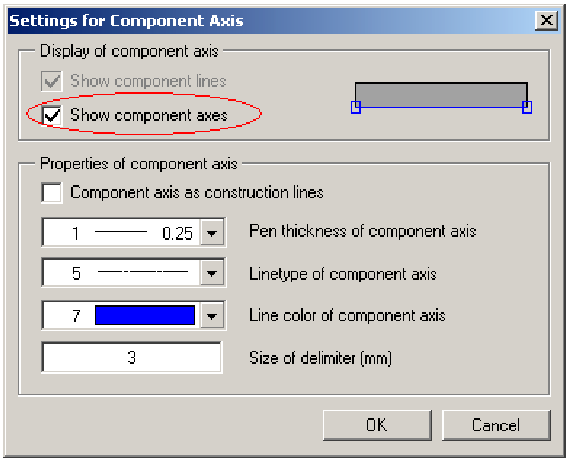
The architectural elements are recalculated. This process may take some time.

Some of the walls are now no longer exterior walls - they have become interior walls. To change the thickness of these walls, we will use the **Apply Archit. Component Properties** tool.

When creating these walls, you defined them with an offset direction towards the interior. The wall axis is on the exterior side. As the side with the axis does not change, the new thickness would be applied towards the interior again. Thus, we will start by moving the axes of these walls to the opposite side (interior side).

Tip: More information on the component axis is provided in Allplan's online Help. See the section entitled "Component Axis".

For a better overview, you can display the component axes in plan: Open the **Architecture Options**, select the **Display** tab, click the **Axis ...** button and enable the **Show component axes** check box.



Settings for Component Axis

Display of component axis

☑ Show component lines

☑ Show component axes

Properties of component axis

☐ Component axis as construction lines

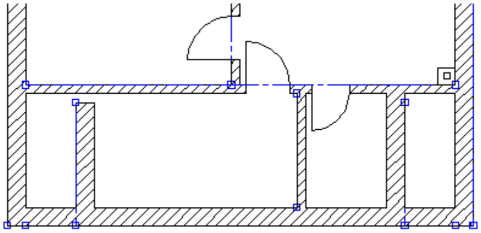
1 0.25 Pen thickness of component axis

5 Linetype of component axis

7 Line color of component axis

3 Size of delimiter (mm)

Now the walls are displayed as follows:

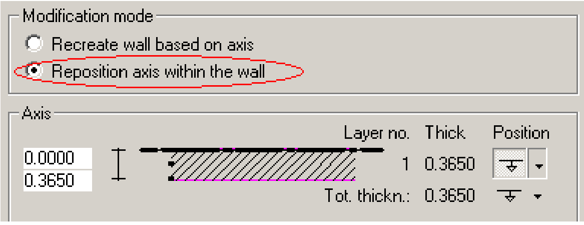


To modify the thickness of walls

1 Click the old exterior wall on the left with the right mouse button and select **Properties** on the shortcut menu.

2 Enable the **Reposition axis within the wall** option and use the mouse to drag the component axis to the opposite side of the wall in the preview area. Press **OK** to confirm.

The result looks like this:



Modification mode

○ Recreate wall based on axis

● Reposition axis within the wall

Axis

	Layer no.	Thick
0.0000		
0.3650	1	0.3650
	Tot. thickn.:	0.3650

3 Repeat steps 1 and 2 for the old exterior wall on the right.

4 Click **Apply Archit. Component Properties** (**Architectural Components** flyout).

Tip: You can also use **Modify Offset** to change the thickness of walls.

5 The old exterior walls are to become interior walls with a thickness of **0.175**.

Click the donor element

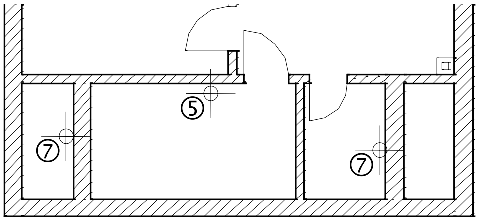
To copy the parameters, just click one of the two walls you want to modify.

The **Wall** dialog box opens and the parameters of the wall you clicked are displayed. Change the thickness to **0.175**.

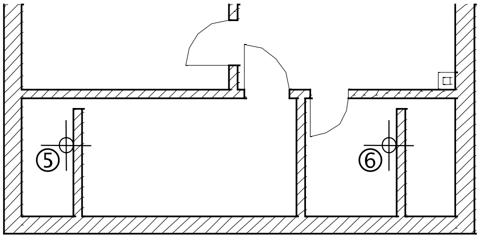
Note: Check that the **Recreate wall based on axis** option is enabled in the **Modification mode** area.

6 Press **OK** to confirm the dialog box.

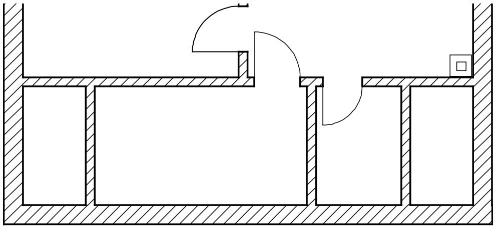
7 Click the two old vertical exterior walls at the bottom and confirm your selection with the right mouse button.



The new thickness is applied to the walls. If required, join the walls with the other interior walls again.



The result should look like this:



To move the walls, we can use the **Stretch Entities** tool. This will move the walls together with any doors and windows that have been inserted without corrupting wall junctions.

To move walls

Tip: When you use **Stretch Entities** to move walls, we recommend that you do not work with the crosshairs. Always enter exact values in the dialog line.

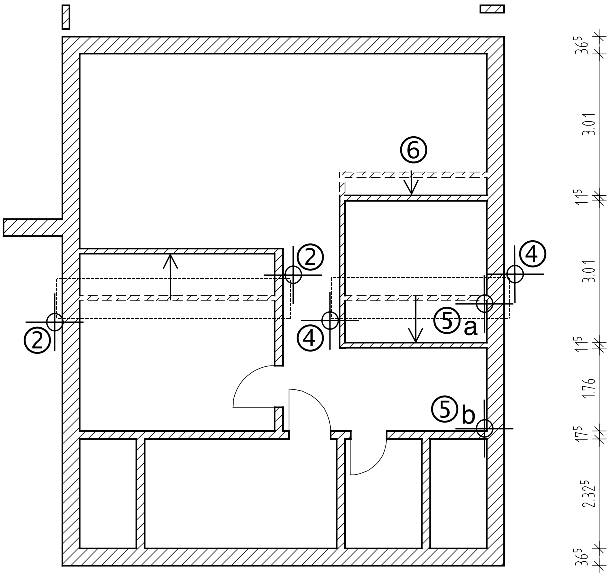
1 Click **Stretch Entities** (**Edit** flyout).

2 Enclose the left interior wall in a rectangular selection window.

3 Enter the following values when prompted in the dialog line:
dX = **0** dY = **1.0** dZ = **0**

4 Select the interior wall at bottom right.

5 Use the following approach to define the new position of the wall:
   - a) *From point*: click the wall junctions
   - b) *To point*: point to interior wall corner at the bottom the data entry boxes are highlighted in yellow
   - c) enter **Y Coordinate** = **1.76** in the dialog line
   - d) Press ENTER to confirm



6 Move the interior wall at top right.

You can use the **Delete Wall Sections** tool to delete entire wall sections. Two smaller, discrete walls are created based on the wall.

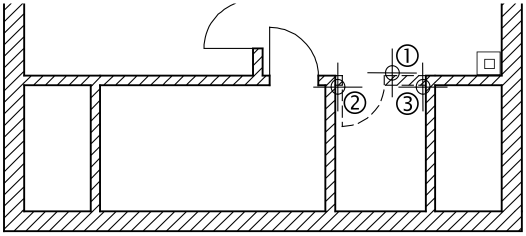
To delete a wall section

1 Using the right mouse button, click the wall in which you want to delete a section. On the shortcut menu that appears, click **Delete Wall Sections.**

Tip: If the point you click on the opening is not a significant (defined) point, a small square will appear to indicate the nearest significant point together with the distance between the square and the point you clicked (represented by an arrow).

2 Click the first side of the opening - the corner of the wall.

3 Click the second side of the opening (= the other corner).



Walls can also be joined with lines in the same manner as the **Join Walls** tool. The main difference occurs when joining walls that have multiple construction layers. If only one layer in the wall is to be joined, use **Join Walls** - this tool will allow you to select the layer in question separately from the others. Using **Join Wall with Line**, however, it is only possible to select the entire wall.

The exterior wall on the left and right need to be modified so that they stretch as far the columns over which the balcony will later be constructed.
You will find it helpful now if you display the grid you drew earlier.

To join walls with lines

Tip: The **Join Wall with Line** tool is also located on the shortcut menu.

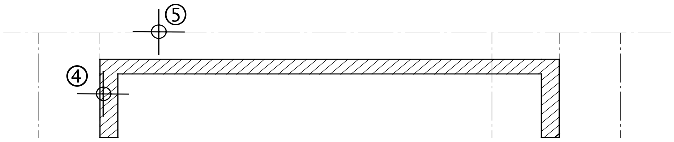
1 Open drawing file **1** in the background and make the layer **DE_GRID** visible.

2 **Delete** (**Edit** flyout) the rectangular columns.

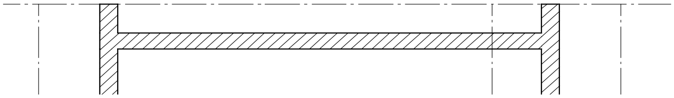
3 Click **Join Wall with Line** (**Architectural Components** flyout).

4 Click the exterior wall on the left.

5 Click the gridline through to which the wall is to extend.



6 Using the same approach, lengthen the exterior wall on the right.



7 Close drawing file **1**.

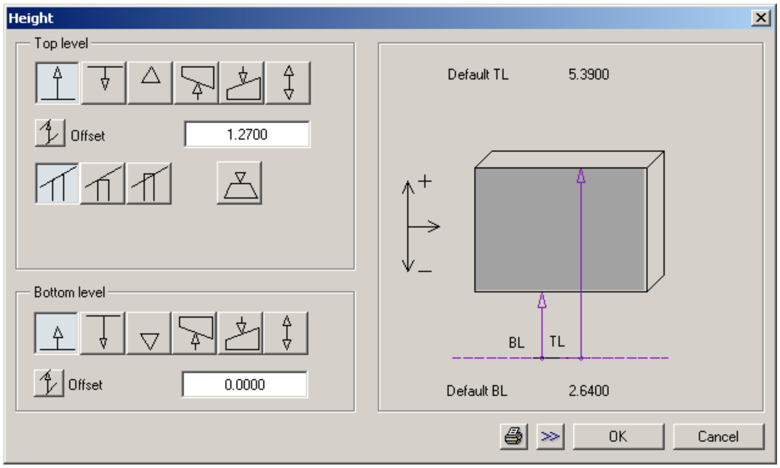
The modifications you have made so far have involved alterations in the xy plane. In the following exercise we will change the height of part of the wall on the left, at the end of the balcony. It needs to be 1.27 m high.

To change the height settings of a wall

1 Click 3 **Viewports** (**Window** menu) so that you can better observe the changes as they happen.

2 Using the right mouse button, click the section of wall on the outer left and on the shortcut menu, click **Properties**.
The **Wall** dialog box is displayed and contains the parameters settings of the wall you clicked.

3 Click **Setup** and change the settings for the wall's top level as shown. Leave the bottom level as it is.



Top level

Offset 1.2700

Bottom level

Offset 0.0000

Default TL 5.3900

Default BL 2.6400

4 Press **OK** to confirm the settings in the dialog boxes.

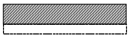
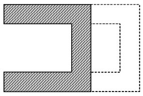
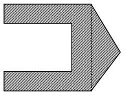
Tip: You can also double click a component to view its properties.

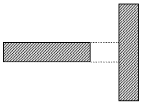
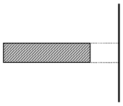
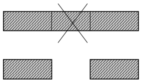
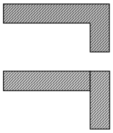
Notice how the height of the wall changes in the isometric and elevation views.

Summary of modification functions

You should now be aware of the main modification tools. It's up to you to decide whether it's quicker to employ one of these tools or whether it's more efficient drawing new elements from scratch. Don't forget the other, more general tools which you can use to copy, mirror etc.

Tip:
Modify Offset, **Stretch Entities** and **Fold Line** – these tools are used in exactly the same way with 2D designs.

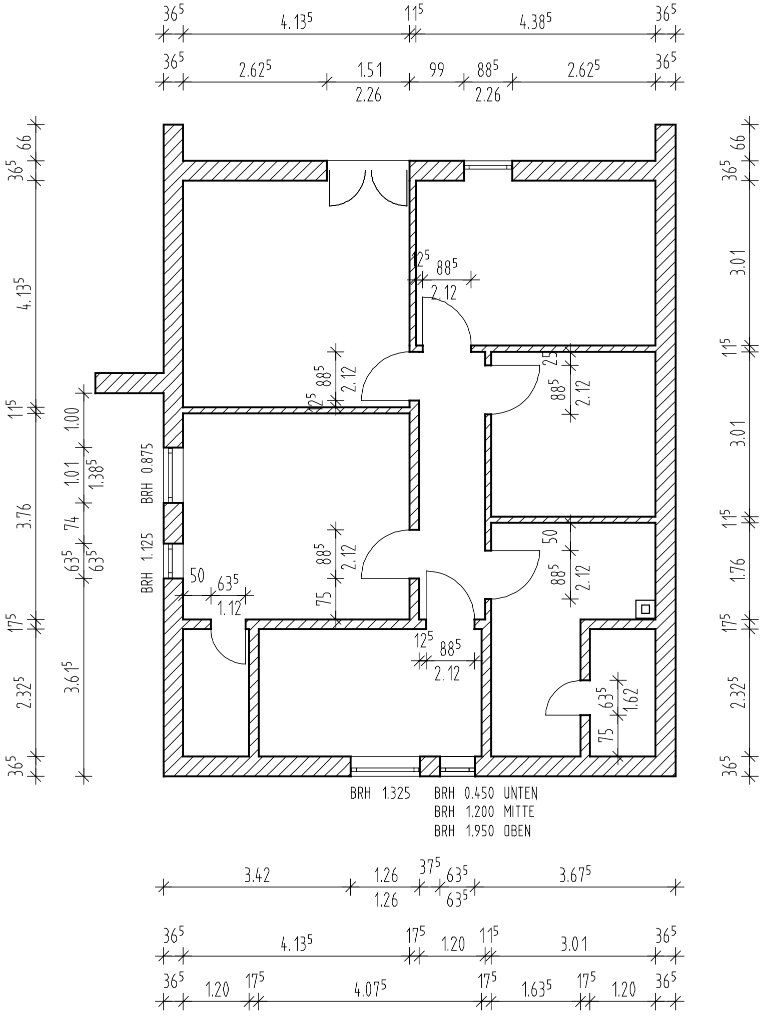
To do this	Use this	Method
Modifying parameters		
Modifying architectural elements of the same type (analogous to creation method), Repositioning component axis within the element **Apply Archit. Component Properties**		
Modifying individual architectural elements (analogous to creation method) **Shortcut menu → Properties**		
Modifying architectural elements of different types (including height settings) **Change Archit. Properties**		
Modifying the geometry		
Modifying the thickness of walls **Modify Offset**		
Lengthening, shortening, moving walls; changing the width of openings **Stretch Entities**		
Folding the edge of walls, fitting the end of a wall **Fold Line**		

To do this	Use this	Method
Joining walls with walls **Join Walls**		
Joining walls with lines The difference between this and joining walls with walls is relevant in the case of walls with multiple construction layers. **Join Wall with Line**		
Deleting wall sections (the wall is divided into two sections) **Delete Wall Sections**		
Showing/hiding wall junction lines Each wall is delimited by a boundary line even when it appears to seamlessly ‘flow’ into the next wall. This tool only affects the appearance of the walls and does not affect the elements themselves. **Show/Hide Junctions**		

If you have configured the system to display the component axis, the following tools may lead to different results:
Modify Offset,
Stretch Entities and
Fold Line.
More information is provided in Allplan’s online Help. See the section entitled “Component Axis”.

Now it's your turn. Finish modifying the first floor and add the missing doors and windows.
When you have finished, the roof should look like this:

Tip: For the door onto the balcony, you can use the smart symbol called Double Exterior Doors in the Basic Symbols catalog provided by Nemetschek.



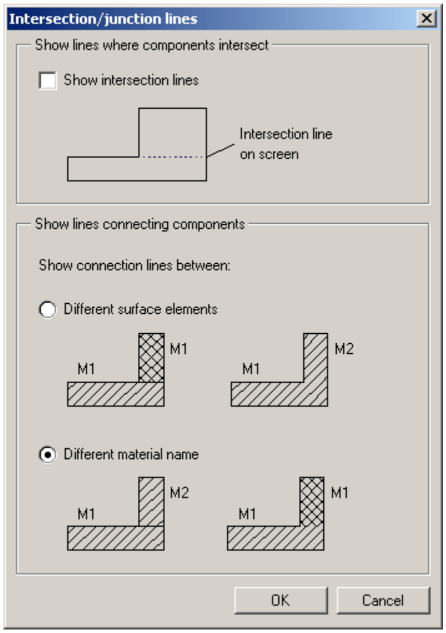
In this exercise we will be employing the following tools with which you are already familiar - Wall (straight and curved) and Delete Wall Sections. The parapet is 1.17 m high, the upstand is 25 cm high and 8 cm from the edge of the slab.

To draw the balcony parapet

1 Click **Options** (**Standard** toolbar) and in the dialog box that appears, click **Architecture**.

2 In the **Display** tab, click the **Lines...** button and select the option **Show connection lines between: • Different material names**

3 Press **OK** to confirm the dialog boxes.



Intersection/junction lines

Show lines where components intersect

☐ Show intersection lines

Show lines connecting components

Show connection lines between:

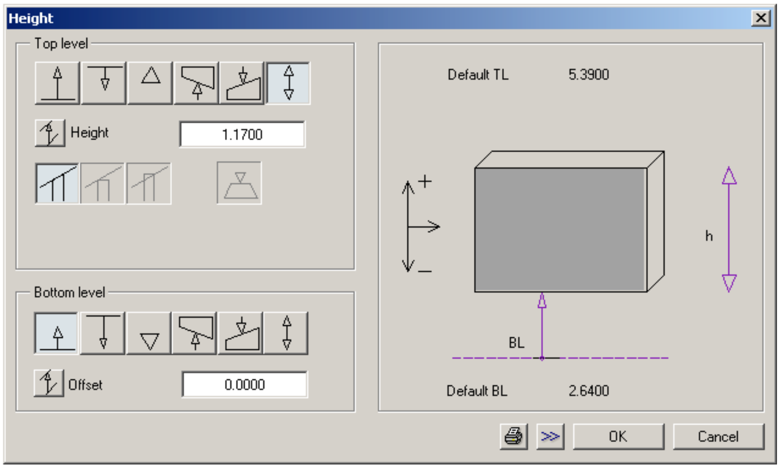
○ Different surface elements

● Different material name

4 Double click a wall with the right mouse button.

This will automatically activate the **Wall** tool

5 Change the **Properties**,
in the **Display of areas** tab:
Hatching: off
in the **Parameters, Attributes** tab:
Material: MZ
Thickness: **0.15**
Priority: **150**
Height: as shown:



Height

Top level

Height 1.1700

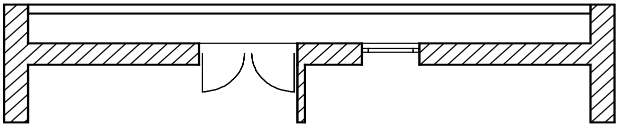
Bottom level

Offset 0.0000

Default TL 5.3900

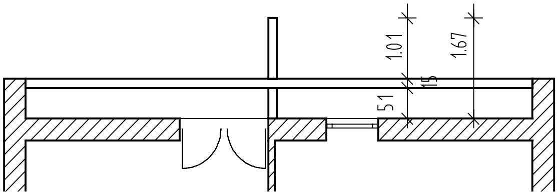
Default BL 2.6400

6 Draw the parapet.
Check the wall's offset direction and, if necessary, change it using **Rotate about axis.**
The **Wall** tool remains active!

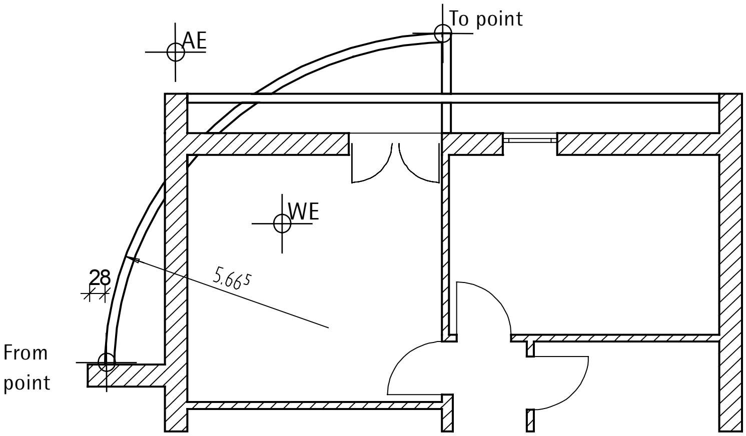


7 Modify the **Properties** again,
in the **Parameters, Attributes** tab:
Material: **B15**
Priority: **100**
Height: **Absolute component height: 0.25**
BL relative to the lower plane: 0.00

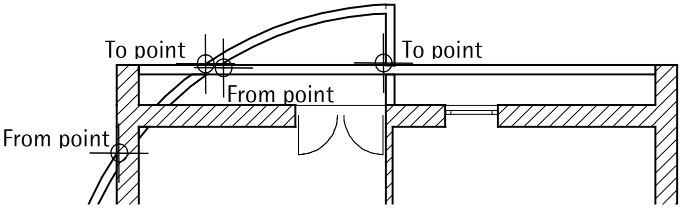
8 Draw a straight wall. You can draw the wall in one go. Due to its lower priority rating, a ‘hole’ is automatically cut out of it where it intersects the parapet wall.



9 Press ESC to finish the straight wall. Now draw a curved wall that follows the path of the wall in the ground floor.

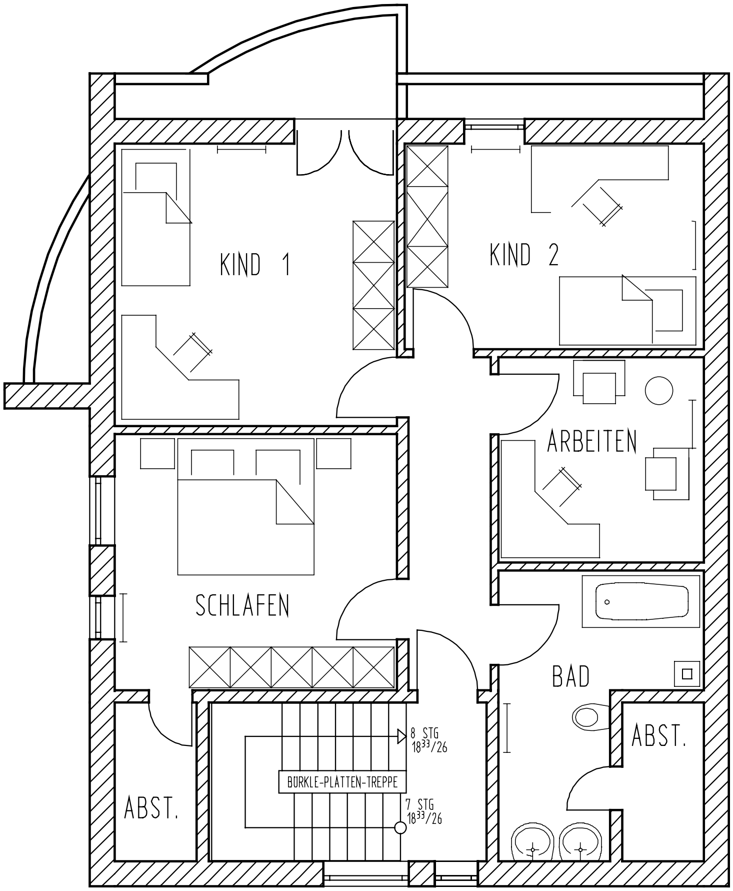


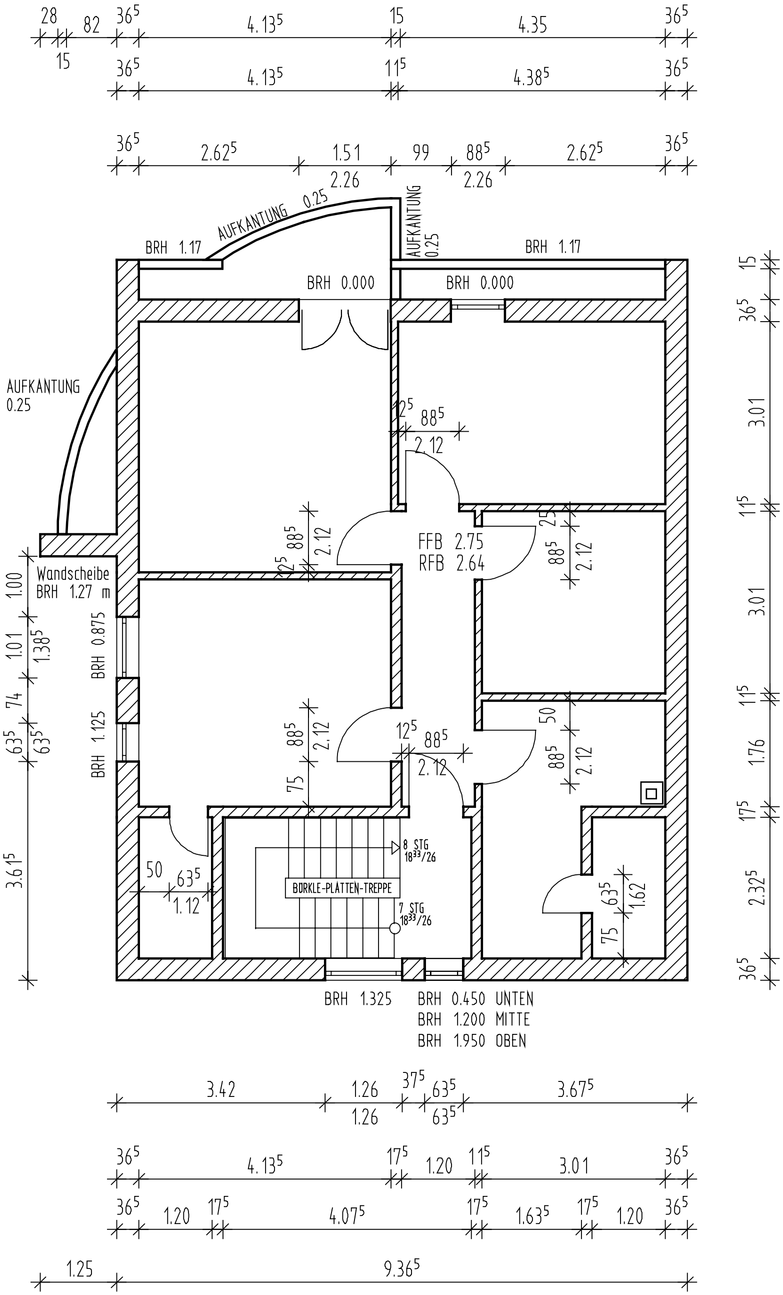
10 Use **Delete Wall Sections** (**Architectural Components** flyout) to delete the redundant wall sections.



11 Press ESC to quit the tool.

Make sure you use the appropriate layers when completing the dimensioning, labels and furnishings.
When you have finished, the plan of the first floor should look something like this:




AUFKANTUNG 0.25
AUFKANTUNG 0.25
AUFKANTUNG 0.25
BRH 1.17
BRH 1.17
BRH 0.000
BRH 0.000
Wandscheibe
BRH 1.27 m
BRH 0.875
BRH 1.125
FFB 2.75
RFB 2.64
8 STG
$18^{33}/26$
7 STG
$18^{33}/26$
BÖRKLE-PLATTEN-TREPPE
BRH 1.325
BRH 0.450 UNTEN
BRH 1.200 MITTE
BRH 1.950 OBEN
1.25
9.36⁵
7.00
4.53⁵
4.13⁵
3.76
3.61⁵
3.01
3.01
2.32⁵
1.76
3.42
1.26
3.67⁵
4.07⁵
1.63⁵
4.35
4.38⁵
2.62⁵
2.26
2.12
88⁵

Exercise 5: Basement

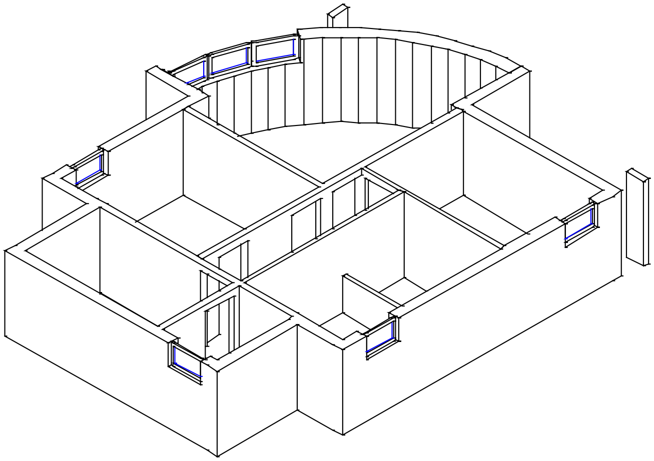
Now's a good time for you to start trying things out on your own.

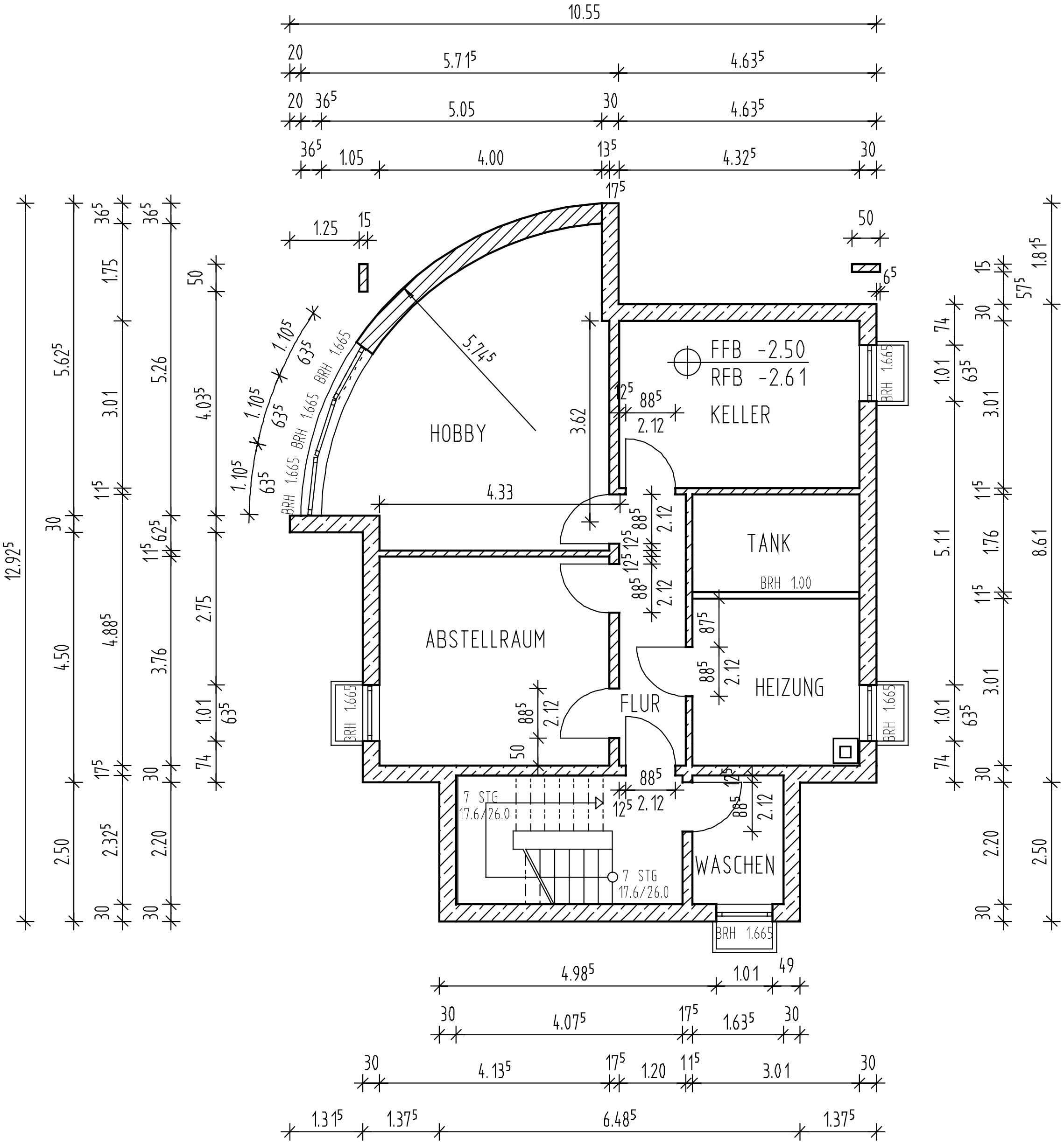
Select drawing file **101, Basement model** and open drawing file **111, Ground floor model** in reference mode.

To set the height in the basement, change the values for the upper and lower default reference planes in drawing file **101** as follows:
Default lower plane: **-2.61** (= height of unfinished floor in the basement)
Default upper plane: **-0.11**(= height of unfinished floor in ground floor).

Instead of modifying the walls, we recommend that you draw the exterior walls from scratch. That's quicker! Use **Copy/Move Elements between Files** to copy the necessary components (curved wall, columns, chimney, stair outline and some of the interior walls) from drawing file **111, Ground floor model** to drawing file **101, Basement model**.

You can use **Restore 3D View** to adjust the components you have just copied to the new height of the reference planes. Now you can make the required modifications.




10.55
HOBBY
KELLER
FFB -2.50
RFB -2.61
TANK
BRH 1.00
HEIZUNG
ABSTELLRAUM
FLUR
WASCHEN
7 STG
17.6/26.0
BRH 1.665
5.74⁵
4.33
3.62
12.92⁵
8.61

Unit 5: Reference Planes

➲ The exercises in this unit require the **Architecture** and **Roof Modeler** modules. Check in **CAD Navigator** to see whether you have licensed these modules.
If you have not licensed the **Roof Modeler** module, you can use the **Roof Frame** tool (**Create** flyout) in the **Architecture** module instead.

Reference planes are applied as a means of facilitating work in 3D space without the need for tedious and time-consuming calculation. Reference planes always come in pairs - an upper and a lower plane. The general approach is as follows

- Define the location of the pair of planes in space;
- Define the height of architectural elements (walls, columns, window openings, niches....) relative to the planes – in other words, attach the top and bottom level of an element to the upper or lower reference plane at an offset of your choice.

This may appear complex at first – however, experience has shown that this is a simple, accurate and elegant approach (especially if you are designing multi-storey buildings!).

Reference planes afford great flexibility. There are two types of reference planes:

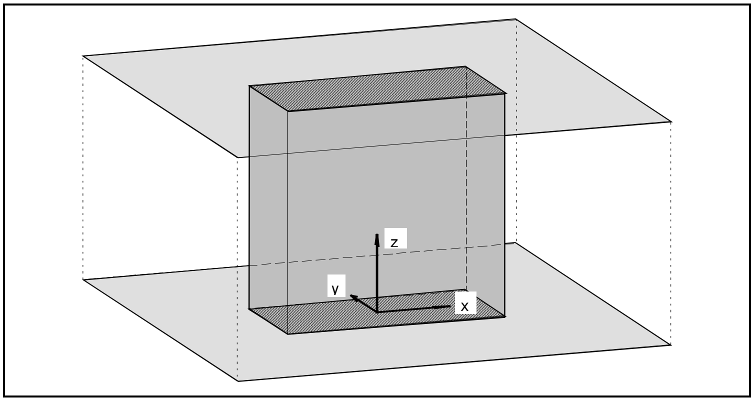
- **Default reference planes** - horizontal and parallel to each other. They apply to the entire drawing file;
- **Custom reference planes** – not necessarily horizontal, these only apply to the area you define by entering the outline of the planes.

Using Planes

Default reference planes

You have already used the default reference planes in some of the exercises earlier in this workbook. The section that follows explains the concept of the default reference planes in more detail.

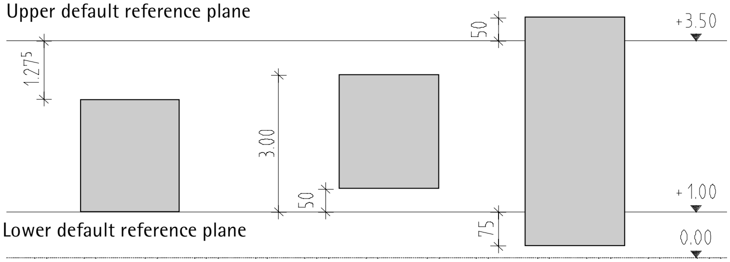
Imagine two horizontal planes in three-dimensional space, parallel to each other and at different elevations. When you position an architectural element (a wall, say) between the two planes, the program ”stretches” the wall so that its top and bottom levels are flush with the upper and lower planes respectively. Every drawing file has an imaginary pair of planes (these are called the default reference planes). Default reference planes are invisible and stretch to infinity.



The default reference planes can be set to different heights in different drawing files. By attaching an element’s top and bottom levels with these planes, you ensure that any changes you make to the height of the planes also apply to the elements. The offset distance between architectural elements and the upper and lower reference planes is user-definable.

You can enter an offset between the top level (TL) and/or bottom level (BL) of the architectural elements to the upper and/or lower reference planes. You can also specify whether the offset is a constant value.

Example: **Default upper plane** set to **3.50** and **default lower plane** set to **1.00**.



TL relative to upper plane,
offset **–1.275** m
BL relative to lower plane,
offset **0.00** m

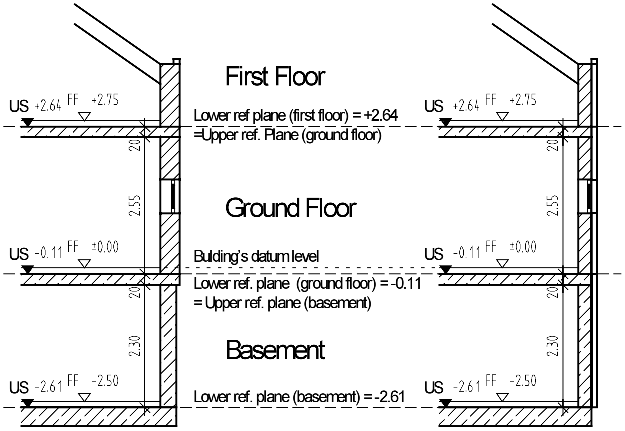
TL relative to lower plane,
offset **3.00** m
BL relative to lower plane,
offset **0.50** m

TL relative to upper plane,
offset **0.5** m
BL relative to lower plane,
offset **–0.75** m

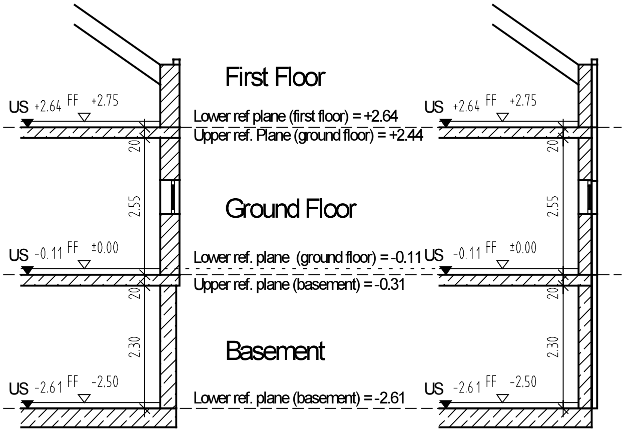
Changing the elevation of the default reference planes in a drawing file affects all the elements associated with them.

There is no rule as to how the reference planes need to be placed. However, as a rule of thumb, you might consider setting them up as follows:

- Default reference planes attached to the top level of the floor slab (unfinished) in the storey above
  (this is the setting used in this workbook)


First Floor
US +2.64 FF +2.75
Lower ref plane (first floor) = +2.64
=Upper ref. Plane (ground floor)
US +2.64 FF +2.75
20
2.55
Ground Floor
US -0.11 FF ±0.00
Bulding's datum level
Lower ref. plane (ground floor) = -0.11
= Upper ref. plane (basement)
US -0.11 FF ±0.00
20
2.30
Basement
US -2.61 FF -2.50
Lower ref. plane (basement) = -2.61
US -2.61 FF -2.50

- Lower default reference plane = top of floor slab (unfinished)
  Upper reference plane = bottom of floor slab (unfinished)


First Floor
US +2.64 FF +2.75
Lower ref plane (first floor) = +2.64
Upper ref. Plane (ground floor) = +2.44
US +2.64 FF +2.75
20
2.55
Ground Floor
US -0.11 FF ±0.00
Lower ref. plane (ground floor) = -0.11
Upper ref. plane (basement) = -0.31
US -0.11 FF ±0.00
20
2.30
Basement
US -2.61 FF -2.50
Lower ref. plane (basement) = -2.61
US -2.61 FF -2.50

- Lower default reference plane = top of finished floor
  Upper reference plane = bottom of suspended ceiling
  (e.g., for interior architects)

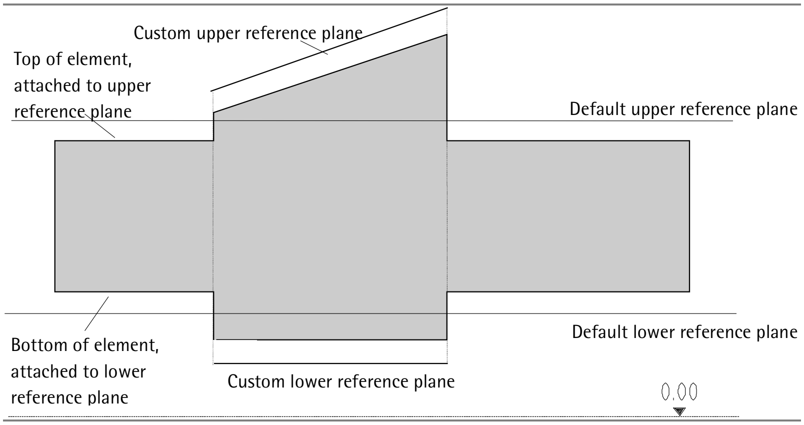
Custom reference planes

Default reference planes do not afford the possibility of accounting for height differences within a component - sloping walls, for example. In this case, custom reference planes are used.

These reference planes come in pairs, too. However, they do not stretch to infinity. They have a boundary. You can define the outline of the planes in plan - any shape you wish. These planes (there are always two) can be inclined at any angle and any height that you assign to them.

Tip: Elements can also be associated with reference planes that do not necessarily envelop the element.

You can define as many custom pairs of reference planes as you like in a drawing file and these take precedence over the default pair. All the components attached with reference planes update to meet the envelope defined by the reference planes between which they are located. If no custom reference plane has been defined, then the elements *default* to the default reference planes.

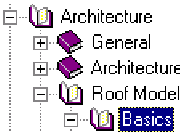

Custom upper reference plane
Top of element, attached to upper reference plane
Default upper reference plane
Default lower reference plane
Bottom of element, attached to lower reference plane
Custom lower reference plane
0.00

When you design a roof frame, you are in effect creating a whole series of custom pairs of reference planes in a simple and elegant manner - we will see how this is done in the next exercise.

The **Custom Planes** and **Modify Planes** tools can be combined, providing enormous design flexibility. Presenting these tools is beyond the scope of this workbook – however, by experimenting a little, you will quickly master what these tools are capable of.

Exercise 6: Roof

Tip: See the section entitled "Roof Modeler Module – Basics" in the online Help:



- Architecture
  - General
  - Architecture Module
  - Roof Modeler Module
    - Basics

The **Roof Modeler** module contains tools that you can use to create custom planes in a comfortable manner.
A roof frame is comprised of several pairs of reference planes: each slope in the roof represents one pair of reference planes. The upper plane lends a shape to the roof while the lower plane in the pair remains horizontal. This way, you can easily construct flank walls between the planes. If the walls are already plane-associated (as in this example), then they will adjust automatically to the reference planes in the roof frame.

A roof can consist of several roof frames. In plan, you only have to draw the outline of each new roof plane you want to add. The outline may overlap or be fully bounded by the outline of existing roof planes. The program will automatically calculate the roof’s eccentricity and the points where the roof planes intersect.

Roof design

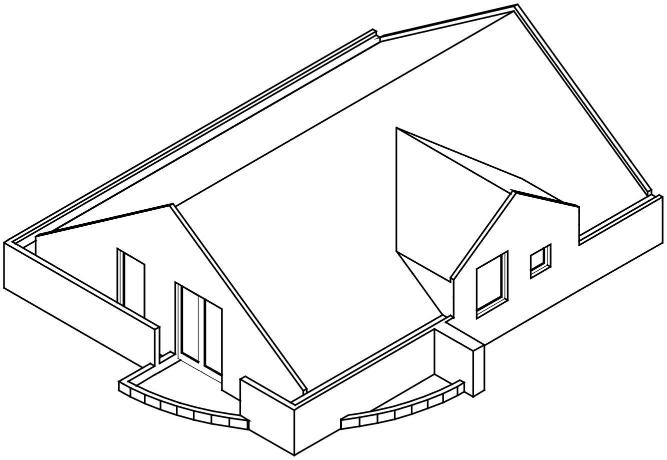
1. Enter the outline and values for the top and bottom of the roof. The program will initially create a cube-like frame.
2. Apply slopes to the frame and make settings for the height. To set the height:

   – enter the absolute height of the eaves or
   – set a point through which the slope is to pass.

   This defines the shape of the roof.
3. Use the **Roof Covering** or **Slab** tool to apply a roof covering.

Roof planes

In the sample building here, you need to add a roof with a dormer. The main roof and the dormer pitch is 35°. The flank of the roof joins with the flank walls at the sides of the building. The roof slopes extend to the inside edge of the exterior walls, to create a hidden eaves gutter. The position of the roof slopes will be defined by the height for the line of the eaves.



First floor with roof, rear left isometric view

To create the main roof

- ➲ Make drawing file **123 Roof** active and set **121** to edit mode.
- ➲ Make only the layers **AR_WALL**, **AR_ROOF** and **AR_CHIMN** visible.
- ➲ In the **CAD Navigator** select the **Roof Modeler** module.

1 Click **Roof Frame** (**Roofs and Planes** flyout) and activate the layer **AR_ROOF**.

2 Click **Gable/Hip Roof.**

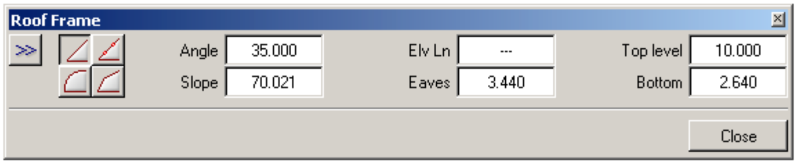
3 Click **Angle** and enter: **35.**

The bottom of the roof frame is to be flush with the lower default reference plane in the first floor (= unfinished floor in the first floor - in this example, the same as the ground floor's upper default reference plane).

4 Click **Bottom** and enter: **2.64**.

5 Click **Top level** and enter **10** as the top level of the roof frame needs to be above the future ridge.

6 Click **Eaves** and enter the height of the eaves: **3.44**.



Roof Frame

Angle 35.000

Slope 70.021

Elv Ln ---

Eaves 3.440

Top level 10.000

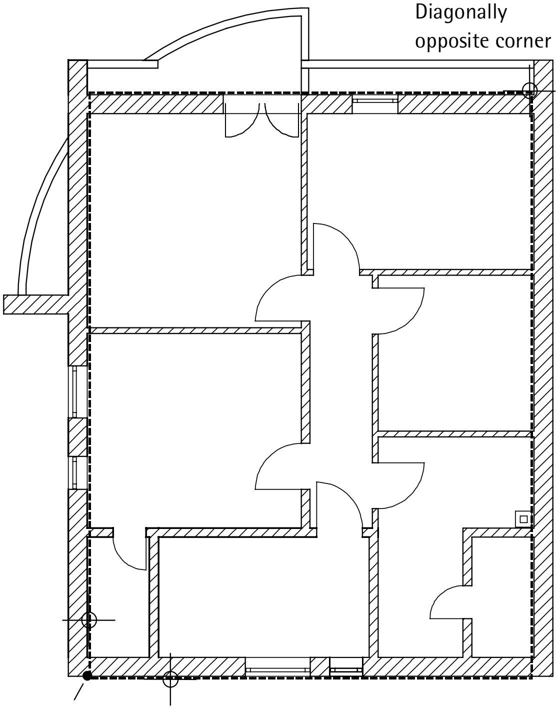
Bottom 2.640

Tip: When you enter the outline of a roof, you can define an offset as you would when enclosing entities in a parallel offset polyline.
The standard polyline entry tools are also available here.

Now enter the outline of the roof as a rectangle in plan:

7 Click with the right mouse button in the empty workspace (do not click an element!), select **Point of Intersection** on the shortcut menu and define the first corner.

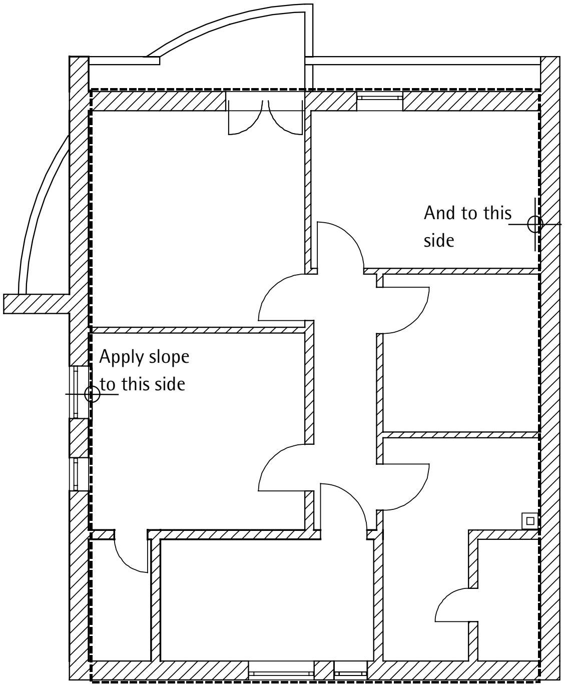
8 Click a diagonally opposite point and then press ESC.
This defines a rectangle.



9 Press ESC to finish entering the line for the eaves.

10 Click ◫ **3 Viewports.**
The roof frame at this stage is still a simple cube.

11 In plan view, click the edges of the roof to indicate where the slopes are to be applied.
Observe the changes as they happen in the isometric view.



12 To finish defining the roof, press ESC or click with the right mouse button when the cursor is positioned over a toolbar.

You can now create the dormer using two more pairs of custom reference planes.

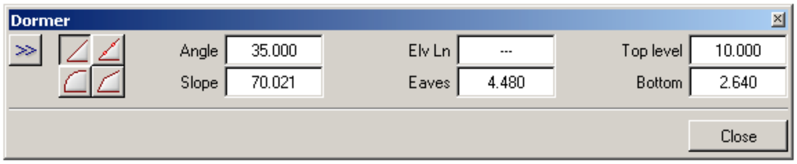
To define the position of the slopes, we will use the height of the eaves. The dormer’s eaves are 4.48 m high and consequently higher than the eaves of the main roof.

To create a dormer

1 Click **Dormer** (**Create** flyout).

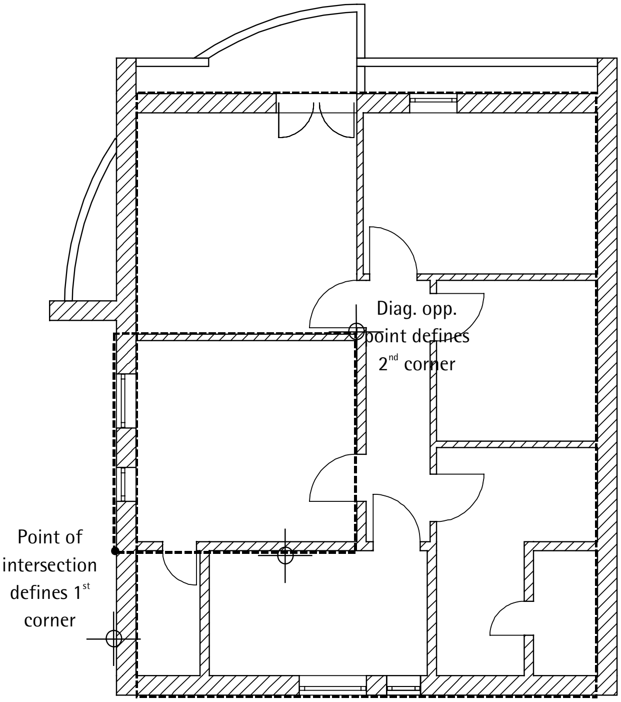
2 Click an edge of the main roof.

3 Check the roof parameters and change the height of the **Eaves: 4.48**



Angle 35.000
Slope 70.021
Elv Ln ---
Eaves 4.480
Top level 10.000
Bottom 2.640

4 Define the outline of the dormer in plan by clicking diagonally opposite points. Use **Point of Intersection** (**Point Assistant**, shortcut menu) to help you. The outline must define the start point and the width of the dormer exactly. The length towards the middle of the building should be sufficient for the intersection of the roof planes.


Diag. opp. point defines 2nd corner
Point of intersection defines 1st corner

Tip: As an alternative to pressing ESC you can also quit by clicking the right mouse button when the cursor is positioned over a toolbar.

5 Press ESC to finish entering. The outline of the dormer is defined.

6 Click the dormer on both sides.
This will form the slopes.

7 Press ESC to quit the tool.

Modifying roof planes

Roof planes can easily be modified. The relevant parameters are located on the Context toolbar.

In this exercise we will draw a 1-m elevation line. This will be a useful aid later on.

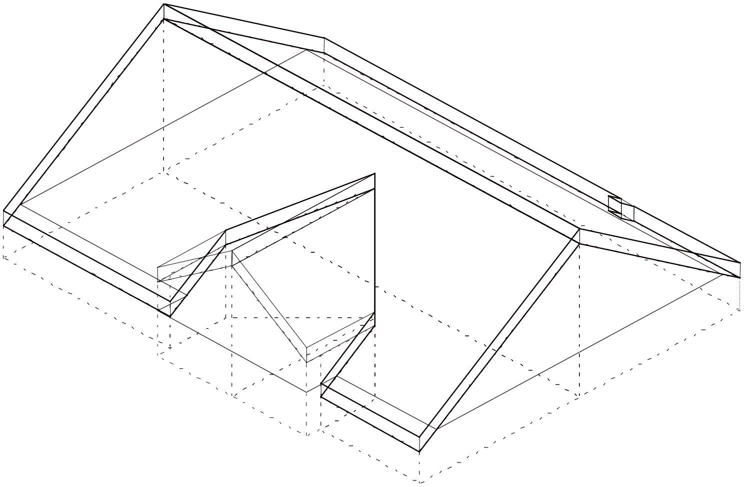
To draw an elevation line

➲ You should still be in the **Roof Modeler** module.

1. Click **Modify Roof Frame** (**Modify** or **Roofs and Planes** flyout).
2. Click the ridge of the roof.
3. Set the height of the elevation line **Elv Ln** to **3.75**
(1 m above finished floor in roof):
The elevation line is drawn in and displayed as a construction line.
4. Press ESC to quit the tool.

Roof covering

To apply the roof covering, use the Roof Covering tool. The bottom level of the roof covering will be set so that it is flush with the upper roof plane. The offset distance between the planes and the top of the roof covering will determine the thickness of the roof covering.



To create the roof covering

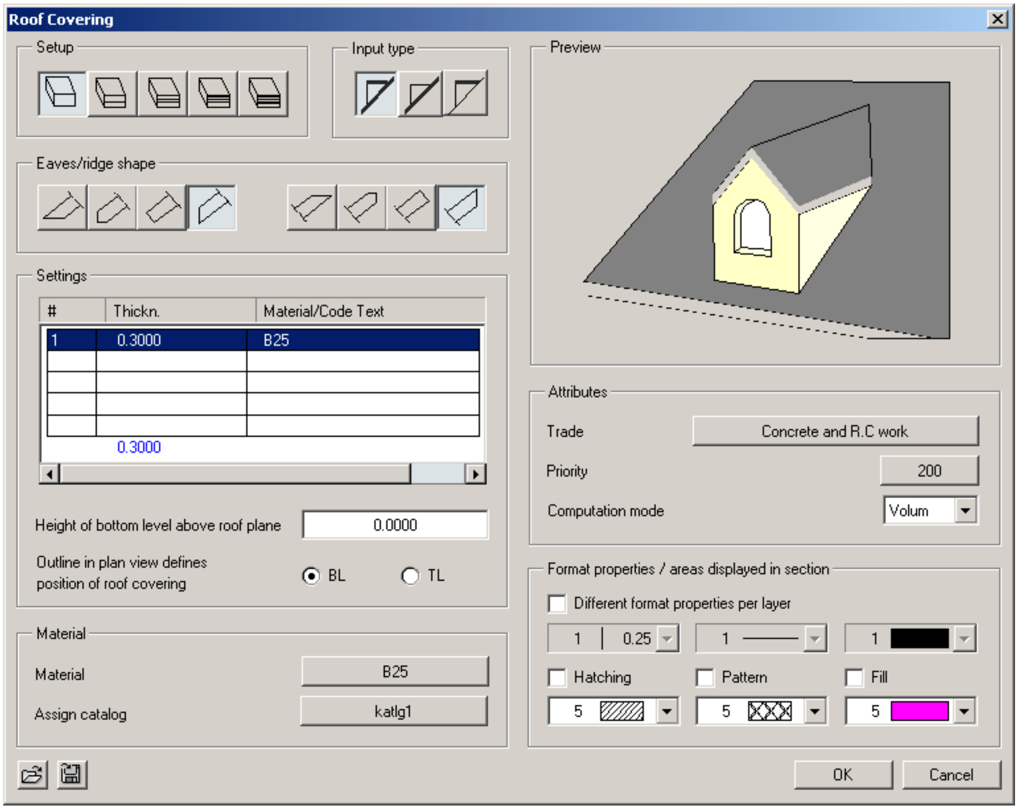
➲ Open drawing file **121** in reference mode.

1 Click **Roof Covering** (**Create** or **Roofs and Planes** flyout) and activate the layer **AR_ROOFC**.

2 Click **Properties**.

3 In **Height of bottom level above roof plane**, enter **0.0**.

4 In **Thickness**, enter **0.3**.



Roof Covering

Settings

#	Thickn.	Material/Code Text
1	0.3000	B25
	0.3000	

Height of bottom level above roof plane: 0.0000

Outline in plan view defines position of roof covering: ● BL ○ TL

Material

Material: B25

Assign catalog: katlg1

Attributes

Trade: Concrete and R.C work

Priority: 200

Computation mode: Volum

Format properties / areas displayed in section

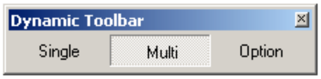
☐ Different format properties per layer

1 | 0.25 — 1 — 1

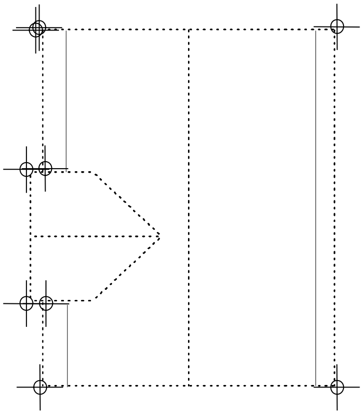
☐ Hatching 5 ☐ Pattern 5 ☐ Fill 5

5 Press **OK** to confirm.

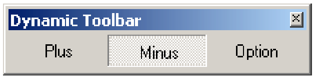
6 On the **Dynamic toolbar**, click **Multi**.



7 Now click the corners of the roof outline (the last point you click should coincide with the first).



8 On the **Dynamic toolbar**, click **Minus**.



9 Draw a ”minus” roof covering – i.e. cut out a section for the chimney.

10 Press ESC to quit the tool

11 Close drawing file **121**.

The **Multi** button on the **Dynamic toolbar** allows you to specify whether the area you enter is to be added (**Plus**) or subtracted (**Minus**).

You can use the **Option** button to control how the general polyline entry tools behave when you generate polylines based on existing elements.

Slab or roof covering?

In theory, both of these tools can be used to create a roof covering. The difference is:

- When a **Roof Covering** protrudes beyond the area of the roof planes, it retains its slope setting.
- The areas of a **Slab** that protrude beyond the roof planes automatically adapt to the default reference planes.
- The **Roof Covering** tool enables you to enter different shapes for eaves and ridge.
- With the **Roof Covering** tool, you ensure that the representation will be accurate when the masking plane tool is employed.
- With the **Slab** tool, the masking plane has the same effect as when it is applied to walls and columns.
- Openings in the **Roof Covering** are created using the **Skylight** tool. You can also insert smart window symbols in these openings.
- When you use the **Slab** tool, openings are created using the **Slab Recess, Opening** tool. Smart 3D symbols inserted in these openings do not adjust to custom planes or roof frames.

Joining walls with the roof

Before you join the end walls and interior walls with the roof, you need to copy the reference planes used for the roof frame to the drawing files. Custom reference planes (and consequently roof planes, too) have precedence over default reference planes. This means that plane-associated building elements in the drawing file will adapt to reflect the new constraints imposed by the revised envelope (defined by the custom reference planes).

To copy roof planes using a filter

➲ Only drawing file 123 should be open.

1 On the **File** menu, click **Copy/Move Elements between Files** and select **Copy to target drawing file.**

2 Enter the number of the destination drawing file: 121.

The destination drawing file already contains data.

3 *This one is already in use. Do you really want to copy/move?* Click **Yes.**

4 On the **Filter Assistant** toolbar, click **Filter archit. elements based on element type.**

5 Select **Plane** and press **OK** to confirm.

6 Select the entire floor plan using a selection rectangle. The roof planes are copied to the drawing file with the walls.

7 Press ESC to finish copying.

8 Make drawing file 121 current and close 123.

9 Click **3 Viewports.**

The walls on drawing file 121 are joined with the roof planes. The exterior walls on the side are not beneath the roof planes and are thus unaffected.

In elevation view, you will notice that the walls are not directly attached to the roof. Remember when we entered the walls in the ground floor? We attached the top of the walls to the upper reference plane but at an offset of -0.20. We can change this now. Moreover, the height of the eave walls and the chimney needs to be changed.

Tip: You can use the Match tool to copy settings from an existing component into the Context toolbar. The settings displayed on the Context toolbar will be applied to the selected elements.

Often, only one of the parameters needs to be changed. In this case, use Match just to get information on the element and disable the check boxes of all the parameters you do not require.

To join walls with the roof

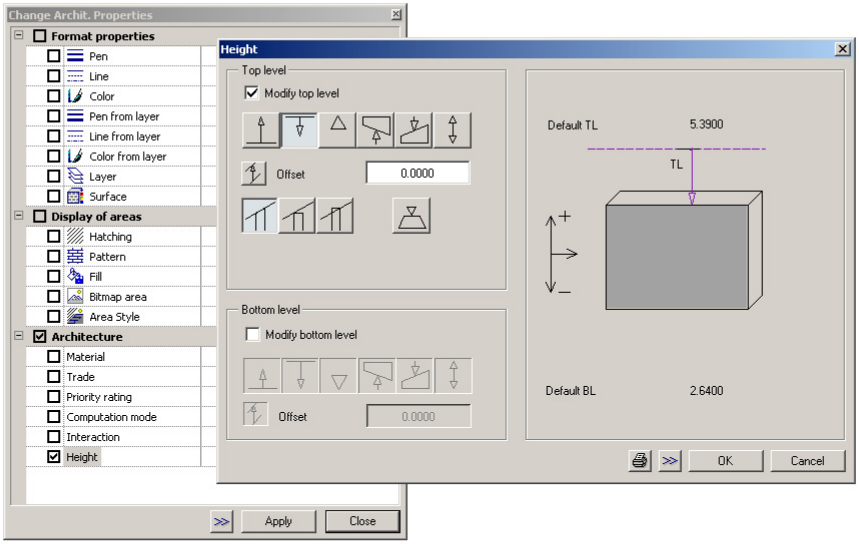
➲ Only drawing file 121 should be active.

1 Click **Change Archit. Properties** (**Modify** or **3D Modification** flyout).

2 Activate the check box bedside **Height**.

The **Height** dialog box opens.

3 Select **Modify top level** and **TL relative to upper plane** with offset **0.00** and press **OK** to confirm.
Leave the bottom level as it is.



Change Archit. Properties

☐ Format properties
☐ Pen
☐ Line
☐ Color
☐ Pen from layer
☐ Line from layer
☐ Color from layer
☐ Layer
☐ Surface
☐ Display of areas
☐ Hatching
☐ Pattern
☐ Fill
☐ Bitmap area
☐ Area Style
☑ Architecture
☐ Material
☐ Trade
☐ Priority rating
☐ Computation mode
☐ Interaction
☑ Height

Height

Top level
☑ Modify top level
Offset 0.0000

Bottom level
☐ Modify bottom level
Offset 0.0000

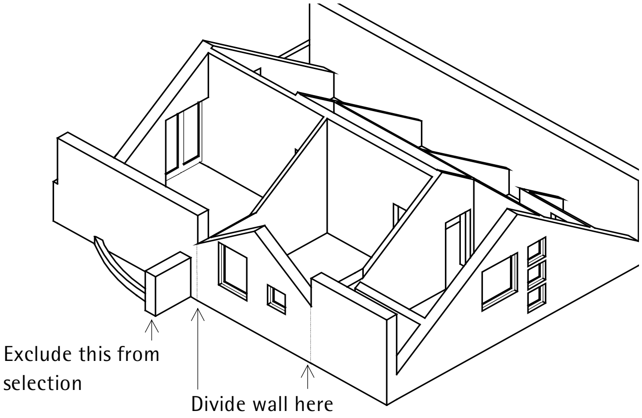
Default TL 5.3900
Default BL 2.6400

4 On the Filter Assistant toolbar click **Filter archit. elements based on element type** and select the entries **Wall** and thicknesses **0.115** / **0.175** / **0.365**.

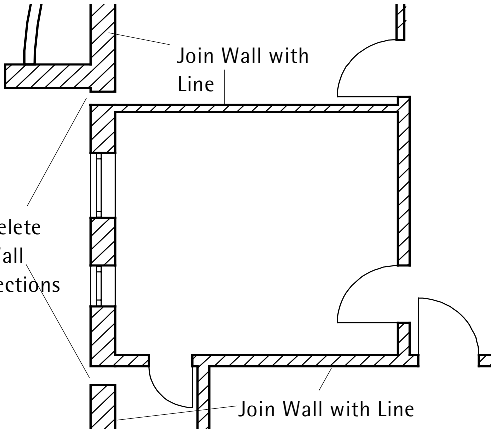
5 Enclose the entire floor plan in a selection window but leave out the wall section on the left.
The components are displayed in selection color. If individual components were left out, you can now click to select them individually.
When you have selected all components, click **Apply** to confirm the dialog box.

The components are recalculated. Press ESC to quit the tool.

Please note the following: the interior and exterior walls in the roof are joined with the roof planes.
The side wall on the right is not enveloped by the roof frame and thus orients itself to the default upper reference plane.
The left side wall is enveloped by both the planes in the dormer and the default reference plane. This wall segment needs to be divided into three wall sections so that each can be handled separately.



6 Click **Delete Wall Sections (Architectural Components** flyout) and delete a section of the wall, starting at the division point.



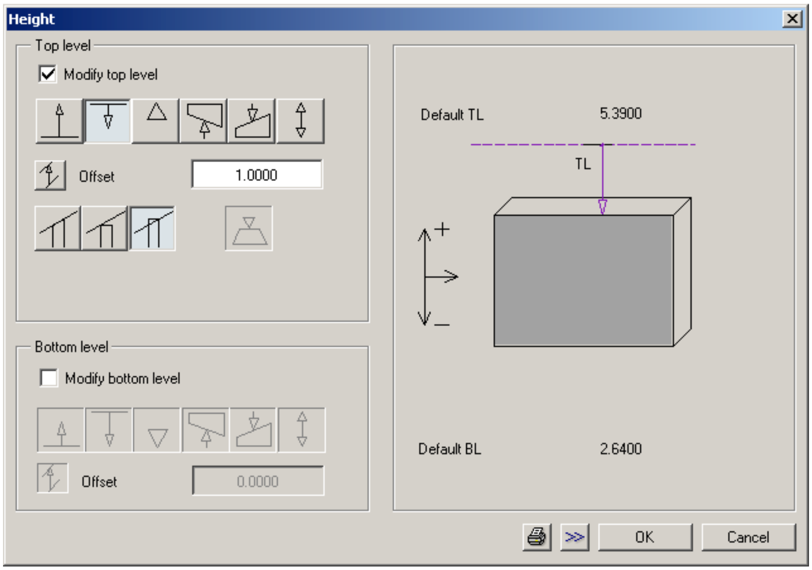
7 Click **Join Wall with Line (Architectural Components)** flyout and join the wall sections again. There are three wall sections, even if the seams are not visible.

8 Click **Change Archit. Properties** and alter the settings for the Height of the top of the side walls that are not below the roof frame (leave the bottom level unchanged):
TL relative to the lower plane, offset: **1.17**.

Tip: If the walls do not assume the full new height, you need to clean up the wall junction between adjacent exterior walls using **Join Walls.**

Check the wall junction lines: In **Options**, activate 'Show wall junctions'.

9 *Define properties or select elements*
Click the chimney and change its height.
It needs to project 1m beyond the roof plane. Activate the option **TL horizontal, interior component edge defines.**



Height

Top level

☑ Modify top level

Offset 1.0000

Bottom level

☐ Modify bottom level

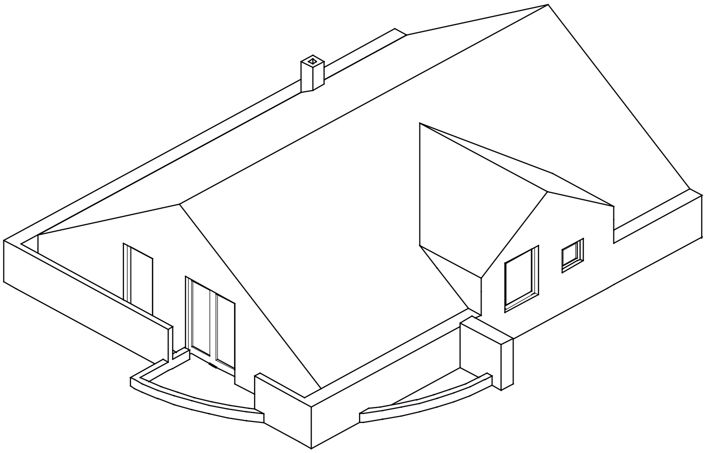
Offset 0.0000

Default TL 5.3900

Default BL 2.6400

10 Open drawing file **123** in the background.

In **Rear Left Iso.** the design should look like this after clicking **Hidden Line Image** and **Refresh**:



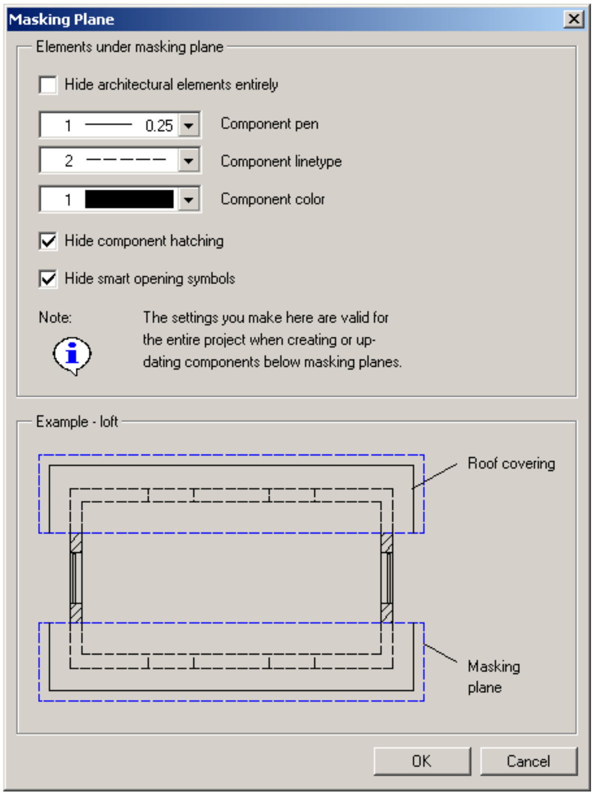
Using a masking plane for the roof

You can use the masking plane to change how architectural elements are displayed in specific areas or to hide them entirely.

To enter masking planes

➲ Make drawing file **124** active (if necessary, click **Open on a project-specific basis** and then **Show/Hide Drawing File List** and drag the drawing file to the **Model** fileset).
Open drawing file **121** in edit mode.

1 Click **Masking Plane** (**Roofs and Planes** flyout) and in the dialog box, specify how the components below the masking plane are to be displayed: Pen **1 0.25** and Linetype **2**. Component hatching and smart symbols need to be turned off.



Masking Plane

Elements under masking plane

☐ Hide architectural elements entirely

1 —— 0.25 Component pen

2 - - - - - Component linetype

1 ■ Component color

☑ Hide component hatching

☑ Hide smart opening symbols

Note: The settings you make here are valid for the entire project when creating or updating components below masking planes.

Example - loft

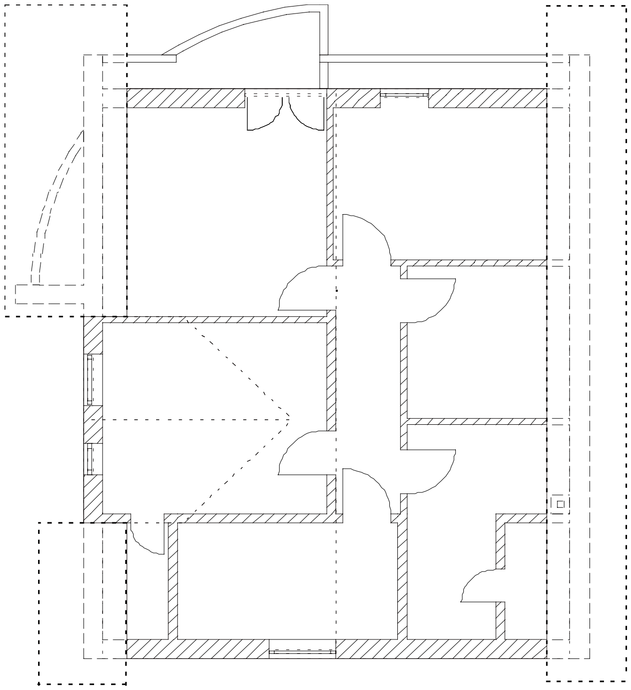
2 Press **OK** to confirm.

3 Activate the layer **AR_MASKP**.

The component representation is to be altered below the 1-m line.

Tip: Check the **Dynamic toolbar**:
To create several regions at once, click **Multi** and then **Plus.**

4 Draw the plane areas as rectangles based on two diagonally opposite points.
The **1 m-line** serves as the boundary inside the building. On the outside, the region will stretch somewhat beyond the walls.



5 Quit the tool and open drawing file **123 Roof** in edit mode.

6 Click **Restore 3D View** (**3D Modification** flyout) and click twice with the right mouse button in the workspace (do not double click!!).
The components are recalculated taking the masking plane into account. The representation of the roof covering is not affected by this.

7 Close drawing files **123** and **124** and make drawing file **121** current. Run **Restore 3D View** (**3D Modification** flyout) again. The elements are displayed again without the masking plane.

Please note that when using the **Restore 3D View** tool to recalculate the display, the masking plane applies to the active drawing file and all those open in edit mode.
The masking plane is even active when the layer in which it is located is hidden.

The roof will now be given an upstand that is 11.5 cm wide and 10 cm high. We will draw this in a separate drawing file, but first the roof planes need to be copied there.

You should always make a point of giving your drawing files meaningful names!

To draw the upstand

Tip: To draw upstands, you can also use the **Upstand** (**Create** menu – **Architecture – Walls, Openings, Components**) tool.
The top level of the wall below the upstand is automatically used as height value for the upstand. But this is not suitable for flank walls; therefore we will use the **Wall** tool to create the upstand in this example.

➲ Make drawing file **123** current and close all the others.

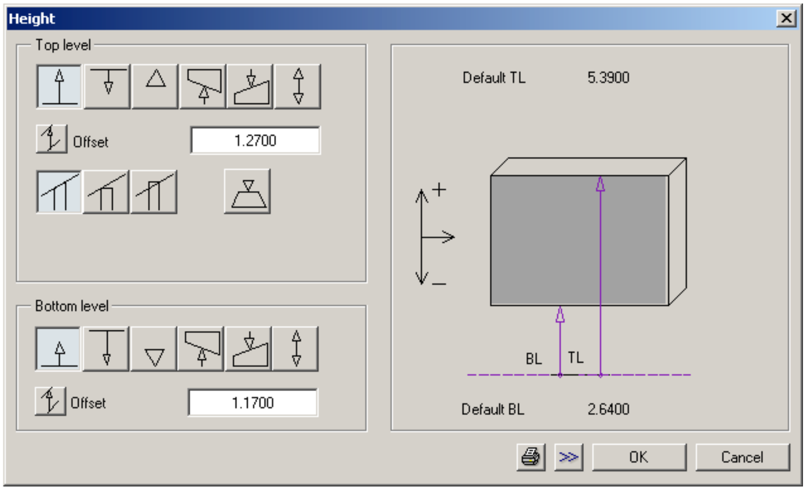
1 Use **Copy/Move Elements between Files** (**File** menu) and the architecture filter () to copy the (roof) **plane** to drawing file **126**.

2 In **Open on a project-specific basis** drag drawing file **126** into the **Model** fileset, activate it and set drawing file **121** to edit mode.

3 Click **Default Planes** and make the following settings for the new drawing file 126:
set **Default lower plane** to **2.64** m and **Default upper plane** to **5.39** m.

4 Click **Wall** (**Architectural Components** flyout) or double click an existing wall with the right mouse button.

5 Set the **Properties**:
Thickness: **0.115**; Material: **B25**
Height: Attach the top and bottom level to the lower plane – and press **OK** to confirm.



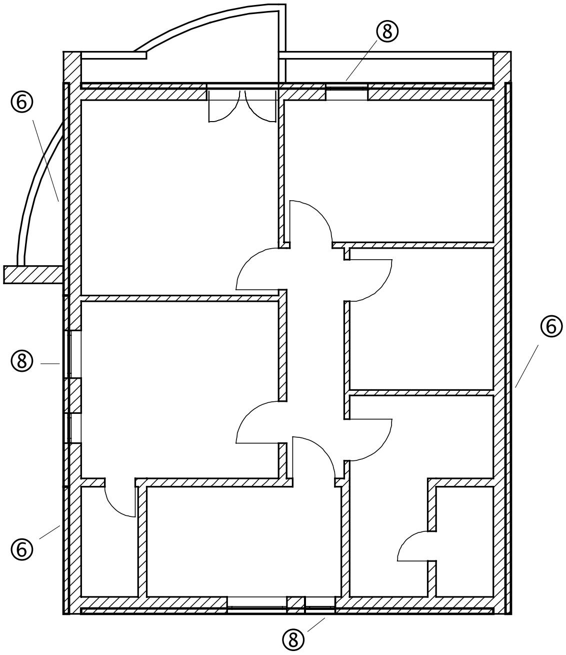
Offset 1.2700

Offset 1.1700

Default TL 5.3900

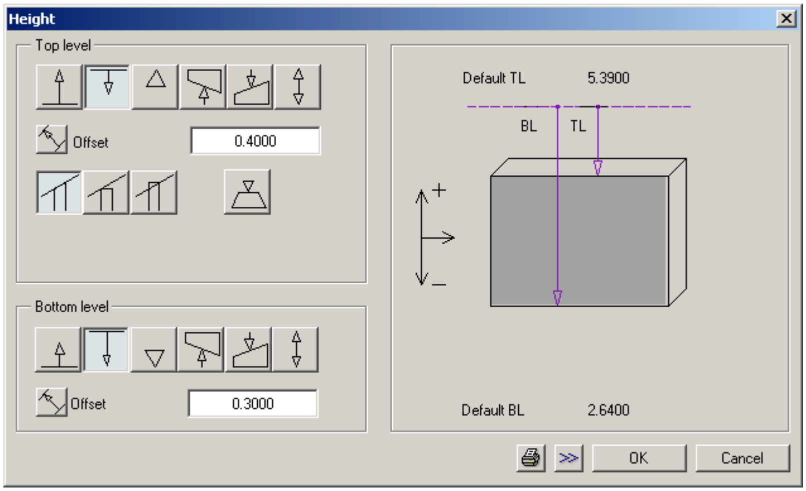
Default BL 2.6400

6 Draw the upstand on the flank walls but not over the dormer.



7 Now change the **height** for the end walls in the main roof and the dormer. The upstand should be flush with the roof covering.

Note: To ensure that the distance between the upstand and the roof plane stays at 10cm, set both toggles to **Offset perpendicular to plane.**



Height

Top level

Offset 0.4000

Bottom level

Offset 0.3000

Default TL 5.3900

Default BL 2.6400

8 Draw the upstand on the end walls and above the dormer.

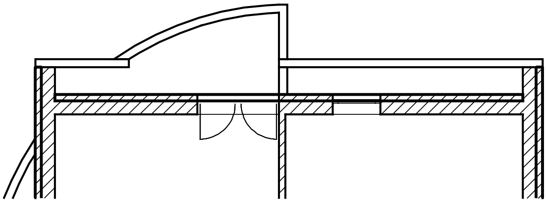
With just a few clicks of the mouse, you can design alternative facades for the balcony.

To design alternatives

- ➲ Open drawing files **121** and **126**. Copy them to an empty drawing file - **127**, for example.
- ➲ Make drawing file **127** current and close the other drawing files (drag drawing file 127 into the **Model** fileset).

Tip: Instead of having the parapet pass through the exterior wall, first use **Join wall with Line** to reset the exterior wall and lengthen the parapet.

1 Use **Join Wall With Line** to alter the wall junctions as shown below.



2 Use **Change Archit. Properties** to change the height of the parapet to **1.27** m.

The **hidden line image** of drawing file 123 should now correspond to the illustration at the beginning of the "Roof" section.

Exercise 7: Custom Reference Planes

Next we will draw the roofs for the carports using custom reference planes. The pitch of the roofs is 8°. We will place these planes directly over the floor plan of the roofs for the carports.
So that you can better compare this approach, first copy the drawing file 112, Ground floor, carport to an empty drawing file. You will learn how to copy using ProjectPilot.

Copying/moving drawing files

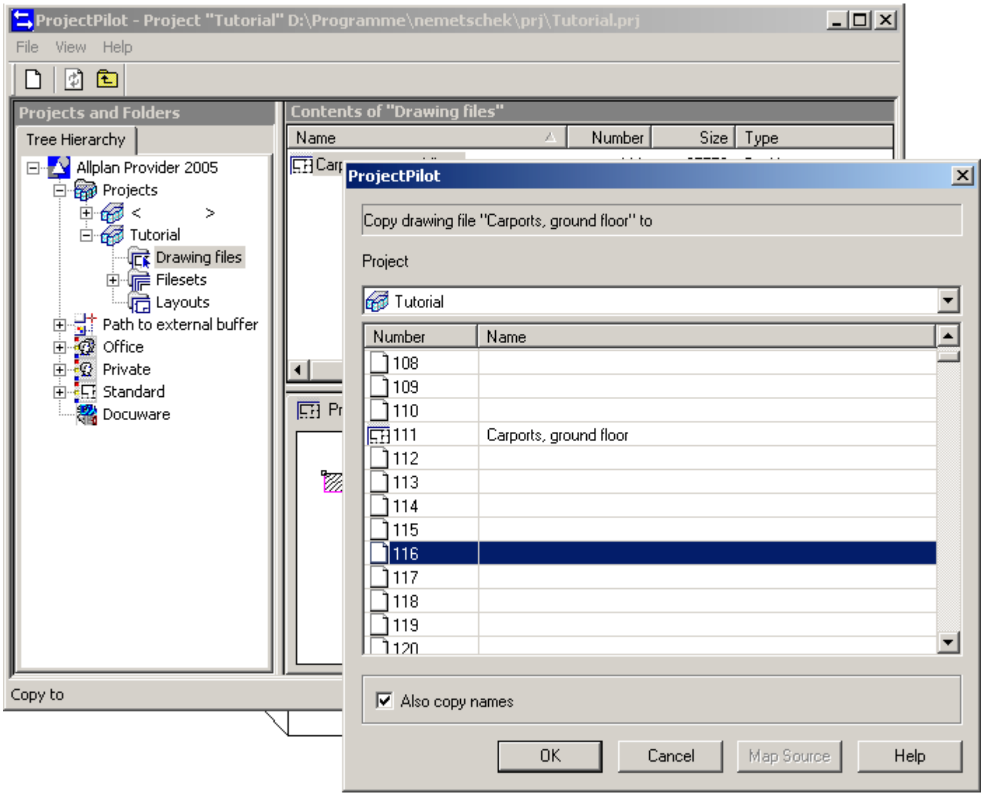
Copy/Move Elements between Files	ProjectPilot → Drawing files
• Within the project only • Individual elements and elements in drawing files open in reference mode can be copied/moved • Target drawing file can already contain elements. New ones are added • Elements can be positioned as required	• Within the project and in other projects • Entire contents of drawing files are copied/moved • Any number of drawing files can be copied/moved in one go • The contents of drawing files are overwritten (after additional confirmation)

To copy drawing files in Admin

1 On the **File** menu, click **ProjectPilot / Admin.**

2 Open the folder with the tutorial project, select drawing file **112** and on the shortcut menu, click **Copy to... .**

3 Select the target drawing file **116** and press OK to confirm.



ProjectPilot - Project "Tutorial" D:\Programme\nemetschek\prj\Tutorial.prj

Copy drawing file "Carports, ground floor" to

Project: Tutorial

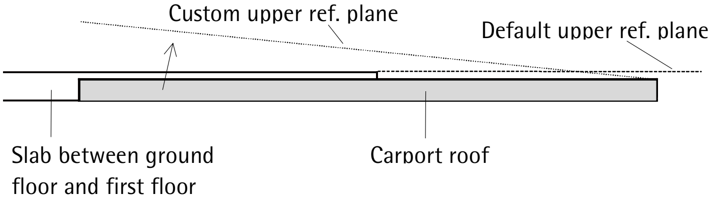
Number	Name
108	
109	
110	
111	Carports, ground floor
112	
113	
114	
115	
116	
117	
118	
119	
120	

☑ Also copy names

4 Rename drawing file 116: ”Ground floor carport – alternative”.

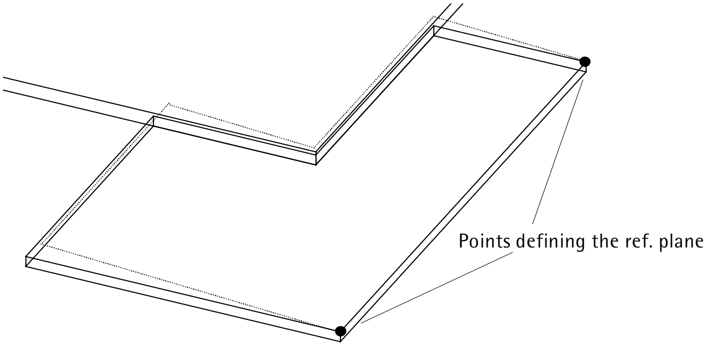
5 Exit ProjectPilot.

The custom reference planes will be created on the drawing file with the carport you just copied. Each carport roof will have its own pair of reference planes. The lower reference plane in each pair will remain horizontal while the upper reference plane will be defined by placing two points and specifying an angle of inclination.



Detail, cross-section

Tip: A plane can be defined with three points or with two points and an angle of inclination.



Isometric view, the carport roof slopes along the outside edge.

To define custom reference planes

➲ In the **CAD Navigator** select the **Architecture** module.

➲ Make the carport drawing file you copied (**116**) current and set drawing file **111** to reference mode (drag the drawing file to the **Model** fileset).

1 Make layer **AR_SLAB** visible and hide all the others.

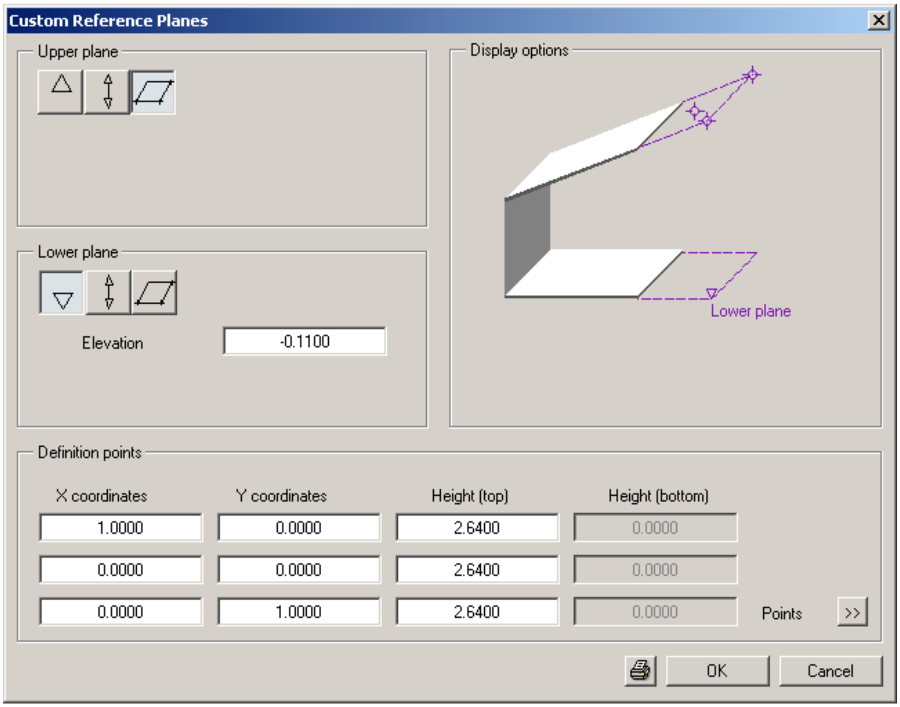
2 Click **Custom Planes** (**Create** flyout).

3 Click **Properties.**

The upper plane needs to be inclined while the lower one stays horizontal, flush with the lower default plane.

4 In the **Upper plane** area, click **custom plane.**

5 In the **Lower plane** area, click **Elevation** and enter **–0.11.**



Elevation: -0.1100

X coordinates	Y coordinates	Height (top)	Height (bottom)
1.0000	0.0000	2.6400	0.0000
0.0000	0.0000	2.6400	0.0000
0.0000	1.0000	2.6400	0.0000

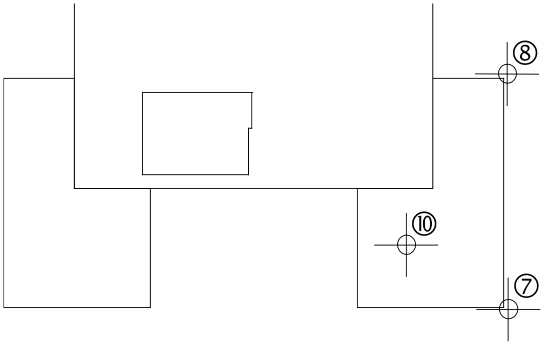
Start by defining the inclination of the upper plane. If you know the position of three points defining a plane, you can enter their coordinates in the appropriate boxes.
In this example, we will get the position of the first two points from the drawing and then specify an angle of inclination.

6 Click near to **Points.**

7 *Point 1*
Click the corner at bottom right and specify its height: **2.59.**

Tip: You can also click the first points in an isometric view.
This way, you define three coordinates per point with a single click!

8 *Point 2*
Click the corner at top right and specify the height: **2.59**.



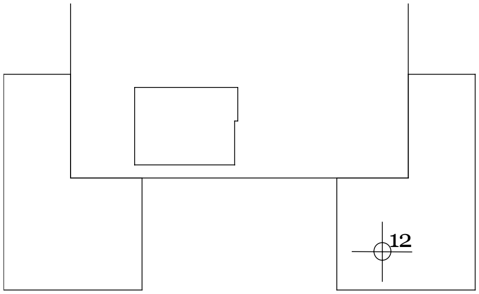
9 *Point 3 / Inclination of upper plane*
Enter the inclination: **8**.

10 *Area of upward inclination*
Click the two points on the left in the workspace.

11 Now you have defined the inclination of the upper plane, and the **Custom Reference Planes** dialog box is displayed again.
Press **OK** to confirm.

Now enter the outline of the custom plane.

12 Activate **Outline Auto-Detect** (at bottom right in the dialog line or in the **Point Assistant**), click inside the outline of the carport and press ESC.



13 Click **3 Viewports.** You should now see the sloping reference planes in the isometric and elevation views.

Tip: If you select the **Multi** option on the **Dynamic toolbar** to begin with, the tool stays open.

14 Repeat steps 2 through 12 to create the second pair of custom reference planes for the second carport roof.

15 Press ESC to quit the tool.

Further edits

Take a closer look at the elevation view. As you can see, the carport roofs are not directly attached to the custom, upper reference plane.

Remember: The reason for this is that when we created the roof, we attached it to the upper reference plane, but at an offset of -0.05. The **TL relative to upper plane** needs to be changed to **0** with **Properties** (shortcut menu) or with **Change Archit. Properties.** The **Absolute component height** will remain unchanged at 0.15 m.

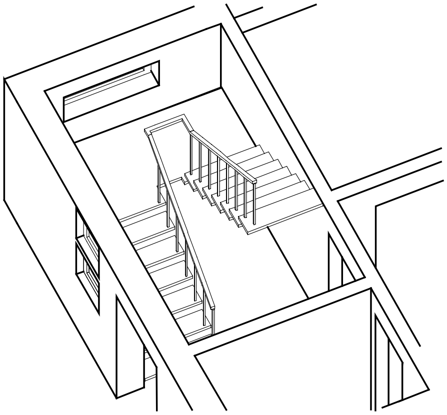
Make the layer AR_COL visible. As you can see, these also need to be fitted in.
Use **Change Archit. Properties** to change the offset between the top level of the column and the upper reference plane to **–0.15.**

Unit 6: Stairs

➲ The exercises in this unit require the **Stairs** module. Check in **CAD Navigator** to see whether you have licensed the module.

You still need to design the stairs between the ground floor and the first floor. To do this, we will use the tools in Allplan 2005's Stairs module. For each stair you create, you can define individual components such as treads, risers, stringers, handrails etc..

In this manual, we can only cover one of the wide range of possibilities. To use the Stairs module effectively, you should try to spend some time experimenting with other shapes and parameter settings. Each exercise begins with remarks that are also valid for the other stair shapes.



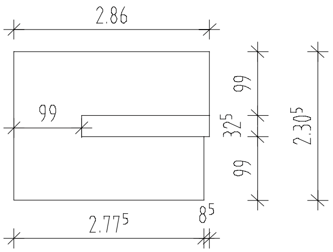
Before you start designing the stair, draw the outline using construction lines. This will be a useful aid to orientation when you enter the staircase.

To draw the stair outline in construction line mode

➲ Open drawing file **111** Ground floor, model and close the others. Make the layer **DE_GEN02** (stair outline) visible and hide all the other layers.

1 Click **Line** (**Draft** flyout), enable **Construction Lines** (**Format** toolbar) and
activate the layer **DE_CLINE**.

2 Trace the outline of the stair.



3 Switch **Construction Lines** off again.

4 Keep the layer **DE_CLINE** visible and hide all the other layers.

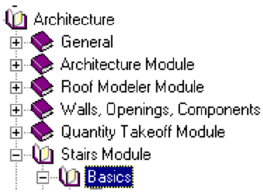
The procedure for creating a stair is always the same. Once you have created a stair, it can always be altered using **Modify Stair**.

Procedure for stair design

- Select the stair type.
- Enter the outline of the stair. This also defines the flight length from the bottom of the stair.
- Set up the height and position the line of travel. The system will initially create a basic stair design that can be modified to your specific needs.
- If necessary, change settings e.g., number of steps, position of last step, step angle etc. This completes the initial design. Only the treads are displayed.
- Set up stair components (optional) such as handrails and carriages.
- Lock the stair and label it.

Exercise 8: U-Type Stair

Tip: See the section entitled "Stairs Module – Basics" in the online Help:



- Architecture
  - General
  - Architecture Module
  - Roof Modeler Module
  - Walls, Openings, Components
  - Quantity Takeoff Module
  - Stairs Module
    - Basics

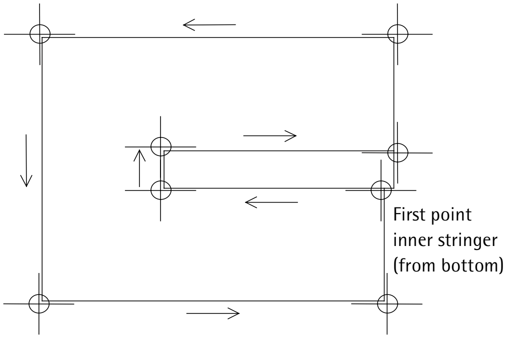
Start by creating the basis for the stair.
The stair outline you enter depends on the stair type you select. For example, if you select the straight-flight stair type, the system will close the outline after you have placed four points. The outline of a U-type stair is defined by 8 points. A spiral stair is defined by two arc radii and a free-form stair can be based on as many points and shapes as you want - even splines.

To create the basic stair

1 Click **U-Type Stair** (**Stairs** flyout) and activate the layer AR_STAIR.

2 The first point you click will define the point where the bottom of the stair and the inner stringer meet.

3 Click the other corners using the outline of the stair we created earlier. In total, you need to place 8 points.

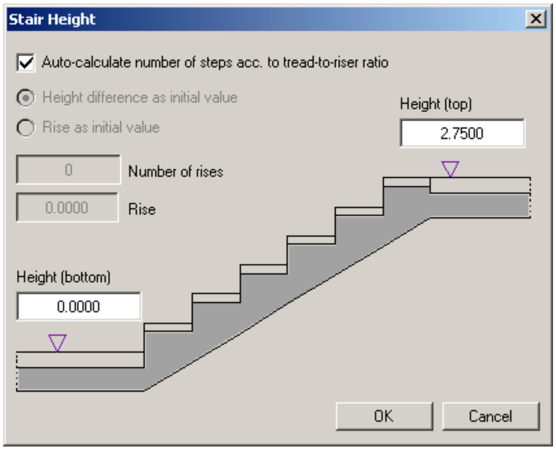


4 Click the **Height** box.

5 Activate the **Optimize (tread-to-riser ratio)** check box and enter the following height settings:

- Height (top): **2.75** (top floor default lower plane + 11 cm; finished floor in top floor)
- Height (bottom): **0.00** (ground floor default lower plane + 11 cm; finished floor in ground floor)

and press **OK** to confirm.



Stair Height

☑ Auto-calculate number of steps acc. to tread-to-riser ratio

● Height difference as initial value

○ Rise as initial value

Height (top): 2.7500

Number of rises: 0

Rise: 0.0000

Height (bottom): 0.0000

The height of the stair – 2.75 m – is displayed in the **Stair Outline / Line of Travel / Height** dialog box.

6 Press **OK** to confirm the settings.

A stair is created and the dialog box with the parameters for the stair geometry is displayed.

7 Press ESC to finish entering stair parameters,
acknowledge the prompt by pressing **Yes** and
place the label.
If you do not want to label the stair, simply press ESC.

8 Make layers AR_WALL and AR_SLAB visible too.

9 Click **3 Viewports.**
In the isometric and elevation views, check the height and orientation of the stair.

You can modify the parameters proposed by the program in the **Stair Outline** dialog box. In this exercise we will:

- Position the last step
- Change the step angle (only possible with u-type stairs).

The tread and rise are calculated automatically by the system. In the case of u-type stairs, the landing cannot be modified, its position is locked by the stair outline. The number of steps, however, can be altered - this is true for all the stair types.

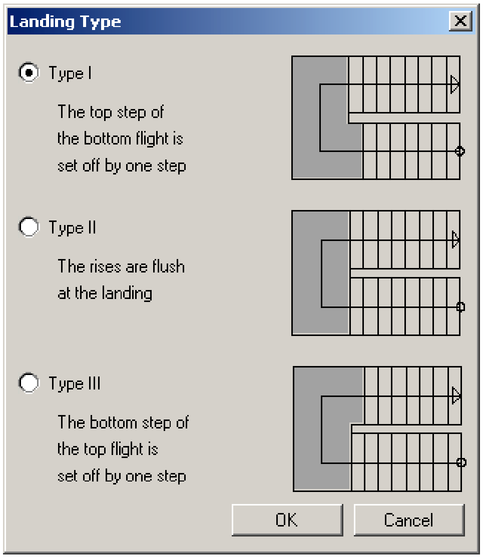
Stair symbols

- Large arrows on the steps indicate that the components are at different heights.
- Small arrows on a short line indicate that two components (steps or landings) are at the same height.

To change the stair's geometry

1 Click **Modify Stair** (**Stair** flyout) and click the line of travel of the stair.

2 Click **Landing Type**, activate **Type I** and click **OK** to confirm.



Landing Type

● Type I

The top step of the bottom flight is set off by one step

○ Type II

The rises are flush at the landing

○ Type III

The bottom step of the top flight is set off by one step

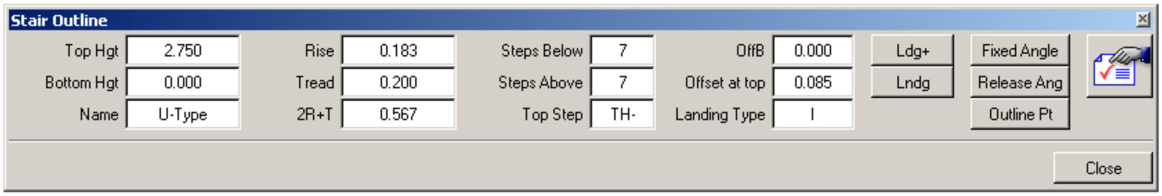
3 Click **Top Step**. The display will change to **TH-**.
In elevation, you should be able to see how the last step is one rise below the top of the stair. The top flight thus has **7** steps and 8 rises. The value of the rise changes automatically and the tread is calculated based on the length of the first flight.

In plan, you should now be able to see how the top flight doesn't quite reach the border of the stair outline. The flight needs to be moved along the line of travel.

4 First, check the distance between the last rise and the boundary of the outline using **Measure** (**Standard** toolbar).

5 Click **Offset at top** (defining the overlap above) and enter the value for the distance (calculated above): **0.085**.
We will lengthen the landing by the same value and the steps will move.

The **Stair Outline** dialog box should now look like this:



Top Hgt 2.750
Bottom Hgt 0.000
Name U-Type
Rise 0.183
Tread 0.200
2R+T 0.567
Steps Below 7
Steps Above 7
Top Step TH-
OffB 0.000
Offset at top 0.085
Landing Type I

On the screen, the stair is represented by treads only. If you want, you can add other stair components. The program presents these components and offers options for displaying them in a single, easy-to-use dialog box. In addition, each component also has its own property sheet where you can set up the various dimensions. In the following exercise you will learn how to define the treads, the inner handrail and the balusters.

To define stair components

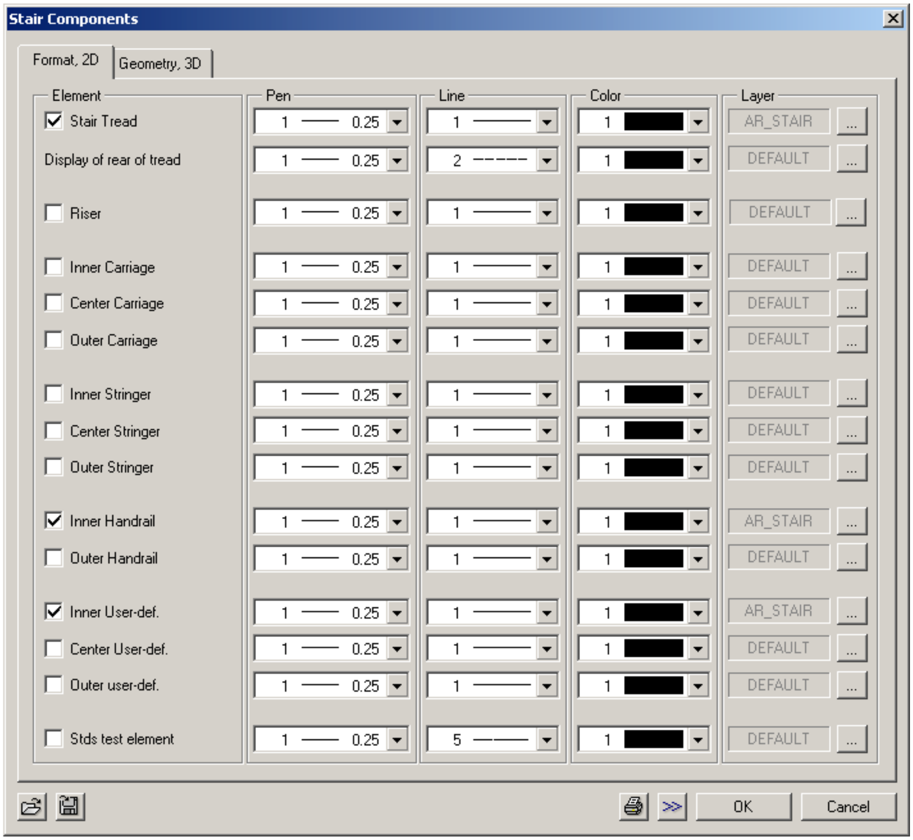
➲ The **Stair Outline** dialog box is open.

1 Click to access the **Stair Components** dialog box.

2 In the **Stair Components** dialog box, select the **Format, 2D** tab.

Tip: User-definable components can be used for balusters, panel walls, flanges and other stair elements.

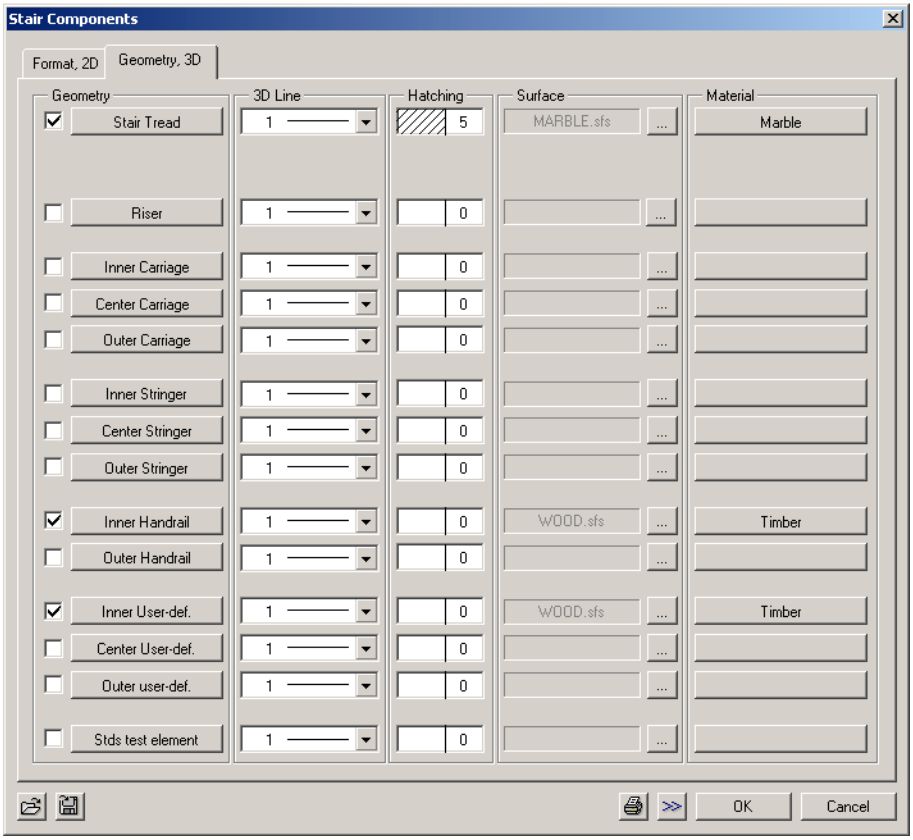
3 Activate the check boxes beside **Stair Tread**, **Inner Handrail** and **Inner User-def.** (for the baluster).
Click **...** in the **Layer** area and assign the **AR_STAIR** layer to the components you have just selected.



Element	Pen	Line	Color	Layer
☑ Stair Tread	1 0.25	1	1	AR_STAIR
Display of rear of tread	1 0.25	2	1	DEFAULT
☐ Riser	1 0.25	1	1	DEFAULT
☐ Inner Carriage	1 0.25	1	1	DEFAULT
☐ Center Carriage	1 0.25	1	1	DEFAULT
☐ Outer Carriage	1 0.25	1	1	DEFAULT
☐ Inner Stringer	1 0.25	1	1	DEFAULT
☐ Center Stringer	1 0.25	1	1	DEFAULT
☐ Outer Stringer	1 0.25	1	1	DEFAULT
☑ Inner Handrail	1 0.25	1	1	AR_STAIR
☐ Outer Handrail	1 0.25	1	1	DEFAULT
☑ Inner User-def.	1 0.25	1	1	AR_STAIR
☐ Center User-def.	1 0.25	1	1	DEFAULT
☐ Outer user-def.	1 0.25	1	1	DEFAULT
☐ Stds test element	1 0.25	5	1	DEFAULT

In the **Format, 2D tab** you can also modify the format properties used to display the selected components in plan view.

4 Now switch to the **Geometry, 3D** tab.

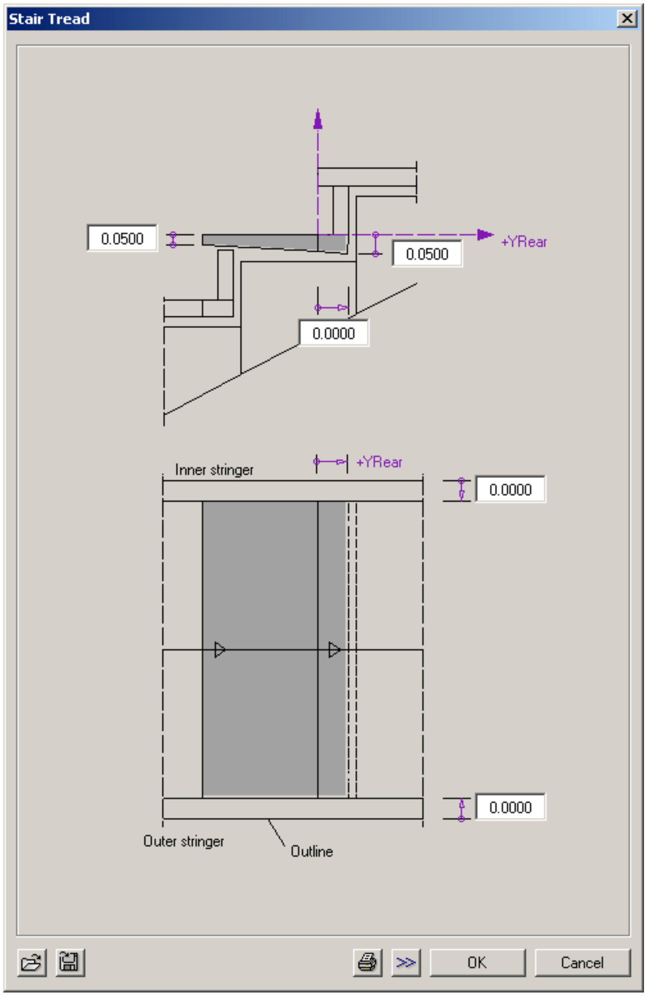


Geometry		3D Line	Hatching	Surface	Material
☑	Stair Tread	1	▨ 5	MARBLE.sfs	Marble
☐	Riser	1	0		
☐	Inner Carriage	1	0		
☐	Center Carriage	1	0		
☐	Outer Carriage	1	0		
☐	Inner Stringer	1	0		
☐	Center Stringer	1	0		
☐	Outer Stringer	1	0		
☑	Inner Handrail	1	0	WOOD.sfs	Timber
☐	Outer Handrail	1	0		
☑	Inner User-def.	1	0	WOOD.sfs	Timber
☐	Center User-def.	1	0		
☐	Outer user-def.	1	0		
☐	Stds test element	1	0		

You can use the **Geometry, 3D** tab to enter not only the geometry of the stair components but also a wide range of parameters:

- In the **3D Line** area, you define the linetypes which are used to display the components in 3D views.
- In the **Hatching** area, you specify the hatching styles to be used to display the components in architectural sections.
- In the **Surface** area, you can assign custom surfaces to the components.
- In the **Material** area, you can assign materials to the components. These materials can be analyzed and evaluated in specific stair schedules.

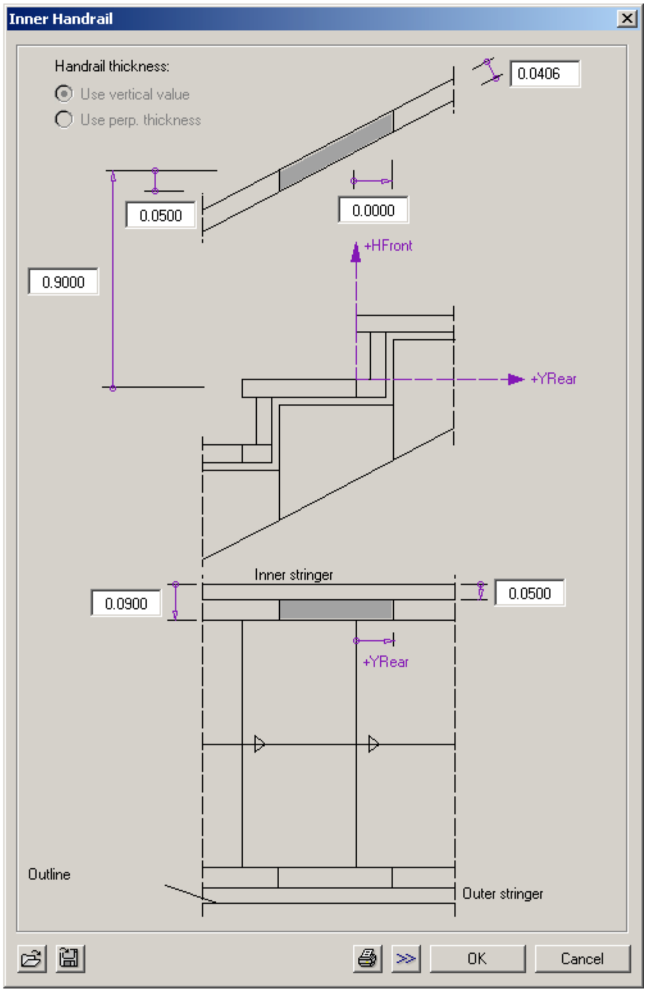
5 In the **Geometry, 3D** tab, click **Stair Tread** and enter the **thickness** of the tread at the **front** and **rear** as well as the **distance between the tread and the outline of the stair.** Press **OK** to confirm the dialog box.



0.0500
0.0500
0.0000
0.0000
0.0000

6 In the **Geometry, 3D** tab, click **Inner Handrail.**

7 Enter the distance between the edges of the handrail and the outline polygon as well as the position of the handrail element relative to the front edge of the steps. This defines where the handrail is to begin. In this example, the baluster will be on the first step. Press **OK** to confirm the dialog box.



Inner Handrail

Handrail thickness:

● Use vertical value

○ Use perp. thickness

0.0406

0.0500

0.0000

0.9000

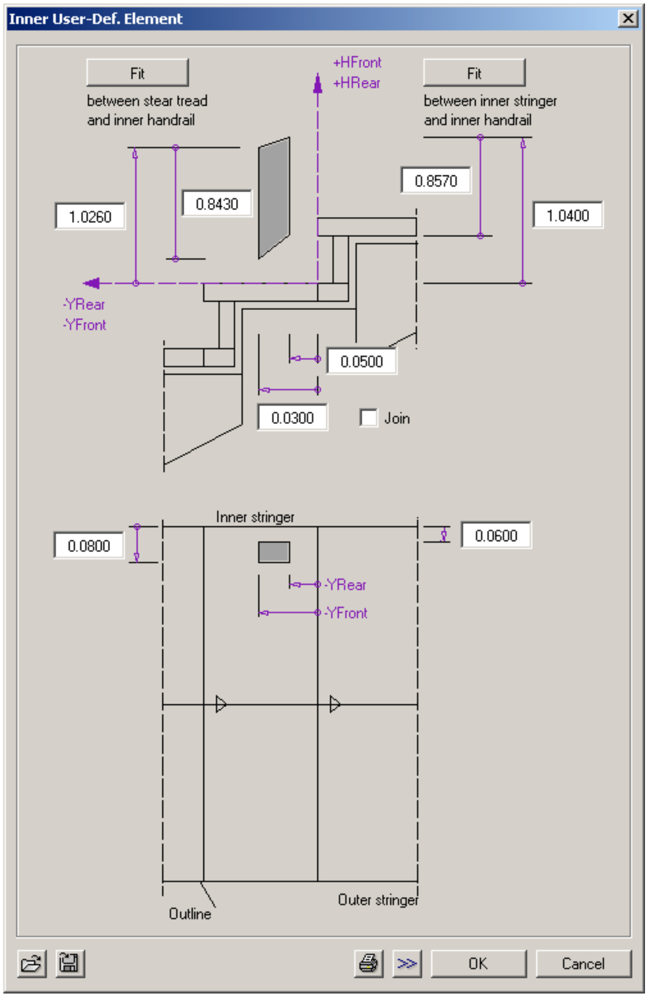
0.0900

0.0500

8 In the **Geometry, 3D** tab, click **Inner User-def.** (inner user-definable component).

9 Enter the distance between the edges of the handrail and the outline polygon as well as the position of the handrail element relative to the front edge of the steps. This defines where the handrail is to begin. In this example, the baluster will be on the first step.

Tip: If you change the dimensions of the tread, handrail or user-definable component, you need to select the Fit option again in order to re-calculate the result.



Inner User-Def. Element

1.0260

0.8430

0.8570

1.0400

0.0500

0.0300

☐ Join

0.0800

0.0600

10 Click **Fit between tread and inner handrail**. The program will automatically calculate the height of the component. Press **OK** to confirm the dialog box.

11 Press **OK** to confirm the dialog box.

The stair components are drawn in, and the **Stair Outline** dialog box is displayed again.

12 Click **Close** and acknowledge the prompt by pressing **Yes**.

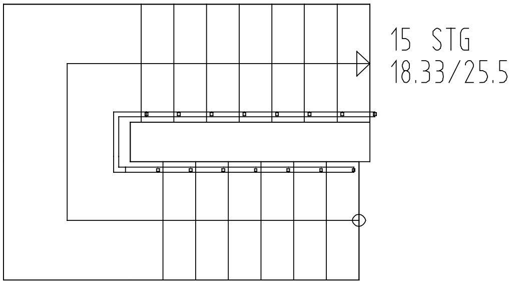
This locks the stair. You can now label the stair – a preview of the label is attached to the cursor.

Tip: You can skip the label by pressing ESC.

13 Click in the boxes that are to appear in the label.

14 Select the number of decimal places.

15 Place the label beside the stair.



We will now display a section of the stair in plan as is usual in construction drawings.

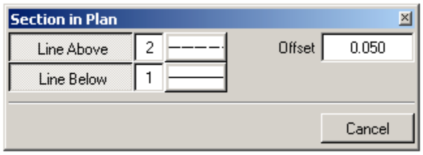
To create a section in plan

1 Click **Section in Plan** (**Stairs** flyout) and activate the layer **AR_STAIR**.

Tip: To use the linetype from the drawing for the initial region, click the **Line Below** button: "–" is displayed.

2 Click the stair's line of travel to identify it.

3 In the dialog box, set the **linetypes** for the stair **below** and **above** the section line.



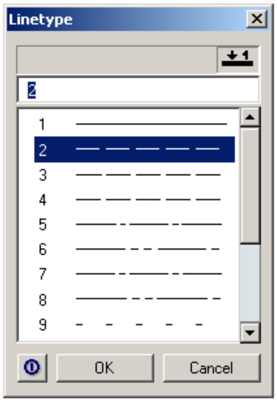
Section in Plan

Line Above: 2

Line Below: 1

Offset: 0.050

Tipp: Soll ein Treppenteil unsichtbar gemacht werden, klicken Sie auf Ⓘ.



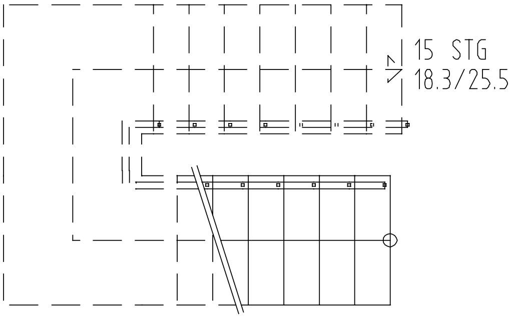
Linetype

2

4 Enter the offset between the section lines. This value is scale-independent.

Tip: If you make changes to the stair later, you will need to re-create the section in plan manually using this tool.

5 Click the start and end points of the section lines. In plan, the display will change automatically while the appearance of the stair in elevation and isometric views stays the same.



Unit 7: Smart Symbols

➲ The exercises in this unit require the **Walls, Openings, Components** module. Check in **CAD Navigator** to see whether you have licensed the module.

If you do not have Nemetschek's symbol catalogs or if the smart symbols they contain do not meet your requirements, you can use the **Smart Symbol Designer** tool to design your own, custom smart symbols.
These smart door and window symbols and can be saved in libraries and retrieved whenever needed.

Designing smart symbols

Requirements: an opening.

- Click **Smart Symbol Designer** in the Walls, Openings, Components module and then an opening.
- Set the dimensions of the (door or window) frame and click ▸▸▸ to transfer this to the 3D view.
- For each element in the window, define horizontal and vertical elements and/or muntins or, in the case of doors, the casement and transfer the settings using ▸▸▸.
- Alternatively, select one of the styles presented in the catalogs and enter settings for the dimensions of the various elements. Prior to transferring them, enter the dimensions of the individual elements.
- Set pen/color for the elements and glass.
- Save the smart symbol.

In the next exercise we will insert our own smart symbols in the only windowless wall in the building (on the ground floor).
The next exercise is essentially a repetition but without smart symbols.

To create window openings

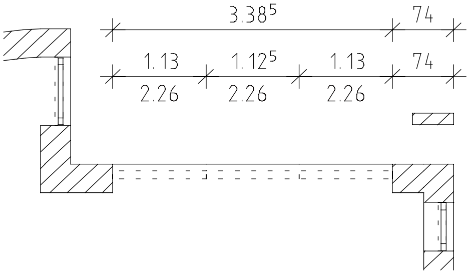
➲ Drawing file **111** is active. Make layer **AR_WALL** visible and hide all the other layers.

1 Double click with the right mouse button in the window opening at door height in the straight wall beside the curved wall (do not click the smart symbol!).

2 Create three window openings as shown.

The **Properties** of the window you clicked were adopted and should look like this (make changes if necessary):

Height: **TL – Absolute component height,**
component height: **2.26**
BL relative to the lower plane, offset: **0.00**
Reveal: Outer reveal **0.09**
Depth of window: **0.10**
Sill: outside
Smart symbol: off



3 Press ESC to quit the tool.

Exercise 9: Designing Smart Symbols

We will now design a three-part, glazed window for the openings. The smart symbol can then be inserted in any opening.

To make sure that the smart symbols we have already taken from the Styles catalog do not look different to the new smart, we will use the same settings for the frame thickness, pen/color etc..

To design a smart window symbol

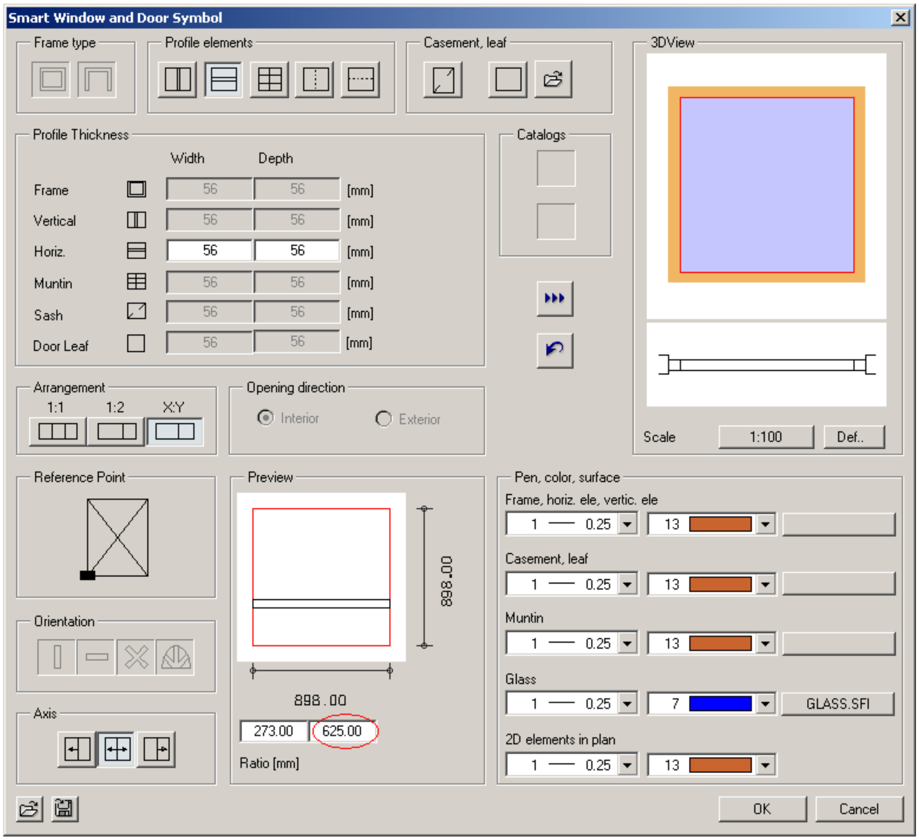
1 Click **Smart Window and Door Symbols** (**Architectural Openings** flyout).

2 Click the side of one of the new openings.
The dialog box now displayed is where we will enter all the settings for the smart symbol. Start with the window frame.

3 Enter the dimensions of the frame in the **Profile thickness** area:
Width: **56** / Depth: **56**

4 Press ▶▶▶ to transfer the settings for the frame to the **3D view** on the right.

Tip: Press ↶ to undo your settings one step at a time.



Smart Window and Door Symbol

Profile Thickness

	Width	Depth	
Frame	56	56	[mm]
Vertical	56	56	[mm]
Horiz.	56	56	[mm]
Muntin	56	56	[mm]
Sash	56	56	[mm]
Door Leaf	56	56	[mm]

Opening direction: ● Interior ○ Exterior

Preview: 898.00 / 898.00

Ratio [mm]: 273.00 625.00

Scale: 1:100

Pen, color, surface

	Pen	Line	Color	Surface
Frame, horiz. ele, vertic. ele	1	0.25	13	
Casement, leaf	1	0.25	13	
Muntin	1	0.25	13	
Glass	1	0.25	7	GLASS.SFI
2D elements in plan	1	0.25	13	

The window is to have horizontal elements (a transom).

5 In the **Profile elements** area click the ⊟ **transom** and enter the following dimensions:
Width: **56** / Depth: **56**

The transom is to be freely positionable.

6 In the **Arrangement** area, click ◫ and enter the value for the height of the top window section: **625** (see figure).

7 Click ▶▶▶ to transfer the settings for the horizontal element to the **3D view**.

8 In the **3DView** area, click in the lower window section. It will be divided by a vertical element.

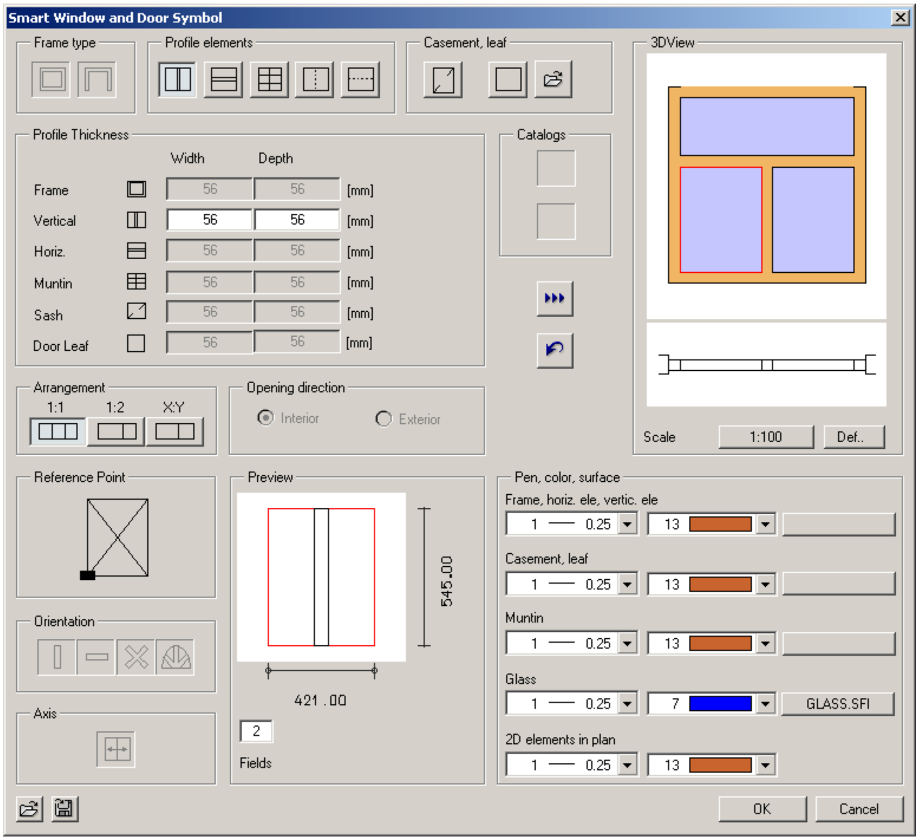
9 In the **Profile elements** area click ◫ **post** and enter the following dimensions:
Width: **56** / Depth: **56**

10 In the **Arrangement** area, click ◫.
The post needs to be centered.

11 Press ▸▸▸ to transfer the settings to the **3DView** area.

12 Select the following settings in the **Pen, color, surface** area:
For **Frame, horiz. ele., vertic. ele.**, select pen 1 and color 13,
for **Glass**, select pen 7 and color 7 and
for **2D elements in plan**, select pen 1 and color 13.

If you want, you can assign surfaces to the elements. These surfaces are then displayed in animated mode.



Profile Thickness

	Width	Depth	
Frame	56	56	[mm]
Vertical	56	56	[mm]
Horiz.	56	56	[mm]
Muntin	56	56	[mm]
Sash	56	56	[mm]
Door Leaf	56	56	[mm]

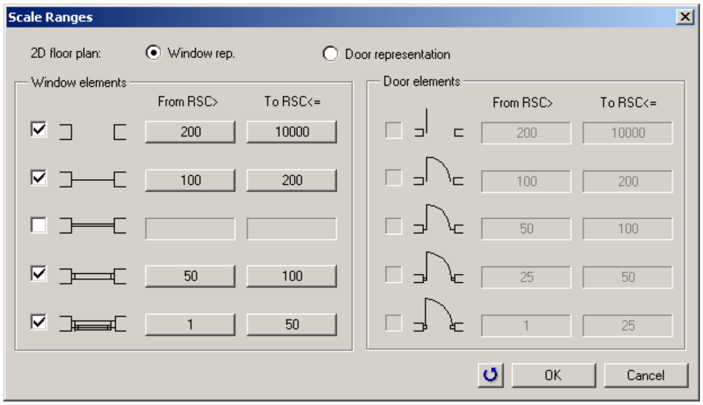
Arrangement: 1:1 1:2 X:Y

Fields: 2

Pen, color, surface

	Pen	Line	Color	Surface
Frame, horiz. ele, vertic. ele	1	0.25	13	
Casement, leaf	1	0.25	13	
Muntin	1	0.25	13	
Glass	1	0.25	7	GLASS.SFI
2D elements in plan	1	0.25	13	

13 In the **Scale** area, click **Def** and activate the check boxes for the scale ranges.



Scale Ranges

2D floor plan: ● Window rep. ○ Door representation

Window elements

	From RSC>	To RSC<=
☑	200	10000
☑	100	200
☐		
☑	50	100
☑	1	50

Door elements

	From RSC>	To RSC<=
☐	200	10000
☐	100	200
☐	50	100
☐	25	50
☐	1	25

14 Press **OK** to confirm the dialog boxes.

15 *Confirm*
Right-click to confirm.

The smart symbol dialog box opens.

16 Use the shortcut menu to create a new folder in the **Private** folder and press OK or ENTER to confirm.

17 *Save as*
Enter a name for the new smart symbol in the dialog line.

18 Press ESC to quit the tool.

Use **Insert Smart Symbol in Opening** (**Architectural Openings** flyout) to insert the smart symbol in the other two openings. In other words, the smart symbol is placed.
Smart symbols should be placed on the layer of the opening.
But you can also assign a different layer using **Modify Format Properties** → **Layer**.

You can replace smart symbols at any time. The only requirement is the presence of the two smart symbols (one to be replaced and the other to be used as a substitute) in the drawing file.

There are two methods for replacing smart symbols:

- Replace all instances of a smart symbol with another smart symbol - **Smart Symbol** setting.
- Replace single instances of a smart symbol – **Instances** setting.

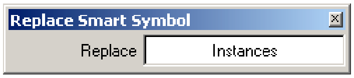
> A smart symbol that has been placed in a drawing file is an ’instance’ of a smart symbol.

In the following exercise we will replace instances of the smart symbol (in other words, smart symbols inserted in openings) in the curved wall with a different smart symbol.

To replace smart symbols

1 Click **Replace Smart Symbol** (**Architectural Openings** flyout).

2 Select the **Instances** setting (click to toggle).



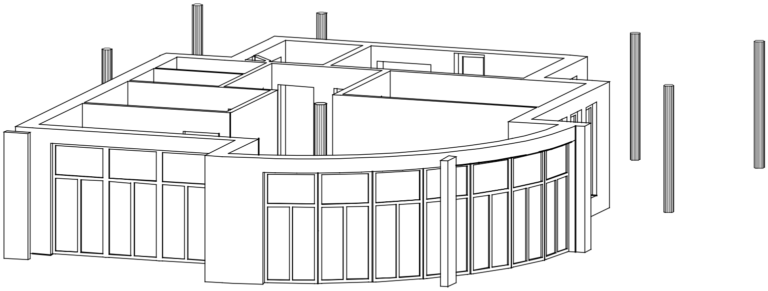
Replace Smart Symbol

Replace Instances

3 *Instance of smart symbol to be replaced*
Select all instances in the curved wall (enclose them in a selection rectangle or use the brackets feature).

4 *Replace with which instance of smart symbol?*
Click an instance (i.e. on of the three windows) of the smart symbol you just created.

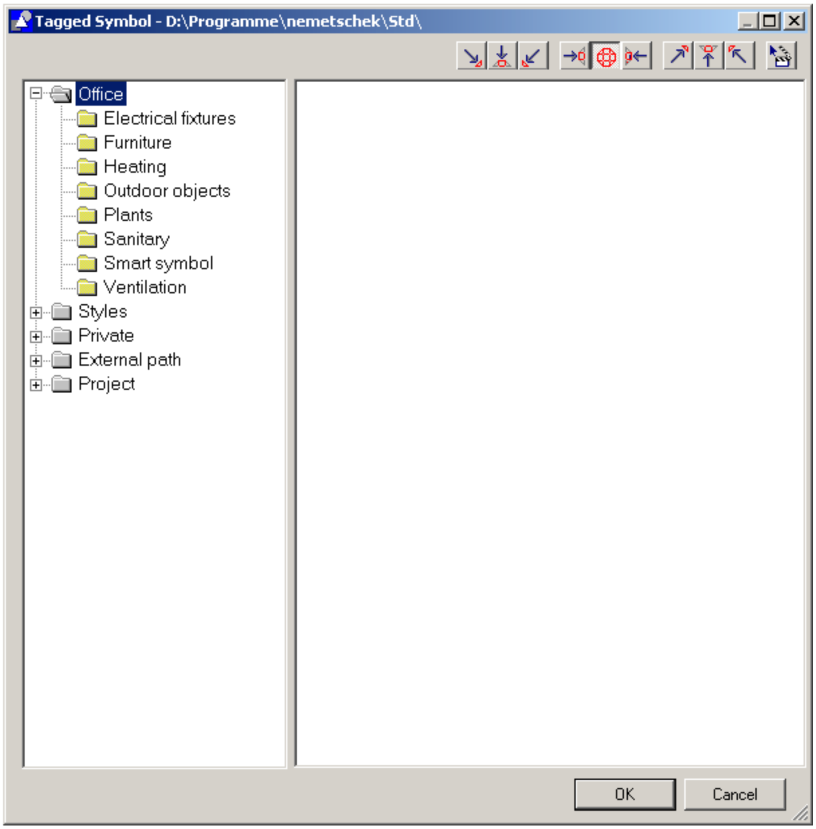
5 Press ESC to quit the tool.



Ground floor: the smart symbols in the curved wall have been replaced.

Managing smart symbols

You can see a list of all the smart symbols in the smart symbol admin.
These are presented in the door and window opening dialog boxes, for example. Or click **Get from Library** (**Standard** toolbar) and select **Tagged Symbol**:



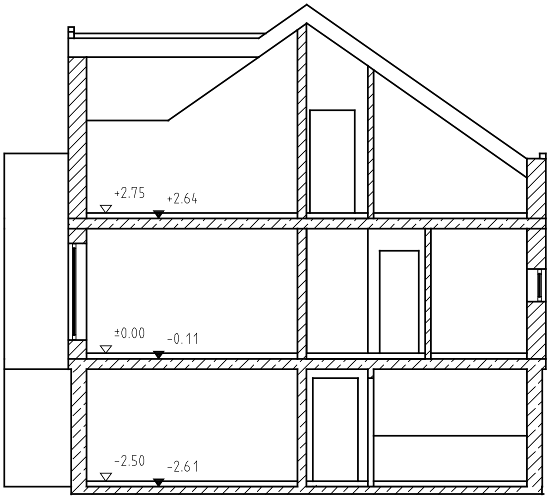
You can copy, move, rename and delete smart symbols here.

Note: Smart symbols in the **Styles** folder can only be copied but not modified.

Unit 8: Sections And Views

Although the building model is now finished, there are still a number of important tasks you have to accomplish to produce a polished construction drawing.

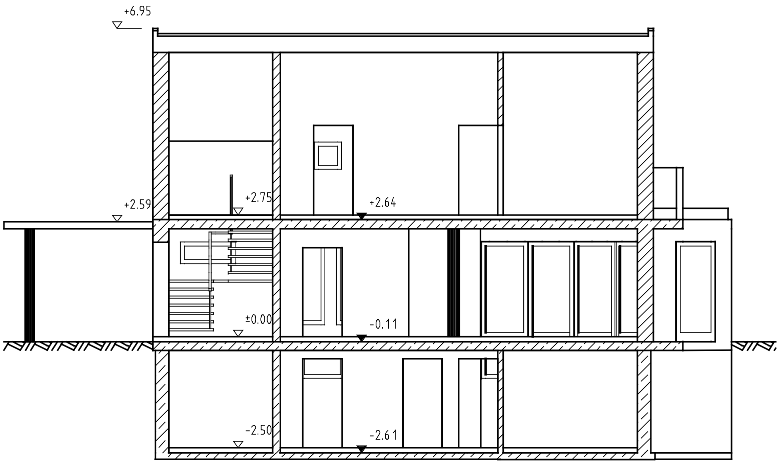
This unit shows how to create sections and views. An additional step involves calculating floor space and areas. These can be output to the drawing file or in the form of schedules.



Section A - A with elevation dimensions

Exercise 10: Sections

Section views of a building show it as if viewed from a specific viewing direction. A section clipping path defines the view and this can be saved as a hidden-line image in a separate drawing file. The manner in which intersected elements are displayed - for example, their hatching - can also be defined for the section view.
If you wish, you can also choose to display intersected elements with a thick line.



Section B - B

First, all the drawing files with the elements you want to include in the section view need to be opened in edit mode and the layers have to be made visible. The section line itself is located on a separate drawing file (this file has to be opened as the current file). The clipping path is defined by setting parameters.

To define a section line

➲ In the **CAD Navigator** select the **Architecture** module. Activate drawing file **2 Clipping path** and open **101, 111, 112, 121, 123** and **126** in edit mode.

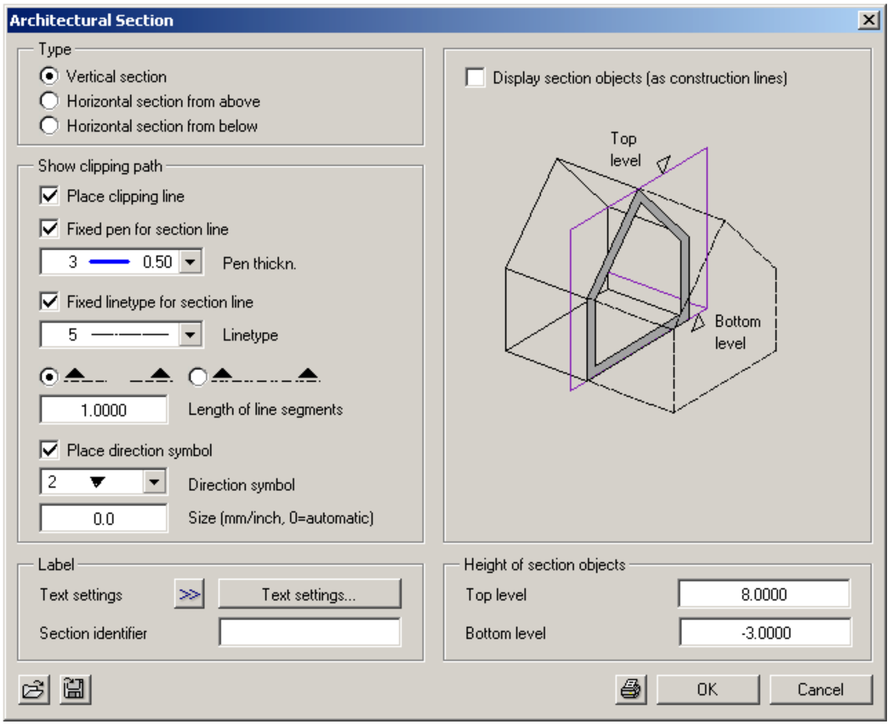
1 Activate the layer set **Model** (all layers with 3D components).

2 On the **Window** menu, click **1 Viewport.**

3 Click **Define Section** (**Roofs and Planes** flyout).

4 Activate the layer **DE_GEN01**.

5 Click **Properties** and make settings as shown below. Press **OK** to confirm.



Type
● Vertical section
○ Horizontal section from above
○ Horizontal section from below

Show clipping path
☑ Place clipping line
☑ Fixed pen for section line
3 0.50 Pen thickn.
☑ Fixed linetype for section line
5 Linetype
● ○
1.0000 Length of line segments
☑ Place direction symbol
2 ▼ Direction symbol
0.0 Size (mm/inch, 0=automatic)

☐ Display section objects (as construction lines)

Label
Text settings >> Text settings...
Section identifier

Height of section objects
Top level 8.0000
Bottom level -3.0000

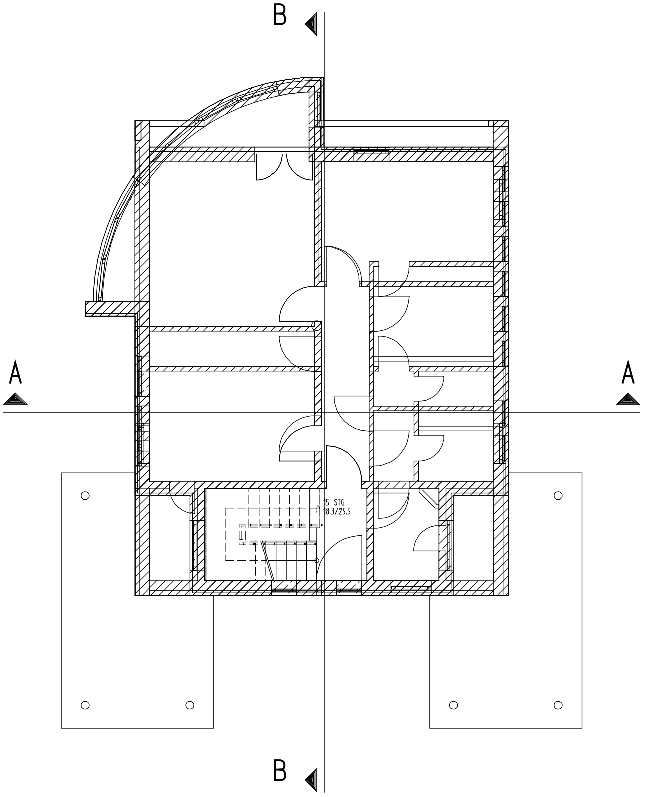
Tip: You can define orthogonal sections as well as sections at angles.

To produce a section which shows the entire building, we need to set the upper edge of the section objects at least 20 cm above the ridge and the lower edge below the bottom of the building.

6 Click the start and endpoints of the section line beyond the building and press ESC to finish. Make sure the section line intersects the walls at right angles and not in an oblique manner.

7 *Depth/viewing direction*
Click a point above the building.
The section depth defines an area behind the section line that includes all the visible building elements in the final section view. The greater the depth of the section, the larger the volume of data generated.

8 Repeat steps 3 through 7 and enter the section identifier: **B**.



Activating sections

The section is a three-dimensional wireframe model. Based on this wireframe model, we can create a hidden-line image and save it in a separate drawing file. This will create a 2D image that can be edited using the tools in the Draft, Text and Dimension Line modules.

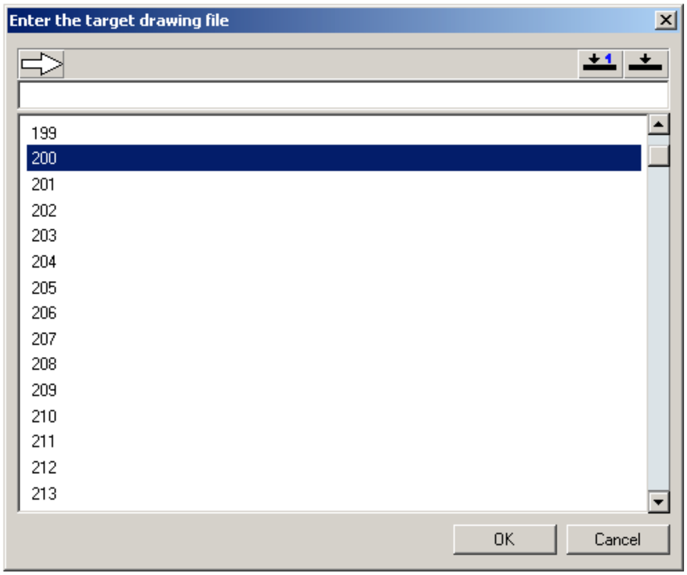
To activate a section

1 In the border of the viewport, click **Activate Section.**

2 Click the **A-A** section line.
The system will produce a section view of the building using the settings you defined earlier in Define Section.

3 On the **Standard** toolbar, click **Hidden Line Image, Wireframe.**

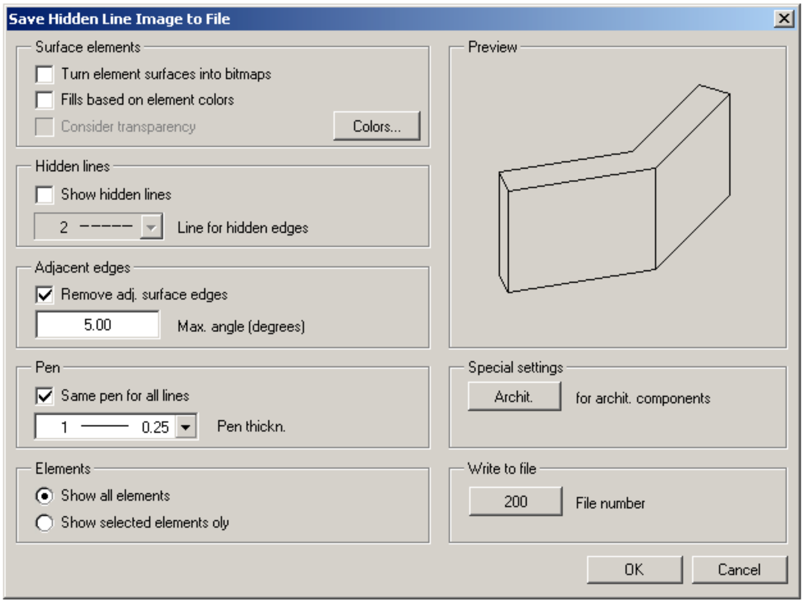
4 Select **Hidden Line Image to File** and
enter the number of the target drawing file: **200.**
Press **OK** to confirm.



Enter the target drawing file

199
200
201
202
203
204
205
206
207
208
209
210
211
212
213

5 In the next dialog box, make settings as shown below.
To represent curves in hidden line images as smooth surfaces instead of faceted, adjust the Max. merge angle to 5 degrees, for example.



Save Hidden Line Image to File

Surface elements
☐ Turn element surfaces into bitmaps
☐ Fills based on element colors
☐ Consider transparency

Hidden lines
☐ Show hidden lines
2 ----- Line for hidden edges

Adjacent edges
☑ Remove adj. surface edges
5.00 Max. angle (degrees)

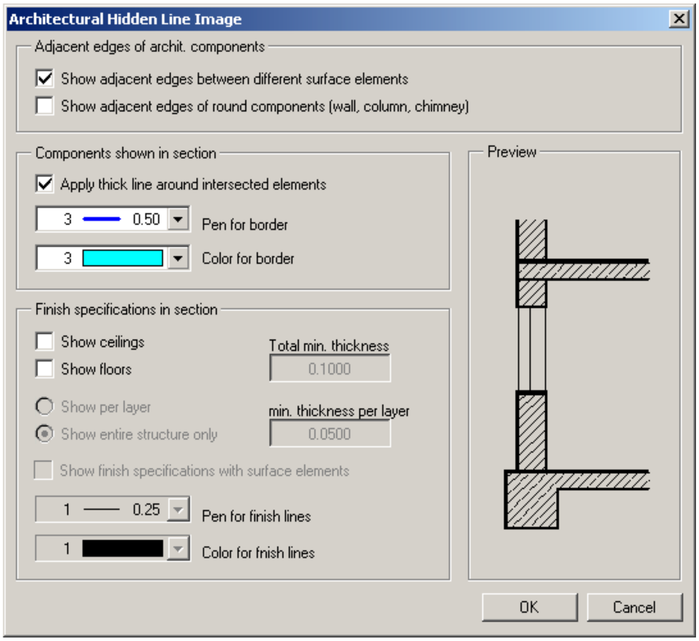
Pen
☑ Same pen for all lines
1 ——— 0.25 Pen thickn.

Elements
● Show all elements
○ Show selected elements oly

Special settings
Archit. for archit. components

Write to file
200 File number

6 In the **Special settings** area, click **Archit...** and set the options as shown in the figure below.



Architectural Hidden Line Image

Adjacent edges of archit. components

☑ Show adjacent edges between different surface elements

☐ Show adjacent edges of round components (wall, column, chimney)

Components shown in section

☑ Apply thick line around intersected elements

3 0.50 Pen for border

3 Color for border

Finish specifications in section

☐ Show ceilings

☐ Show floors

Total min. thickness 0.1000

○ Show per layer

● Show entire structure only

min. thickness per layer 0.0500

☐ Show finish specifications with surface elements

1 0.25 Pen for finish lines

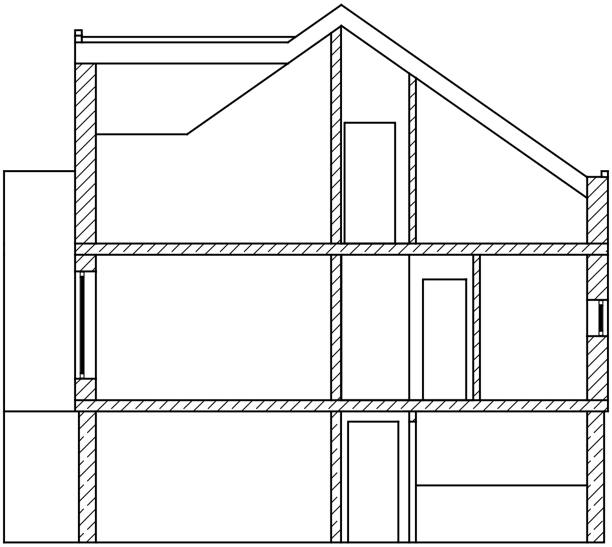
1 Color for finish lines

Tip: Finish specifications you define using the **Room** tool can also be displayed in sections. This way, you do not need to edit the sections later.

7 Press **OK** to close all the dialog boxes.
The hidden line image is calculated. The name of the drawing file is retained.

8 Click **Open on a project-specific basis**, switch to the fileset **Sections** and open drawing file **200**.

9 Set the view to **Plan**.



Section A -A

The section view will **not** update automatically to reflect alterations you make to the floor plan. You need to calculate the section again and update the drawing file using **Hidden Line Image, Wireframe** and **Update Hidden Line Image Calculation**.

Editing the section

You can now edit the section view. Draw the new elements on a separate drawing file. Otherwise, these will be deleted when the drawing file with the image is updated.

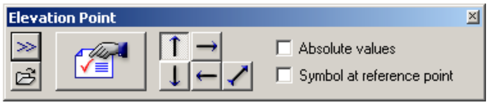
First draw the finished floor in the section.

To create elevation dimensioning

➲ Make drawing file **201** current and set **200** to edit mode.
Draw the finished floor.
In the **CAD Navigator** select the **Dimension Lines** module.

1 Click **Elevation** (**Create** flyout).

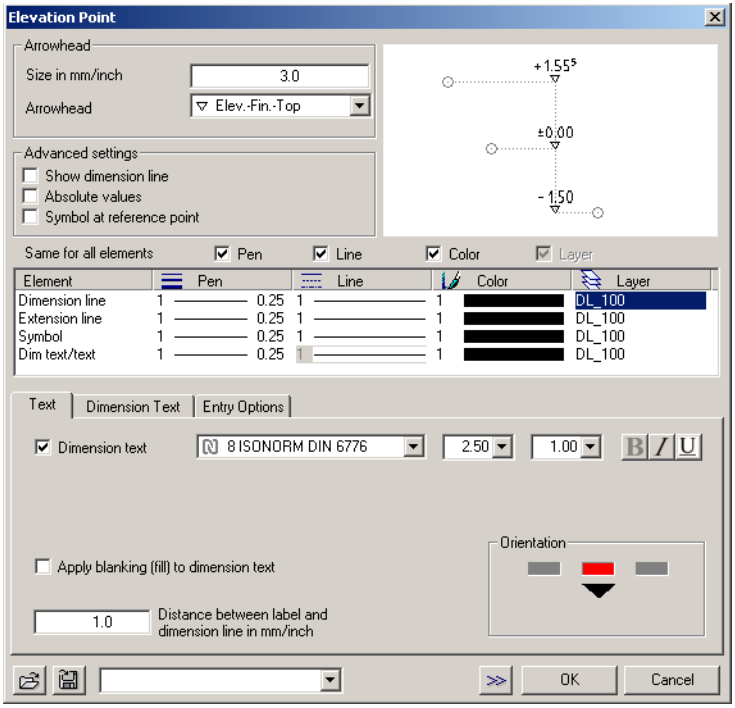
2 On the **Elevation Point** Context toolbar, select the type ⭡ **Upwards in a vertical direction.**
Then click **Properties.**



Elevation Point

☐ Absolute values
☐ Symbol at reference point

3 Select the **Arrowhead** (mark for finished floor) in the top part of the dialog box, set the format properties and activate the layer **DL_100** (see figure).
Set the parameters in the **Text** tab as shown below.



Elevation Point

Arrowhead
Size in mm/inch: 3.0
Arrowhead: ▽ Elev.-Fin.-Top

Advanced settings
☐ Show dimension line
☐ Absolute values
☐ Symbol at reference point

Same for all elements ☑ Pen ☑ Line ☑ Color ☑ Layer

Element	Pen		Line		Color	Layer
Dimension line	1	0.25	1	1	■	DL_100
Extension line	1	0.25	1	1	■	DL_100
Symbol	1	0.25	1	1	■	DL_100
Dim text/text	1	0.25	1	1	■	DL_100

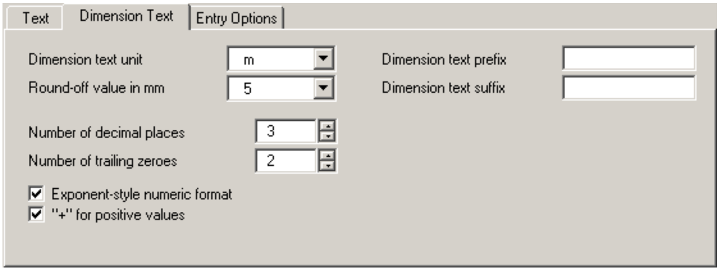
Text | Dimension Text | Entry Options

☑ Dimension text: 8 ISONORM DIN 6776, 2.50, 1.00

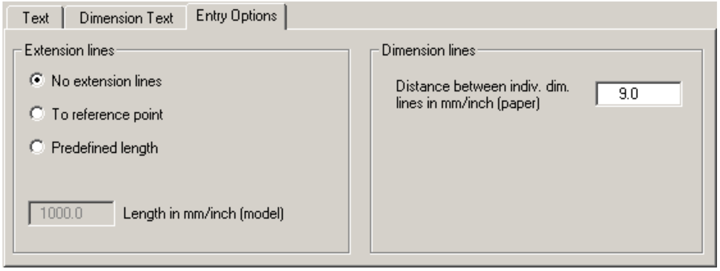
☐ Apply blanking (fill) to dimension text

1.0 Distance between label and dimension line in mm/inch

4 Set the options in the **Dimension Text** and **Entry Options** tabs as shown in the figures below. Press **OK** to confirm.



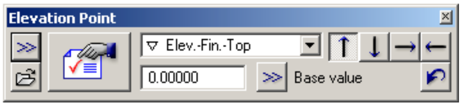
Dimension text unit: m
Round-off value in mm: 5
Number of decimal places: 3
Number of trailing zeroes: 2
☑ Exponent-style numeric format
☑ "+" for positive values
Dimension text prefix:
Dimension text suffix:



Extension lines
● No extension lines
○ To reference point
○ Predefined length
1000.0 Length in mm/inch (model)

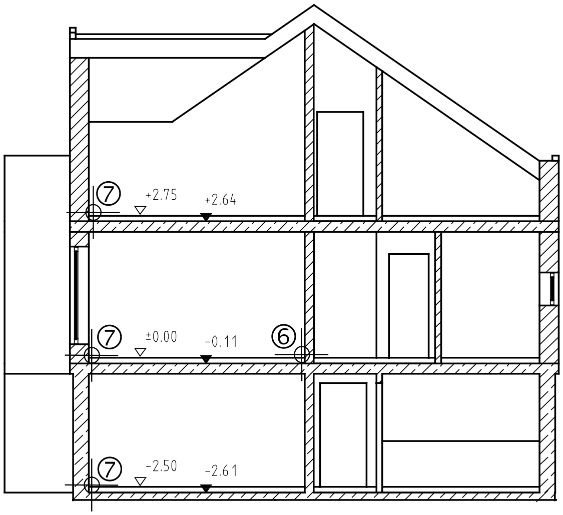
Dimension lines
Distance between indiv. dim. lines in mm/inch (paper): 9.0

5 Place a point through which the dimension line is to pass. The **Elevation Point** Context toolbar changes:



6 *Reference point*
This is a point that is assigned a value that you know.
First enter the base value in the Context toolbar: **0.00**
Then click a point of the finished floor in the ground floor.

7 Click the points to be dimensioned and press ESC.



8 In the **Properties** or on the Context toolbar, change the arrowhead to ▼ Elev.-Unf.-Top and dimension the unfinished floor (steps 5-7).

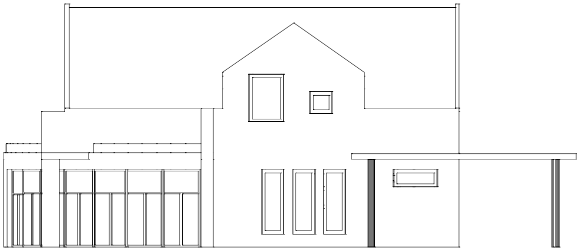
9 Press ESC to finish and quit the tool.

Exercise 11: Views

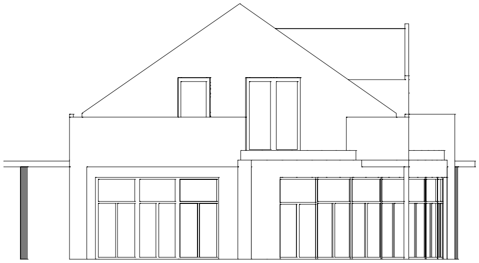
Displaying the building now in different elevations should be no problem as you are already familiar with the tools used.

Procedure

- Open the drawing files that contain the elements you want to display in the view.
- Select a view in the viewport or on the **View** menu, **Views**.
- Display the image as a hidden-line image (**Standard** toolbar) and save the result to an empty drawing file.



South elevation



West elevation

Unit 9: Area Calculation and Quantity Takeoff

The rooms will be created on a separate layer in the drawing file with the walls. This will ensure that all the design components are included in the calculation.

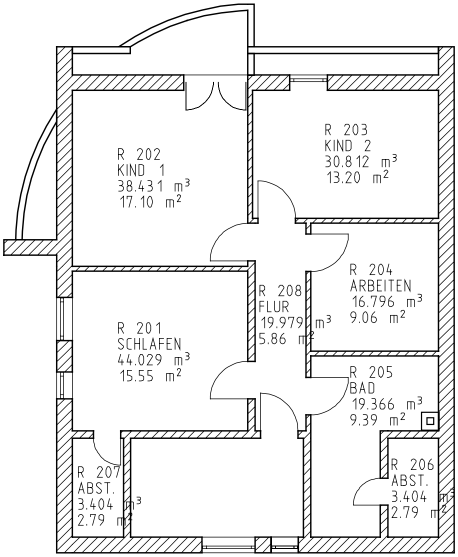
Two methods are provided for creating rooms:

- manually - enter polygons to define the boundary of each room separately. The rooms can be labeled immediately and assigned finish specifications.
- automatically - the system scans the drawing file for closed wall polygons and creates rooms on the basis of the wall polygons it detects. The rooms can only be labeled and assigned finish specifications later.

Exercise 12: Rooms, Finish and Area Calculation

Important notes on defining rooms

- In either case, you have to enter the height of the room first. You enter the height as you would for any other architectural element – you can even associate the height of rooms with reference planes or with other elements.
- It is advisable to work with reference planes consistently and to use a transparent plane concept for both components and rooms.
- So that you can differentiate visually between the rooms and the other elements on-screen, you should draw rooms using a different pen color.



You can only calculate areas according to floor space regulations and output the results to lists and schedules when you have defined rooms and entered finish specifications (for determining the finished dimensions).

Defining single rooms

In the exercises that follow, we will assign a finish to different surfaces in the roof and calculate the floor space. Here, we could employ the automatic room-generation approach. However, we will also consider the manual approach so that you can decide for yourself which is the more effective.

We will start by defining single rooms and labeling their wall surfaces, floors and ceilings. Then, you will be able to define the other rooms automatically.

To create a room

➲ Use **Open on a project-specific basis** to open the **Model** fileset and drawing file 121.

➲ Use **Select, Set Layers** to make the layer set **SC_Rooms** visible.

➲ In the **CAD Navigator**, switch to the **Quantity Takeoff** module.

1 Click **Room** (**Create** flyout) and activate the layer **RO_ROOM** (**Format** toolbar).

2 Select the pen (3) **0.50** (**Format** toolbar).

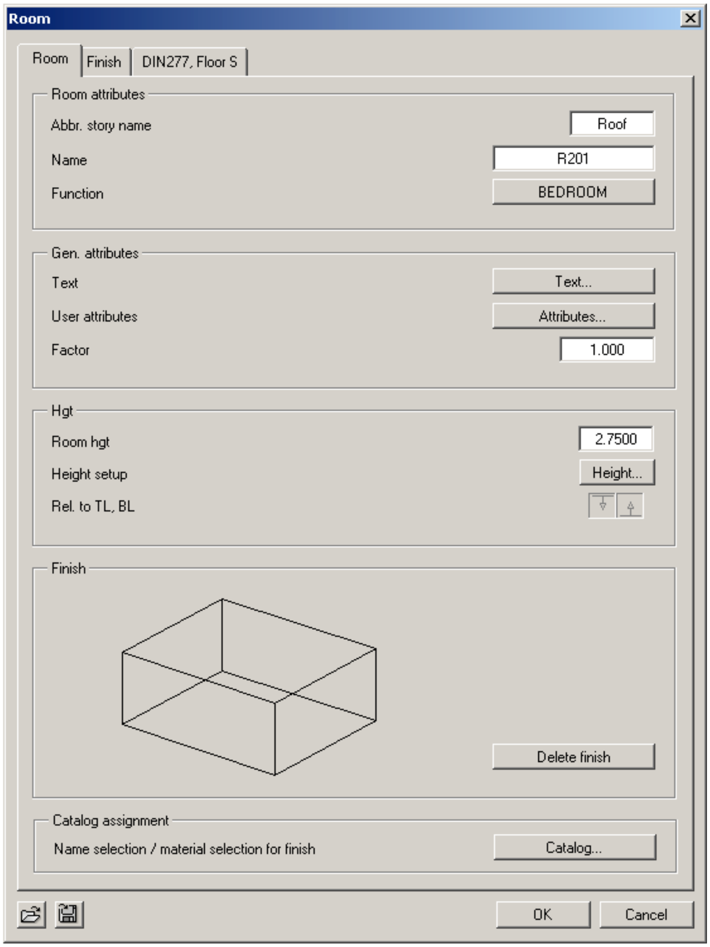
3 Click **Properties**.

Now enter properties for the room.

4 In the **Story Name** box, enter '**Roof**'. Click the **Name** box and enter the number of the room: **201**.

5 Click **Function** and use + to add a new entry to the list: **Bedroom**.

Tip: Entering a factor is useful for areas like balconies, for example, that only counted partially.



Room

Room | Finish | DIN277, Floor S

Room attributes

Abbr. story name: Roof

Name: R201

Function: BEDROOM

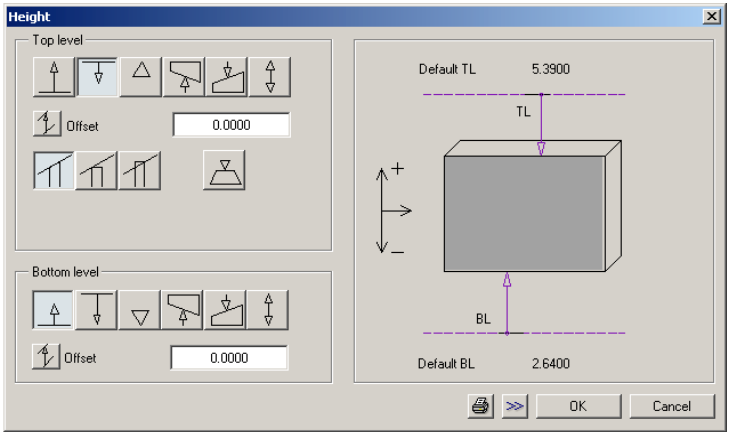
Gen. attributes

Factor: 1.000

Hgt

Room hgt: 2.7500

6 Click **Height** and define the top and bottom levels of the room in such a way that they match the settings defined for the walls in the roof.



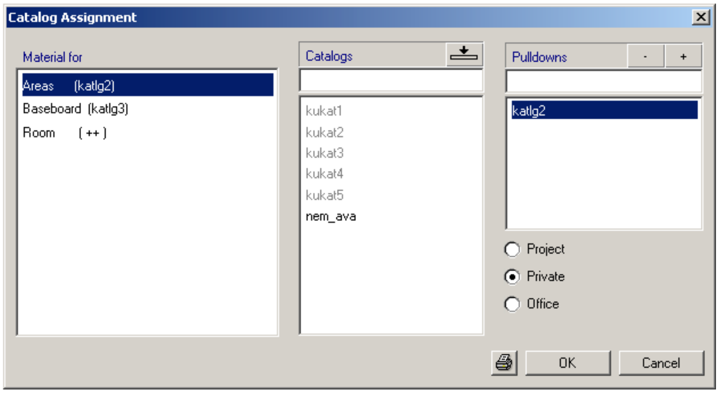
Top level Offset: 0.0000

Bottom level Offset: 0.0000

Default TL 5.3900

Default BL 2.6400

7 Click **Catalog** and set the catalog assignment for the areas.



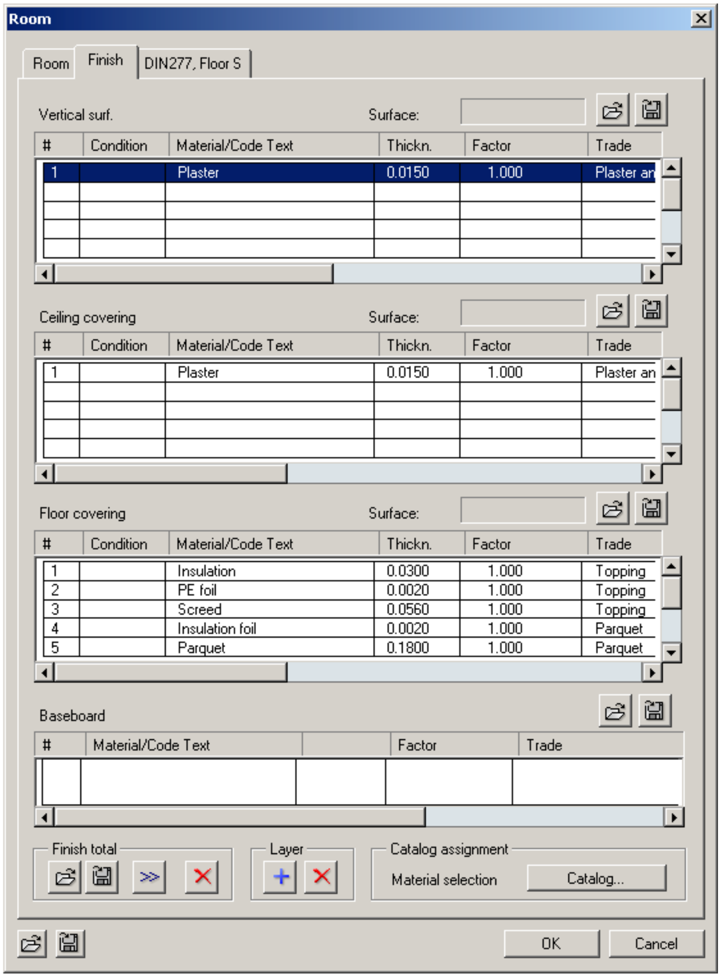
Areas (katlg2)
Baseboard (katlg3)
Room (++)

kukat1
kukat2
kukat3
kukat4
kukat5
nem_ava

katlg2

○ Project
● Private
○ Office

8 Select the **Finish** tab
and enter settings for the vertical surfaces, floors and ceilings.



Vertical surf.

#	Condition	Material/Code Text	Thickn.	Factor	Trade
1		Plaster	0.0150	1.000	Plaster an

Ceiling covering

#	Condition	Material/Code Text	Thickn.	Factor	Trade
1		Plaster	0.0150	1.000	Plaster an

Floor covering

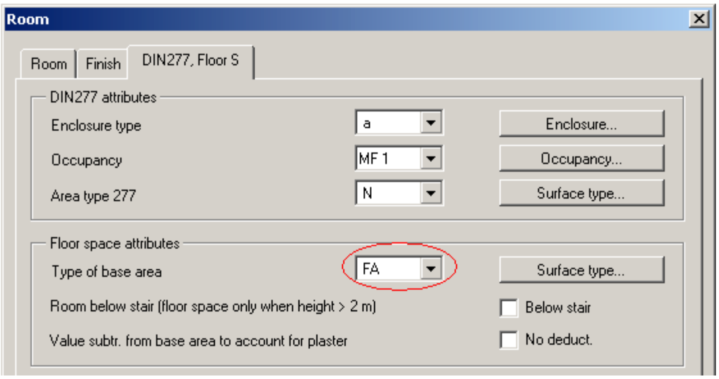
#	Condition	Material/Code Text	Thickn.	Factor	Trade
1		Insulation	0.0300	1.000	Topping
2		PE foil	0.0020	1.000	Topping
3		Screed	0.0560	1.000	Topping
4		Insulation foil	0.0020	1.000	Parquet
5		Parquet	0.1800	1.000	Parquet

Baseboard

#	Material/Code Text		Factor	Trade

Tip: Use 💾 to save combinations of settings as favorites. You can save the settings you make for room surfaces and specific surfaces as favorites.
With large-scale projects in particular, this saves time and increases quality as all those involved access the same favorites.

9 Select the **DIN277, Floor S.** tab and
select the **FA** area type (for living space) in the **Floor space attributes** area.



Room

Room | Finish | DIN277, Floor S

DIN277 attributes

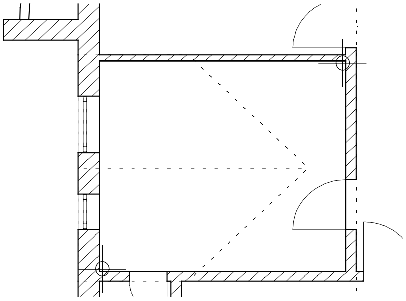
Enclosure type: a — Enclosure...
Occupancy: MF 1 — Occupancy...
Area type 277: N — Surface type...

Floor space attributes

Type of base area: FA — Surface type...
Room below stair (floor space only when height > 2 m) — ☐ Below stair
Value subtr. from base area to account for plaster — ☐ No deduct.

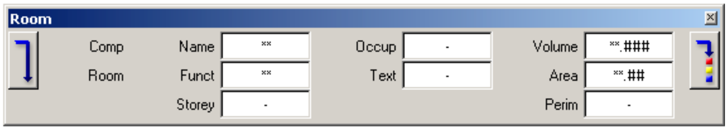
10 Press **OK** to confirm the dialog box.

11 In plan, click the diagonally opposite corners of the room under the dormer and press ESC.



12 Make settings for the label. The label in this exercise will include information on the **name**, **function**, **volume** and **area** of the room.
Click in the relevant boxes to exclude them from the label.

Tip: Click ⤵ to switch to the text parameters.

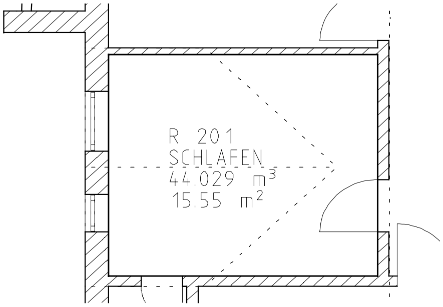


Room

Comp
Room
Name: **
Funct: **
Storey: -
Occup: -
Text: -
Volume: **.###
Area: **.##
Perim: -

13 Activate the layer **AR_LABEL** for the label.

14 Click in the room to place the label (a preview of the label is displayed attached to the crosshairs).



15 Press ESC to quit the tool.

Creating rooms automatically

In the next exercise you will create the other rooms automatically. This involves two steps.

- Define all the rooms using **Auto-Room**
- Label with **Redefine Rooms, Surfaces, Stories.** The finish will be defined immediately when you label the rooms or later using special functions.

To create rooms automatically

1 Click **Auto Room** (**Create** flyout).

2 Click **Height** on the Dynamic toolbar and check the height setting.

3 Define a selection rectangle that encloses the design but that does not include any parts of the balconies. This quits the tool and creates the rooms.

Note: **Auto-Room** will not change any rooms you have already defined.

Finish specifications

You have already defined the finish of the single room; in other words, you have assigned vertical surfaces, ceilings and floors (as well as baseboard).

These surfaces are given properties (for example, material, building trade and thickness). This information is used when calculating floor space and performing quantity takeoff calculations.

The rooms you have defined automatically have not yet been assigned any finish specifications.

Surfaces can be defined in two manners:

Tip: You can use this approach to modify surfaces that have been created using **Room.**

- By defining them as a single entity for the entire room.
  - Finish specifications are created when a room is entered using the **Room** tool, **Finish** tab, or at a later stage using th **Finish Specifications** tool.
    When you modify rooms, you can also define or modify the finish for an entire room using **Redefine Rooms, Surfaces, Stories, Finish** tab.
- By defining them one by one - this will allow you to define separate surfaces within the same area - for example, a tiling pattern up to a specific height.
  - Special surfaces are entered using the **Vertical Surface**, **Ceiling**, **Floor** or **Baseboard** tools.

In the exercises that follow, you will learn how to employ the different methods.

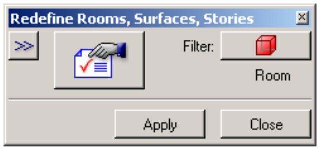
Finish specifications for an entire room (as a modification)

Now we will label the rooms created automatically. The finish settings will be copied from the existing room called “bedroom” and assigned to the rooms as you create the label.

To assign finish specifications to and label rooms

1 Click **Redefine Rooms, Surfaces, Stories** (**Edit** flyout).

2 Make sure that the **Room** filter is enabled on the Context toolbar.



3 Click **Match** and then click within the room called “Bedroom”.

All the attributes of the “Bedroom” (name, finish, type of area) are copied to the modified room.

4 Click **Properties**.
Enter a name in the **Room** tab:
R 202 and **Child 1** for the function. You can add entries to the list using +.

5 Switch to the **Finish** tab.

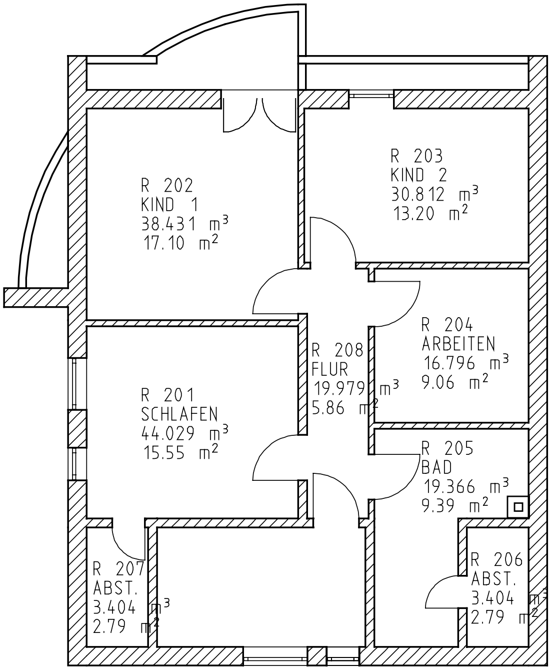
The finish defined for the “Bedroom” is displayed; changes are not necessary at the moment.

6 Check the settings on the **DIN277, Floor S.** tab:

The **FA** area type has also been copied from the “Bedroom”.

7 Click in the room at top left in your drawing and click the right mouse button to confirm.

8 Place the label.



9 Repeat steps 4, 7 and 8 with the other rooms.
Enter the function of the rooms as shown above; the rooms are numbered automatically.
The settings you defined for finish and type of area are retained until you change them, and they are automatically assigned to the modified room together with the label.

10 Press ESC to quit the tool.

The balcony will be defined as a separate room.
Specify a **Function** and **Name**, enter a factor of **0.5** and delete all the finish specifications using the **Delete Finish** button.

For the ceiling and vertical surfaces of the bathroom, we will assign a plaster covering which matches that of the other rooms, and we will specify the materials for the floor which differ from those in the other rooms we have defined so far.

Moreover, we will assign all the walls of the bathroom a tiling pattern that is max. 2 m high. This tiling pattern also needs to be given a height value – relative to the room.

The procedure for creating finish specifications and special surfaces is explained now. The bathroom will serve as our example.

Finish specifications for an entire room

To define finish specifications

1 Click **Finish Specifications** (**Edit** flyout).

2 Enter specifications in the property sheet (see illustration on page 407). These specifications will apply to the entire surface of that type in the room or to all the sides of the room.

Although the tiling pattern is not as high as the entire wall, it is applied to all the sides of the room; this is why the tiling pattern can also be defined as a finish specification.

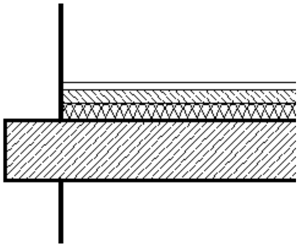
Note: Tiling patterns or other surfaces that differ in height or that are not applied to all the sides in a room are defined separately as special surfaces (see section below).

Note: Do not forget to enable the relevant check boxes!

Note: When you move the horizontal slide bars to the right, additional columns appear.
You can assign custom surfaces to ceilings, floors and vertical surfaces, and in addition, you can assign hatching, patterns or fills to ceilings and floors. Furthermore, you can define the height of vertical surfaces relative to the room.

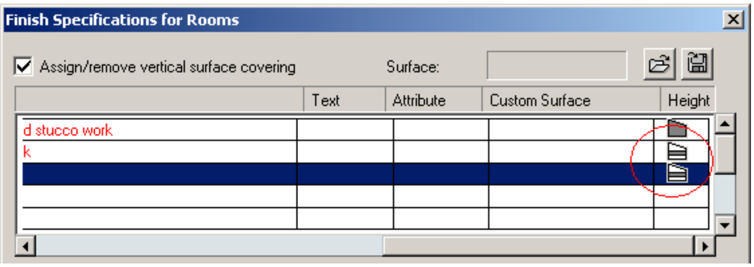
Note: Surfaces you have already defined are overwritten as soon as you activate the check box for the surface in the dialog box – regardless whether or not there are assignments in the dialog box.

Tip: You can also include ceilings and floor (finish specifications) in sections. Make the relevant settings in the **Special Settings for Archit. Components** area of the **Hidden Line Image Wireframe** (**Standard** toolbar) tool.

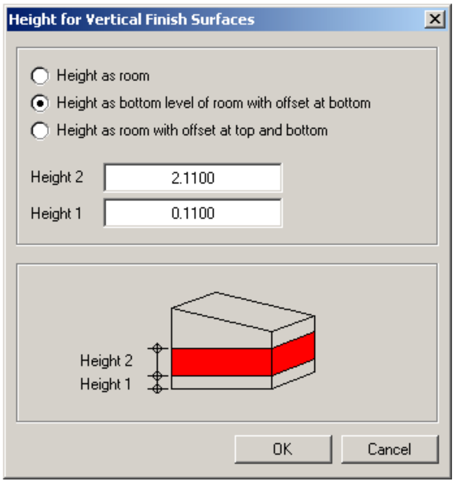


3 The vertical surfaces with the tiling pattern are entered as follows:

- The pattern is applied to the full height of the room, you do not need to take any special conditions into account (default setting).
- Mortar and tiles are not applied to the full height. To enter the height relative to the room, move the slide bar to the right and click the **Height** column.


Finish Specifications for Rooms
☑ Assign/remove vertical surface covering
Surface:
Text
Attribute
Custom Surface
Height
d stucco work
k

- Set the height as follows:



Height for Vertical Finish Surfaces

○ Height as room

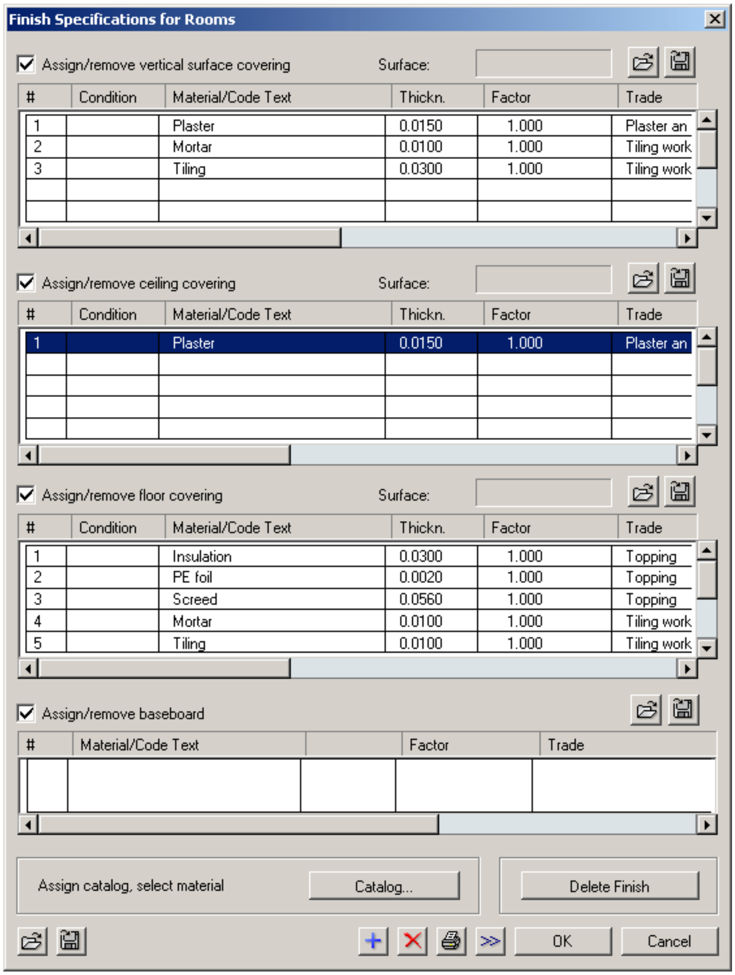
● Height as bottom level of room with offset at bottom

○ Height as room with offset at top and bottom

Height 2: 2.1100

Height 1: 0.1100

The dialog box should now look like this:



Finish Specifications for Rooms

☑ Assign/remove vertical surface covering Surface:

#	Condition	Material/Code Text	Thickn.	Factor	Trade
1		Plaster	0.0150	1.000	Plaster an
2		Mortar	0.0100	1.000	Tiling work
3		Tiling	0.0300	1.000	Tiling work

☑ Assign/remove ceiling covering Surface:

#	Condition	Material/Code Text	Thickn.	Factor	Trade
1		Plaster	0.0150	1.000	Plaster an

☑ Assign/remove floor covering Surface:

#	Condition	Material/Code Text	Thickn.	Factor	Trade
1		Insulation	0.0300	1.000	Topping
2		PE foil	0.0020	1.000	Topping
3		Screed	0.0560	1.000	Topping
4		Mortar	0.0100	1.000	Tiling work
5		Tiling	0.0100	1.000	Tiling work

☑ Assign/remove baseboard

#	Material/Code Text		Factor	Trade

4 Press **OK** to confirm.

5 Click the **bathroom.**

6 Right-click to confirm the selection.
The finish specifications are assigned to the surfaces in the bathroom, even though they are invisible.

7 Press ESC to quit the tool.

Tip: You can apply finish specifications to a whole series of rooms.
To do this, simply enclose the rooms in a selection window and/or use the **Brackets** tool.

Alternative: finish specifications for specific surfaces (special surfaces)

The tiling pattern that is max. 2 m high is not to be assigned to all the walls. Only the walls near sanitary fittings are concerned. These surfaces are entered as special vertical surfaces.

As the bathroom is bounded in part by sloping walls, we will set the height of these surfaces using a special option.

> Special surfaces have a higher priority than 'finishing surfaces' and will intersect them at points where they meet.

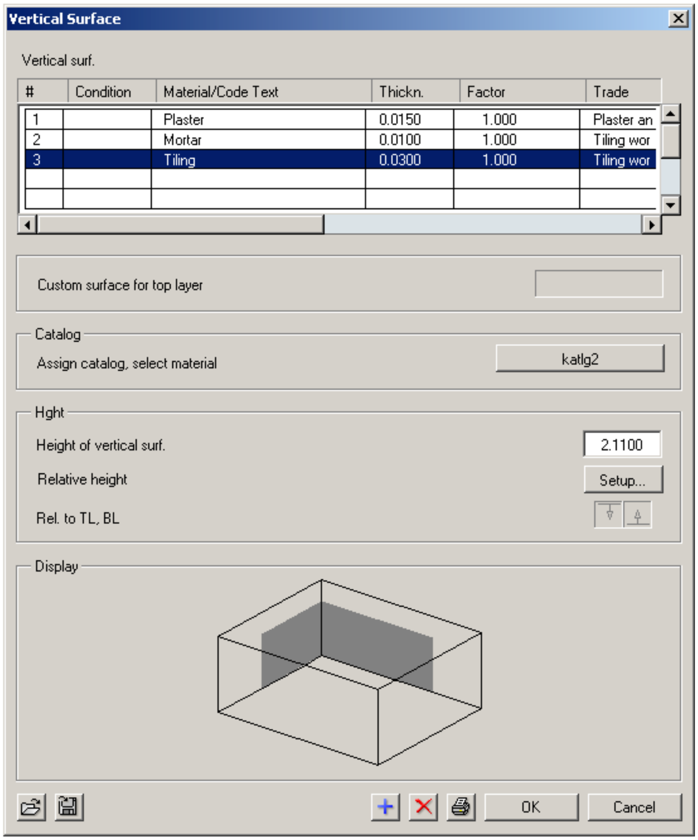
To define vertical surfaces

Tip: Select a different pen (e.g. pen 8, green) for the plan view.

1 Click **Vertical Surface** (**Create** flyout) and activate the layer **RO_VERSU**.

2 Click **Properties.**

3 Enter a **material**, **building trade** and **thickness** for each coat/layer in the surface.
The system will apply the surface to the area of the unfinished structure without taking the coat of plaster (defined earlier for calculating the area) into account. The plaster should therefore be entered as the first layer/coat in the surface properties. Using this approach, you can re-define just specific parts of a surface from scratch.



Vertical Surface

Vertical surf.

#	Condition	Material/Code Text	Thickn.	Factor	Trade
1		Plaster	0.0150	1.000	Plaster an
2		Mortar	0.0100	1.000	Tiling wor
3		Tiling	0.0300	1.000	Tiling wor

Custom surface for top layer

Catalog

Assign catalog, select material: katlg2

Hght

Height of vertical surf.: 2.1100

Relative height: Setup...

Rel. to TL, BL

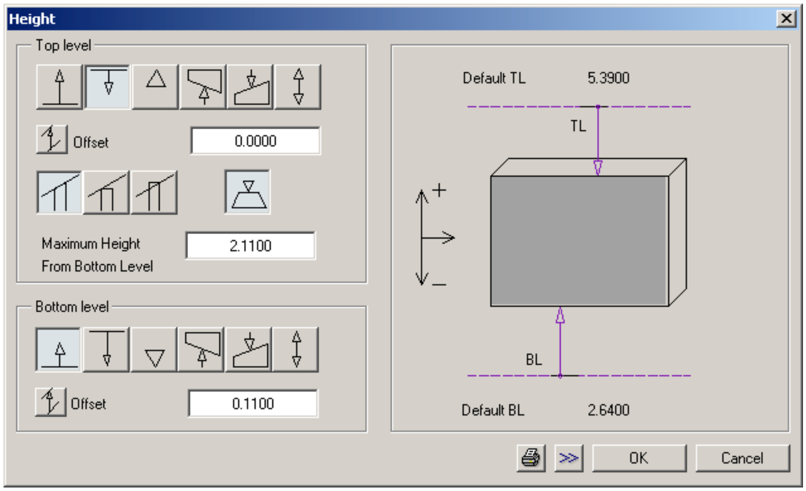
Display

4 Click **Setup** and make the following settings:

- **TL relative to upper plane**, but only up to 2 m from finished floor (= 2.11 m from unfinished floor).

  Therefore,

- click **Maximum component height** and enter **2.11**.



Offset 0.0000

Maximum Height From Bottom Level 2.1100

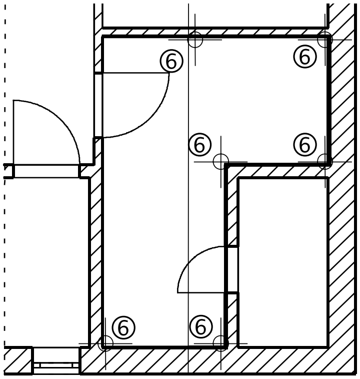
Offset 0.1100

Default TL 5.3900

Default BL 2.6400

5 Press **OK** to confirm all the dialog boxes.

6 In plan, click the corners of the boundary delimiting the room. First, click the top right corner at an offset of approximately 2m (this is where the bathtub ends). Press ESC to close the polyline.



7 Place the label and then press Esc to finish.
If you do not wish to apply a label, just press ESC first.

Area calculation according to regulations

New regulations for calculating floor space and areas came into effect on January 1st, 2004. As opposed to the second calculation directive, precise finished dimensions have to be used and subtracting a flat-rate percentage to account for plaster is no longer permitted.

Using the finish specifications you have defined for every room, you can calculate floor space and areas according to the new regulations without any problem.

Allplan 2005 provides different types of lists for performing area calculations. The following options are available in each list (or schedule):

- For calculations according to the new regulations, use the precise finished dimensions resulting from the finish specifications and/or vertical surfaces, floors and ceilings (based on finished dimensions)
- You can still use the second calculation directive to calculate floor space and areas:
  a value subtracted to account for plaster and covering (based on unfinished dimensions less a percentage for plaster to be subtracted from the overall area)
- Area of structure (based on unfinished dimensions)

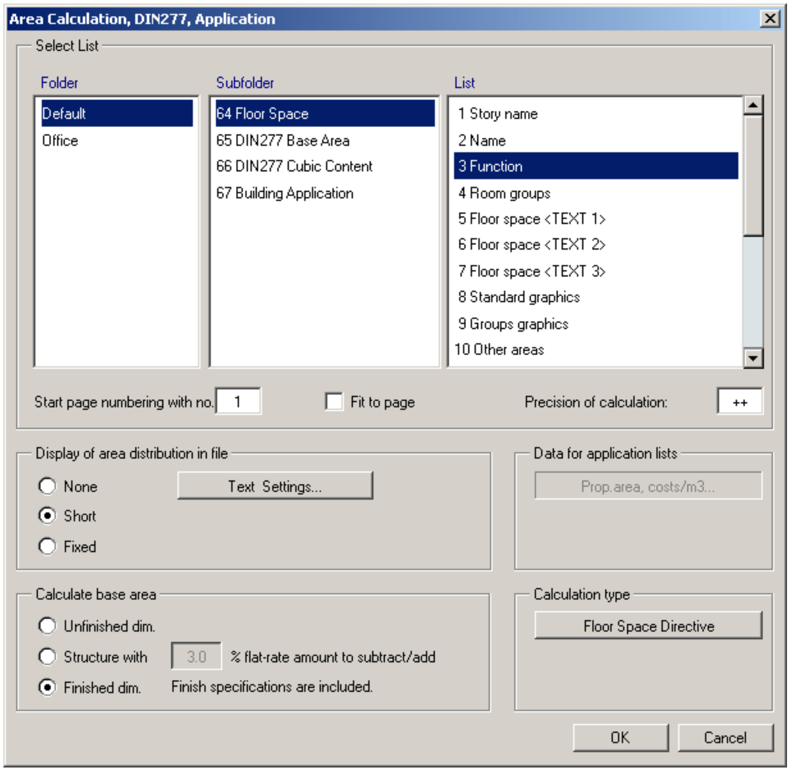
To calculate floor space

➲ Make drawing file **124** current and set **121** to edit mode.

1 Click **Area Calculation, Application** (**Create** flyout).

2 Select the **Default** folder. In the **Floor Space** sub-folder, select the list called **Function**.

3 Enable the **Finished dim.** option.



Area Calculation, DIN277, Application

Select List

Folder	Subfolder	List
Default	64 Floor Space	1 Story name
Office	65 DIN277 Base Area	2 Name
	66 DIN277 Cubic Content	3 Function
	67 Building Application	4 Room groups
		5 Floor space <TEXT 1>
		6 Floor space <TEXT 2>
		7 Floor space <TEXT 3>
		8 Standard graphics
		9 Groups graphics
		10 Other areas

Start page numbering with no. 1

☐ Fit to page

Precision of calculation: ++

Display of area distribution in file

○ None
● Short
○ Fixed

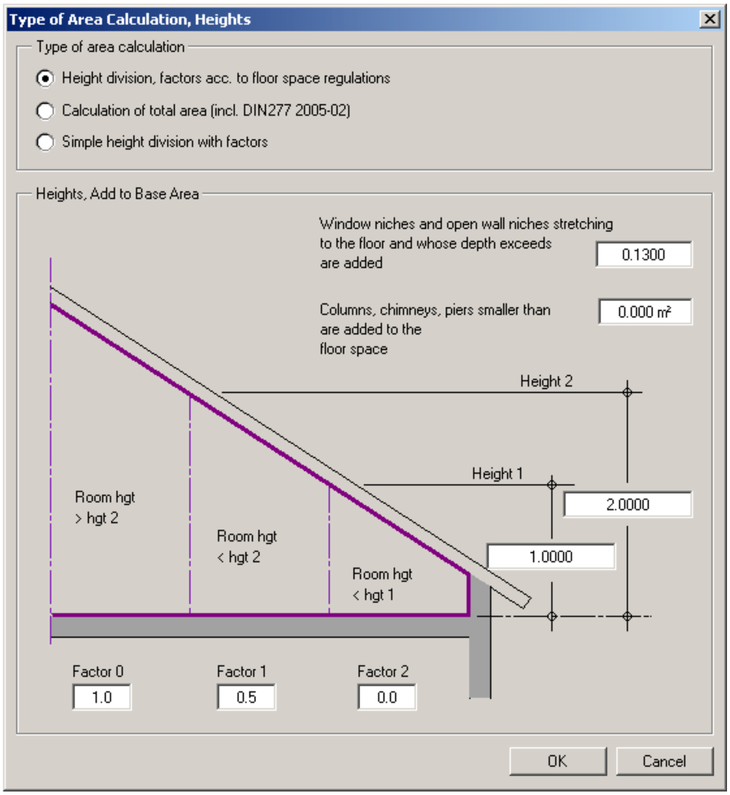
Data for application lists

Calculate base area

○ Unfinished dim.
○ Structure with 3.0 % flat-rate amount to subtract/add
● Finished dim. Finish specifications are included.

Calculation type

4 With **Calculation type**, you can define the **directive** according to which areas are calculated.
Each of the factors can be modified.



Type of Area Calculation, Heights

Type of area calculation

● Height division, factors acc. to floor space regulations

○ Calculation of total area (incl. DIN277 2005-02)

○ Simple height division with factors

Heights, Add to Base Area

Window niches and open wall niches stretching to the floor and whose depth exceeds are added: 0.1300

Columns, chimneys, piers smaller than are added to the floor space: 0.000 m²

Height 2: 2.0000

Height 1: 1.0000

Factor 0: 1.0

Factor 1: 0.5

Factor 2: 0.0

5 Press **OK** to confirm.

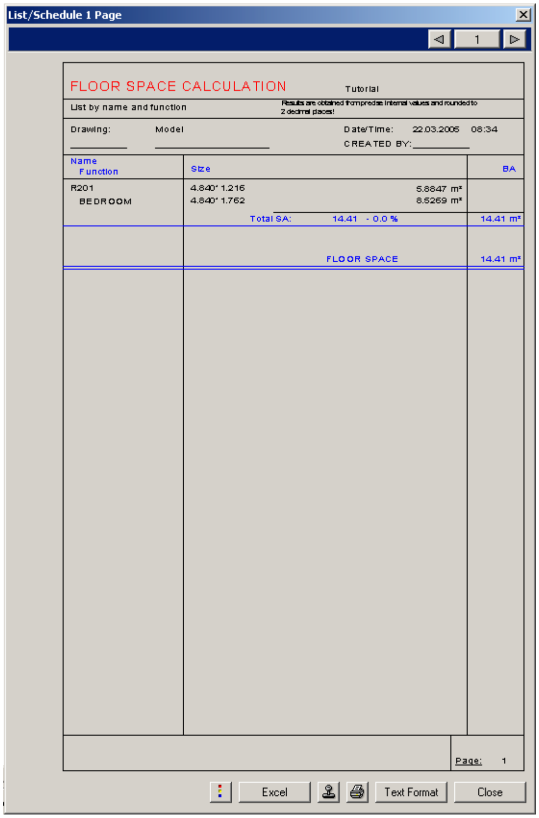
Tip: You can print out the schedule, copy it to the Clipboard, transfer it to Excel and save it as ASCII file.

6 Enclose all the rooms in a selection window.
The list should now be displayed on-screen. To scroll, use the buttons at top right in the schedule.

7 Near the bottom right-hand corner of the list, choose to copy the list into the drawing file.
A preview of the list should now be visible attached to the crosshairs.

8 Set the list's drop-in point beside the floor plan.

9 To finish area calculation, press ESC.



FLOOR SPACE CALCULATION Tutorial

List by name and function

Results are obtained from precise internal values and rounded to 2 decimal places!

Drawing: Model

Date/Time: 22.03.2005 08:34

CREATED BY:

Name Function	Size		BA
R201 BEDROOM	4.840* 1.216 4.840* 1.762	5.8847 m² 8.5269 m²	
	Total SA: 14.41 - 0.0 %		14.41 m²
	FLOOR SPACE		14.41 m²

Page: 1

Tip: Click on the dashed lines in the list head to enter the name of the project author and other information.

Exercise 13: Quantity Takeoff

Lists and schedules

You can use the **Lists/Schedules** tool in any module in the Architecture family to generate schedules based on the building model sorted according to different criteria.

Allplan 2005 comes with a number of ready-made schedules. These are arranged by category. You can also create your own, custom schedules and save them in the **Office** folder.

Tip: Detailed information on all architectural lists and schedules is provided in the online help on Allplan 2005.

To output a schedule – summary

- Open the drawing files with the elements to be included in the calculation. The only requirement is the presence of the specified criteria in the drawing files.
- Click **Lists/Schedules** and select one of the schedules in the list. The entry you choose lays down the criteria according to which the system will scan the drawing files for elements.
- Optional: use **Find Elements** to enter additional filter criteria.
- Define the area of the drawing files to be searched (entire drawing file or just parts of it).
- Print the schedule, display it in the drawing file or save it as ASCII.

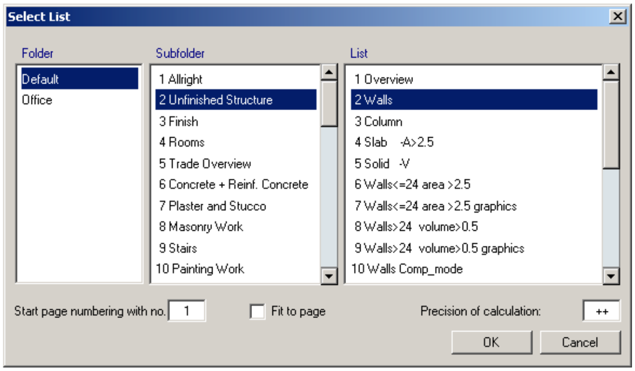
In the following exercises, we present some of the schedules that come with the program and show how to enter additional search criteria.

To output a schedule

- Open drawing file **121 Roof, model** and close the others.
- Make layers **AR_WALL**, **AR_COL** and **AR_CHIMN** visible. Hide the other layers.

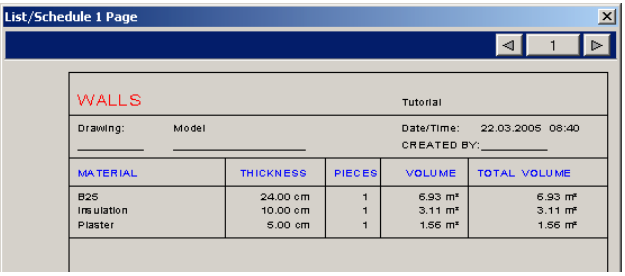
1 Click **Lists/Schedules** (**Create II** flyout).

2 Select the **Default** folder, in the **Unfinished Structure** sub-folder, select the list called **Walls** and press **OK** to confirm.



Start page numbering with no. 1
☐ Fit to page
Precision of calculation: ++

3 Click **All** on the Dynamic toolbar or click twice with the right mouse button in the workspace (**do not** double click!!).
The list/schedule is displayed and you can print it out, save it with the drawing file or save it as ASCII.



WALLS Tutorial

Drawing: Model
Date/Time: 22.03.2005 08:40
CREATED BY:__________

MATERIAL	THICKNESS	PIECES	VOLUME	TOTAL VOLUME
B25	24.00 cm	1	6.93 m^3	6.93 m^3
Insulation	10.00 cm	1	3.11 m^3	3.11 m^3
Plaster	5.00 cm	1	1.56 m^3	1.56 m^3

4 Press ESC to finish.

Using search criteria, you can analyze the building in many different ways. To analyze the entire building, all the relevant drawing files need to be activated.

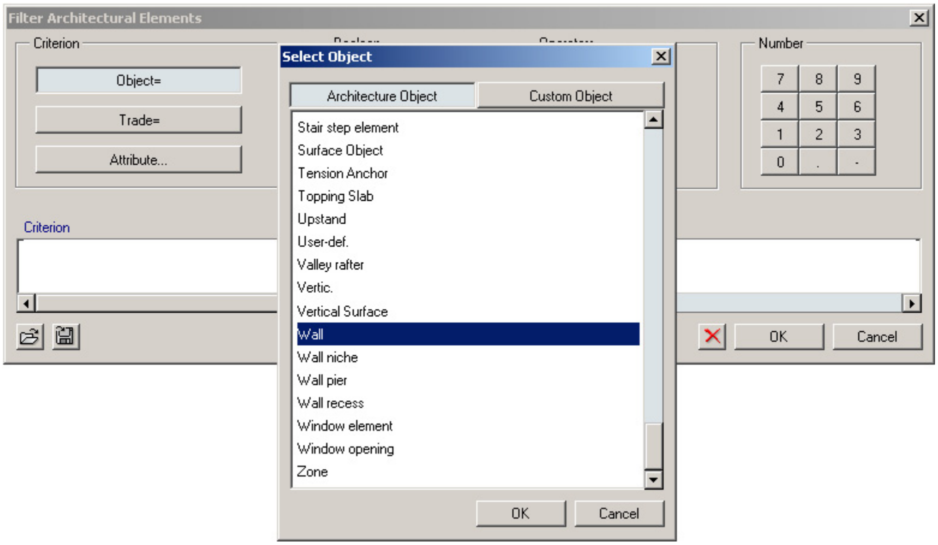
Based on the sample schedule generated above, we will define a search criterion. We will list only walls that are 11.5 cm thick.

To enter search criteria

1 Click **Lists/Schedules** (**Create II** flyout) and select the entry **Unfinished Structure/Walls** again. Press **OK** to confirm.

2 On the **Dynamic toolbar**, click **Find.**

3 Click **Object** and in the dialog box that appears, select the object you want to find: **Wall**. Press **OK** to confirm.

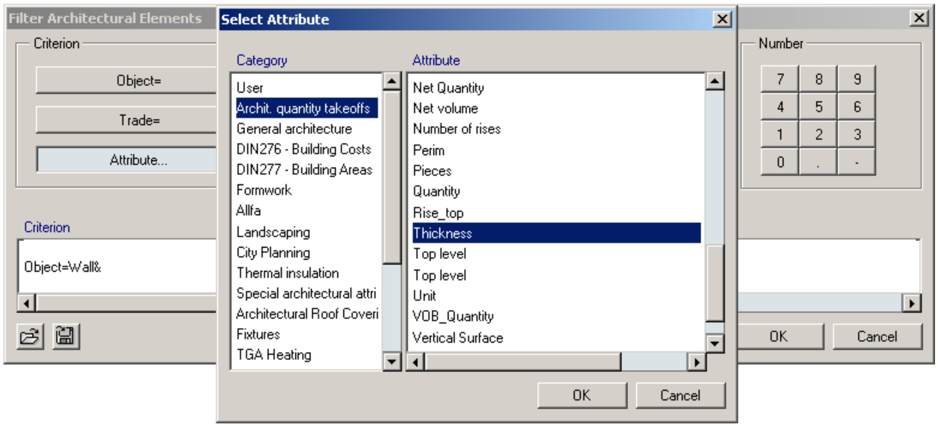


You can use Boolean operators to link your search criteria.

4 Click & **"and"** (logical AND).

The second criterion in this case is a property/attribute of the object **wall** - its **thickness**.

5 Click **Attribute** and in the **Architectural Quantities** category, select the **Thickness** attribute. Press **OK** to confirm.



Category: Archit. quantity takeoffs

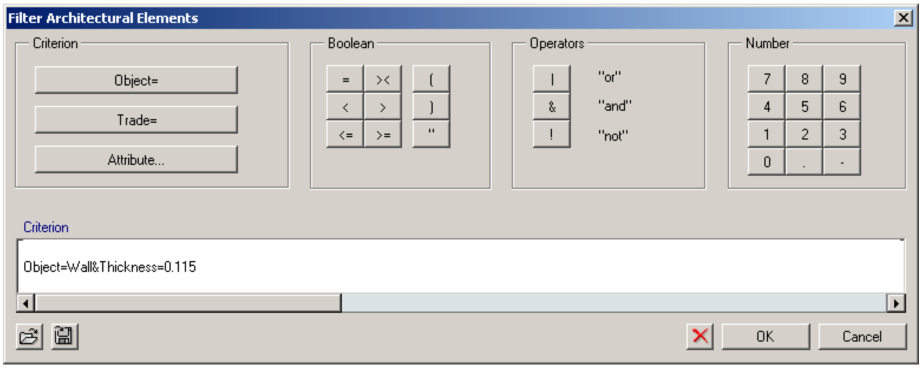
Attribute: Thickness

Criterion: Object=Wall&

Tip: You can use ✕ to undo the entries in the Criterion line one by one.

6 Select the comparison criterion =.

7 Use the **number pad** on the right to enter a value for the thickness: **0.115**. To do this, click the figures in the **Number** area. The search criterion should now look like this:



Criterion: Object=Wall&Thickness=0.115

8 Press **OK** to confirm.

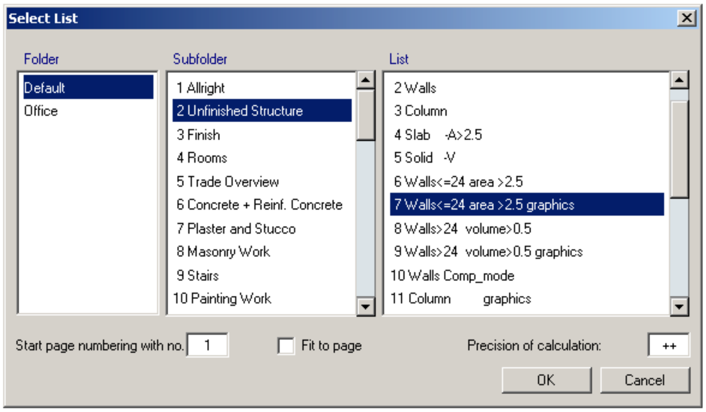
9 Click **All** on the Dynamic toolbar or click twice with the right mouse button in the workspace (**do not** double click!!). The schedule now includes only those walls that match the criterion.

10 Press ESC to quit the tool.

Below is an overview of some schedules to illustrate possible applications.

Tip: Quantity takeoff operations can be performed in such a way that you can transfer the quantities to a program for tendering, ordering and billing.
When assigning materials, you should therefore use material catalogs with item numbers, e.g. the SirAdos catalog or your own custom catalogs.

Schedules in the **Unfinished Structure** subfolder also include areas and volumes to be subtracted in compliance with building regulations. These schedules come with and without graphics.



Folder: Default, Office (Default selected)

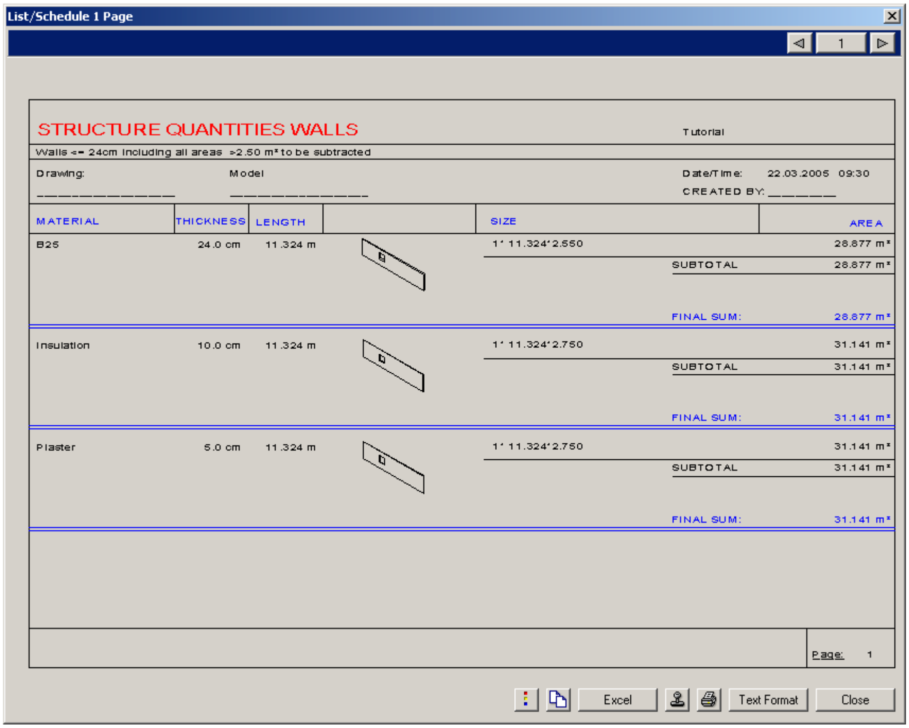
Subfolder: 1 Allright, 2 Unfinished Structure (selected), 3 Finish, 4 Rooms, 5 Trade Overview, 6 Concrete + Reinf. Concrete, 7 Plaster and Stucco, 8 Masonry Work, 9 Stairs, 10 Painting Work

List: 2 Walls, 3 Column, 4 Slab -A>2.5, 5 Solid -V, 6 Walls<=24 area >2.5, 7 Walls<=24 area >2.5 graphics (selected), 8 Walls>24 volume>0.5, 9 Walls>24 volume>0.5 graphics, 10 Walls Comp_mode, 11 Column graphics

Start page numbering with no. 1

☐ Fit to page

Precision of calculation: ++



STRUCTURE QUANTITIES WALLS Tutorial

Walls <= 24cm including all areas >2.50 m^2 to be subtracted

Drawing: ____________ Model ____________

Date/Time: 22.03.2005 09:30

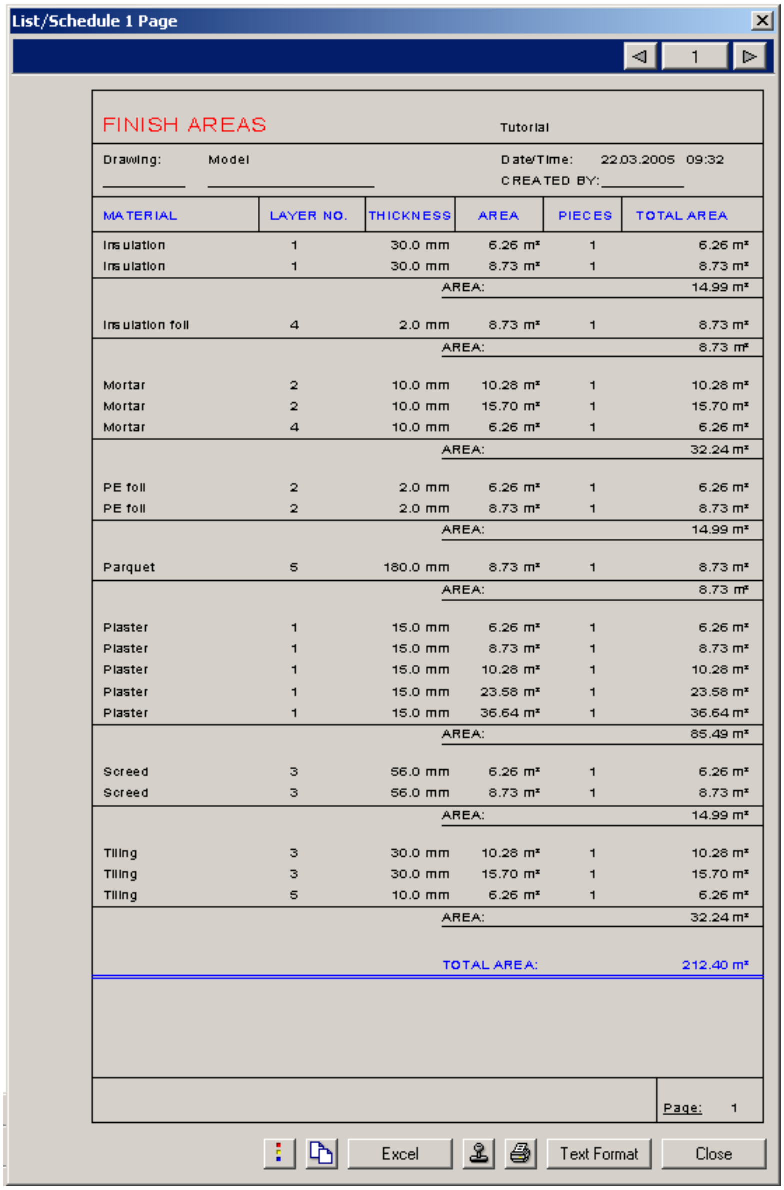
CREATED BY: ______

MATERIAL	THICKNESS	LENGTH	SIZE		AREA
B25	24.0 cm	11.324 m	1* 11.324*2.550		28.877 m^2
				SUBTOTAL	28.877 m^2
				FINAL SUM:	28.877 m^2
Insulation	10.0 cm	11.324 m	1* 11.324*2.750		31.141 m^2
				SUBTOTAL	31.141 m^2
				FINAL SUM:	31.141 m^2
Plaster	5.0 cm	11.324 m	1* 11.324*2.750		31.141 m^2
				SUBTOTAL	31.141 m^2
				FINAL SUM:	31.141 m^2

Page: 1

If you defined finish specifications, you can also generate schedules that list them in different ways. Try it out for yourself and generate a schedule for the finish in the bathroom. In this case, you do not need to open and select everything – just select the bathroom (enclose it in a selection rectangle or click the room). The following figure shows the schedule 'Default → 3 Finish → 4 Finish Specs'. The layer you assigned to the rooms needs to be visible and modifiable.

Tip: The values entered for reveals are also taken into account in these lists and schedules.
Requirement: the reveal needs to have been defined when the window openings were entered.



FINISH AREAS Tutorial

Drawing: Model

Date/Time: 22.03.2005 09:32

CREATED BY:

MATERIAL	LAYER NO.	THICKNESS	AREA	PIECES	TOTAL AREA
Insulation	1	30.0 mm	6.26 m²	1	6.26 m²
Insulation	1	30.0 mm	8.73 m²	1	8.73 m²
		AREA:			14.99 m²
Insulation foil	4	2.0 mm	8.73 m²	1	8.73 m²
		AREA:			8.73 m²
Mortar	2	10.0 mm	10.28 m²	1	10.28 m²
Mortar	2	10.0 mm	15.70 m²	1	15.70 m²
Mortar	4	10.0 mm	6.26 m²	1	6.26 m²
		AREA:			32.24 m²
PE foil	2	2.0 mm	6.26 m²	1	6.26 m²
PE foil	2	2.0 mm	8.73 m²	1	8.73 m²
		AREA:			14.99 m²
Parquet	5	180.0 mm	8.73 m²	1	8.73 m²
		AREA:			8.73 m²
Plaster	1	15.0 mm	6.26 m²	1	6.26 m²
Plaster	1	15.0 mm	8.73 m²	1	8.73 m²
Plaster	1	15.0 mm	10.28 m²	1	10.28 m²
Plaster	1	15.0 mm	23.58 m²	1	23.58 m²
Plaster	1	15.0 mm	36.64 m²	1	36.64 m²
		AREA:			85.49 m²
Screed	3	56.0 mm	6.26 m²	1	6.26 m²
Screed	3	56.0 mm	8.73 m²	1	8.73 m²
		AREA:			14.99 m²
Tiling	3	30.0 mm	10.28 m²	1	10.28 m²
Tiling	3	30.0 mm	15.70 m²	1	15.70 m²
Tiling	5	10.0 mm	6.26 m²	1	6.26 m²
		AREA:			32.24 m²
		TOTAL AREA:			212.40 m²

Page: 1

Using the same approach, you can generate schedules based on the building trade assigned to the various elements in your model. Naturally, this will only work when the elements have actually been assigned a building trade.

Building lists

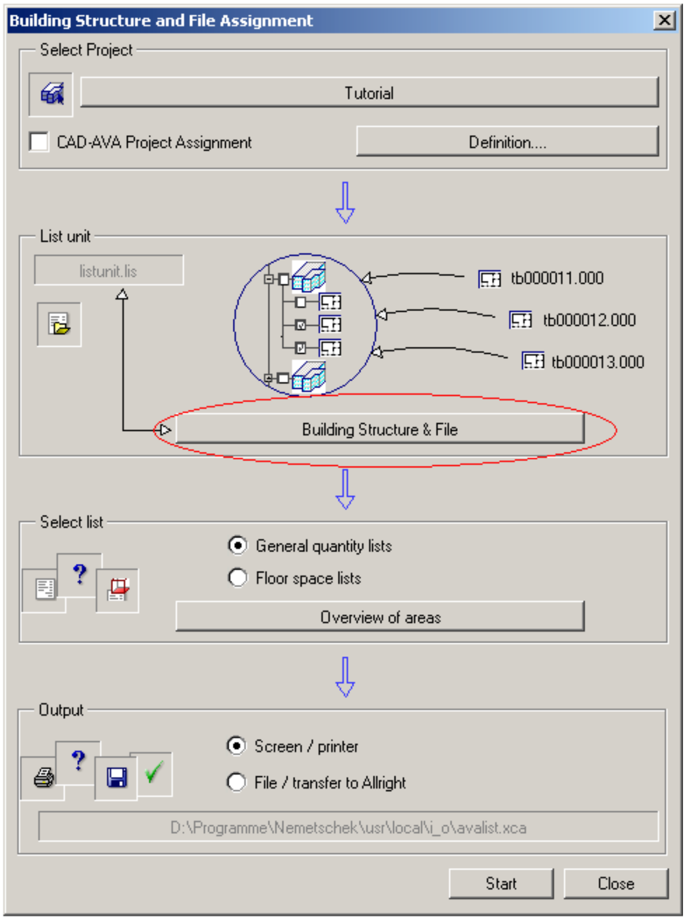
Building lists allow you to perform analyses in the output schedules with which you are already familiar. The drawing files do not need to be loaded for this. The building list is arranged in a tree structure using drag & drop. Next, the components of the building list to be analyzed are defined and you can start the operation.

With **building lists**, the entire contents of drawing files are always selected. Only the visible layers, however, are analyzed. It is therefore necessary to select the layers to be analyzed beforehand.
You can also perform searches according to specific criteria here.

To create a building list

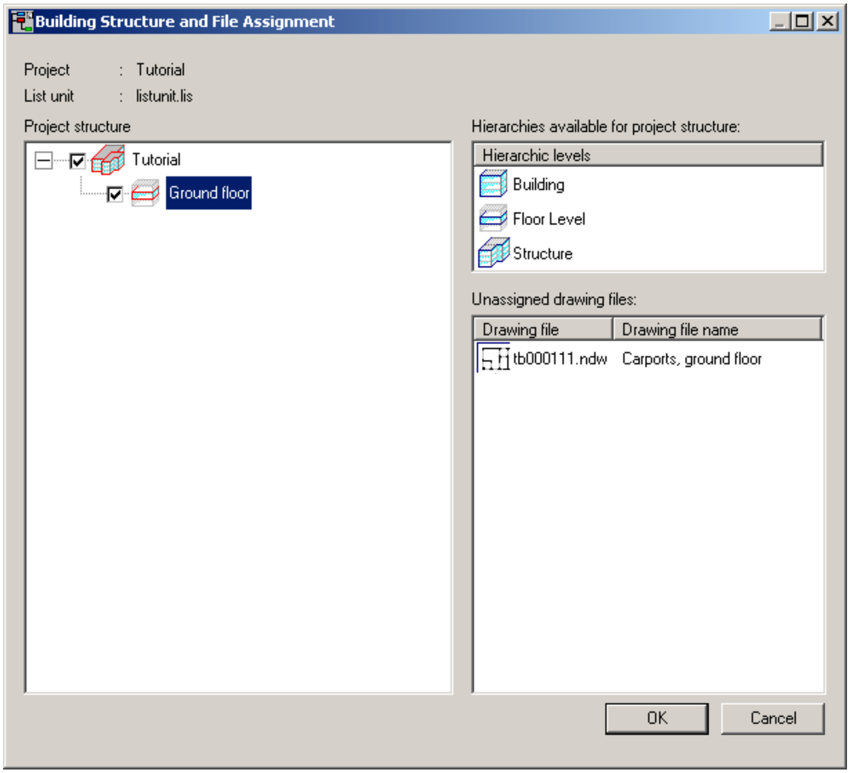
1 On the **File** menu, click **Building Lists....**

2 Click **Building Structure & File.**



3 Press and hold the left mouse button and drag the **Floor Level** from the list of levels to **Tutorial** (release the mouse button).

4 Overwrite the name by entering **Ground floor.**


Building Structure and File Assignment
Project structure
Hierarchies available for project structure:
Hierarchic levels
Building
Floor Level
Structure
Unassigned drawing files:
OK
Cancel

Project : Tutorial
List unit : listunit.lis

☑ Tutorial
☑ Ground floor

Drawing file	Drawing file name
tb000111.ndw	Carports, ground floor

5 Using the same approach, drag the drawing files **111** and **112** to the **Ground floor** level in the project structure.

6 Expand the project structure so that it includes the **roof floor** and drawing files **121**, **123** and **126.**

7 Activate the check box for the **Tutorial** project.
This activates all the elements below – floor levels and drawing files.

8 Press **OK** to confirm.

9 In the **Select List** area, select **General quantity lists** and click **Areas, overview.**

10 Select the **Default** folder, in the **Unfinished Structure** sub-folder, select the list called **Walls** and press **OK** to confirm.

11 In the **Output** area, select **Screen / printer** and click **Start.**

Unit 10: Layout Output

Don’t forget to set up the printer/plotter before you start printing or plotting.

With Allplan 2005 you can also quickly make hard copies of the contents of the workspace as well as set up complex layouts for plotting.

To bring the final drawing to paper, all the filesets and drawing files are arranged in a layout.

Requirements for Plotting

Before you print or plot, the output device needs to be configured correctly. If you are working in a network, you can use any device connected to a remote machine (assuming it is configured correctly).

To do this, you first need to connect the output device.

For more detailed information, please consult your printer's or plotter's user guide or the documentation of the operating system.

Making a quick printout

Often, it is convenient to have the current edit status on paper without having to assemble a layout first.
You can do this by printing the screen contents to a printer or plotter.

To print out the contents of the screen

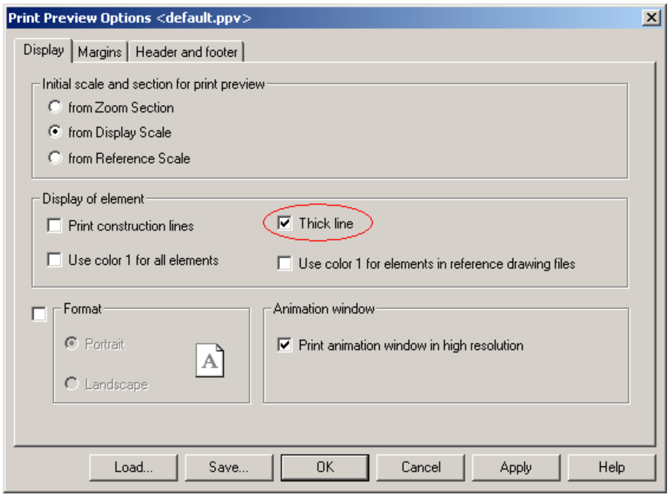
➲ Drawing file 121 is active.
Make the layers AR_WALL, AR_CHIMN and DL_100 visible and hide all the other layers.

1 Click **Print Preview** (**Standard** toolbar).

2 Click **Print Preview Options**, select the **Display** tab and enable the **Thick line** check box This ensures that all the different line weights are printed out as such.

Tip: To print more screen contents, click **Print** on the **Standard** toolbar.

This prints using the most recent settings.



Print Preview Options <default.ppv>

Initial scale and section for print preview
○ from Zoom Section
● from Display Scale
○ from Reference Scale

Display of element
☐ Print construction lines
☑ Thick line
☐ Use color 1 for all elements
☐ Use color 1 for elements in reference drawing files

☐ Format
● Portrait
○ Landscape

Animation window
☑ Print animation window in high resolution

3 Click **Set up printer** and select a printer.

4 Click **Show entire image.**

5 Click **Print.**

6 Press ESC to close the print preview.

Exercise 14: Custom Title Block

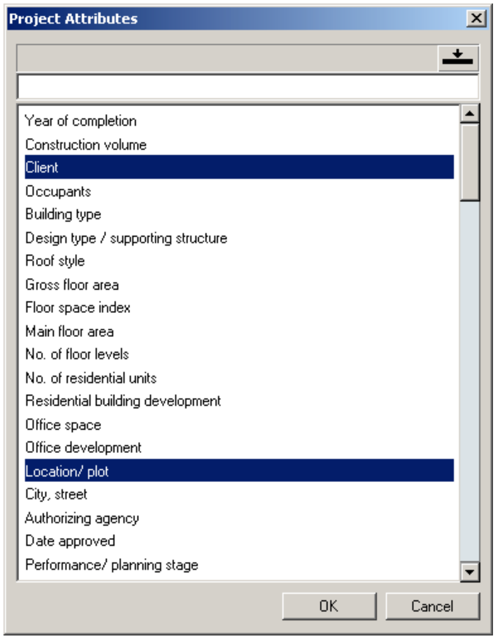
Allplan 2005 provides a wide range of ”intelligent” title blocks based on label styles. Label styles contain design entities, text and attributes.
The advantage of these kinds of labels is that the text they contain will update each time you open the layout.
You can define your own, custom label styles.

To assign attributes

1 On the **File** menu, click **Open Project....** .

2 Click **Select Attributes....** .

3 Select the following attributes:
Client, Location/plot, Architect, Structural analysis, Construction project name, Client address, Architect address.

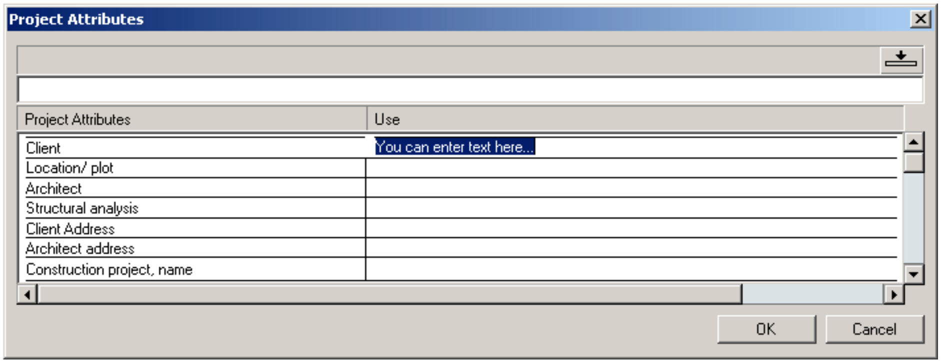


Project Attributes

Year of completion
Construction volume
Client
Occupants
Building type
Design type / supporting structure
Roof style
Gross floor area
Floor space index
Main floor area
No. of floor levels
No. of residential units
Residential building development
Office space
Office development
Location/ plot
City, street
Authorizing agency
Date approved
Performance/ planning stage

4 Select the **Tutorial** project and click **Settings....**

5 Click **Assign Attributes...** and label the attributes by clicking in the column on the right and then entering text.



Project Attributes	Use
Client	You can enter text here...
Location/ plot	
Architect	
Structural analysis	
Client Address	
Architect address	
Construction project, name	

6 Press **OK** to confirm the settings and close the **Project Attributes** and **Project Settings** dialog boxes.

7 To close the **Select Project** dialog box, click **Cancel.**

The attributes you just assigned will now be used in the label style for the title block.
You do not need to draw the title block from scratch. You can use the one that you defined near the beginning of this workbook.

To create the title block as a label style

- Open an **empty drawing file** and close all the others.
- Select the **Quantity Takeoff** module.
- Set the scale to **1:1**.

1 Click **Get from Library** (**Standard** toolbar).

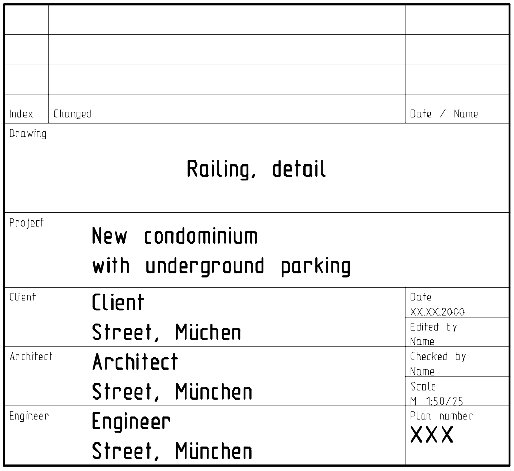
2 In the dialog box which appears, select the **Office** folder and the **Text** library.
This is where you saved the title block in Unit 2.

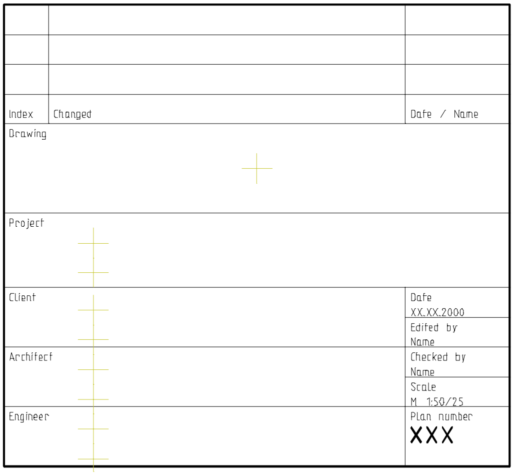
3 Select **Title block** and then **Sample structure**.

4 Place the title block and press ESC to close the dialog box.

5 Delete the text that is to be replaced by attributes (project-specific information).

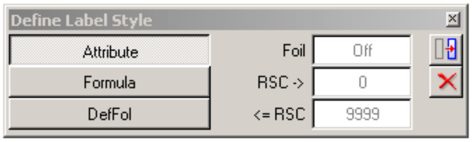
Tip: Place **construction-line** format **single points** at the start of the original text items to be deleted (**Draft** module, **Create** flyout) so that you can position the custom label styles quickly later and with great accuracy.



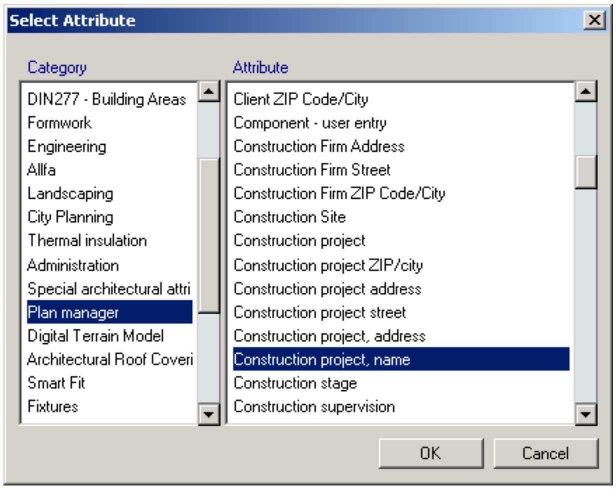


6 Click **Define Label Style** (**Create II** flyout).

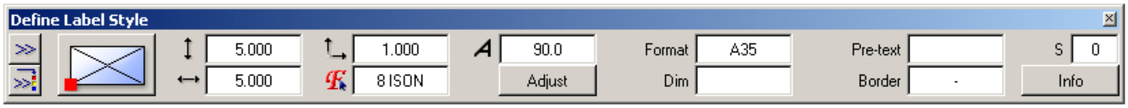
7 On the Context toolbar, click **Attribute**.



8 In the **Plan manager** area, select the **Construction project, name** attribute and press **OK** to confirm.



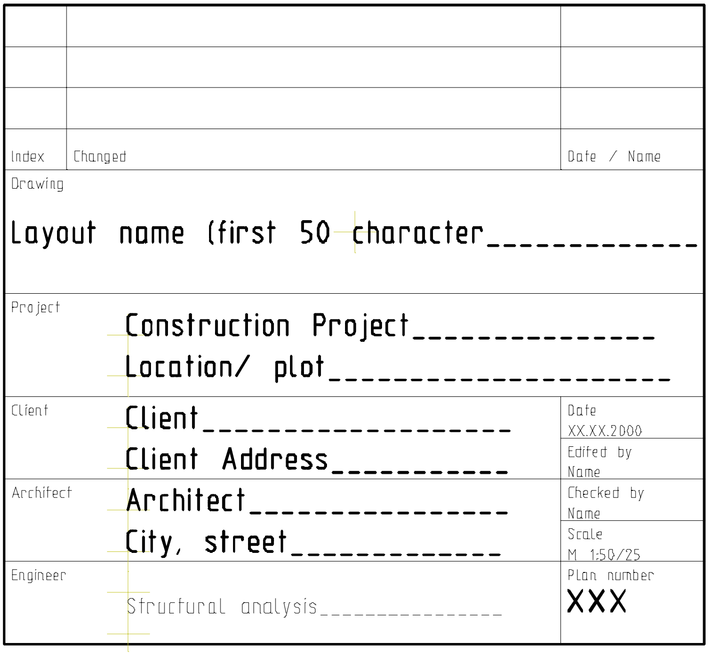
9 Set the text parameters as shown below and change the format: **A35**.
This defines the attribute as a text item with 35 characters maximum.



10 Set the attribute so that it is left-aligned in the box for the construction project details.

11 Repeat steps 7 through 10 and place the following attributes:

Category	Attribute	Format
Plan manager	Construction project, name	A35
	Location/plot	A35
	Client	A35
	Client address	A35
	Architect	A35
	Architect address	A35
	Structural analysis	A35
Admin	Plan name (1-50 characters)	


Index
Changed
Date / Name
Drawing
Layout name (first 50 character____________
Project
Construction Project_______________
Location/ plot______________________
Client
Client____________________
Client Address___________
Date
XX.XX.2000
Edited by
Name
Architect
Architect________________
City, street_____________
Checked by
Name
Scale
M 1:50/25
Engineer
Structural analysis________________
Plan number
XXX

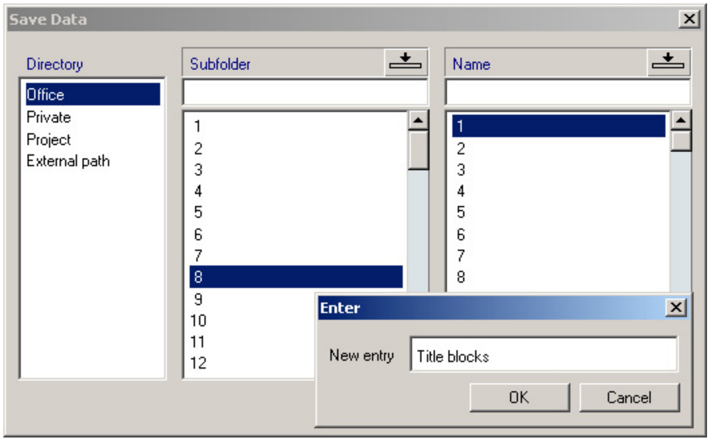
12 Click **DefFol** (Define Foil).

13 Enclose the entire title block in a selection rectangle using the left mouse button.

14 Click the point at bottom right. This will serve as the reference point.

> Title blocks must always be saved in the subfolders 7 and 8 as these subfolders are associated with the **Label** tool in the **Plot Layout** module.

15 Click sub-folder number **8** and enter **Title blocks**.



New entry: Title blocks

16 Click the entry number **1** and enter **Structure**.

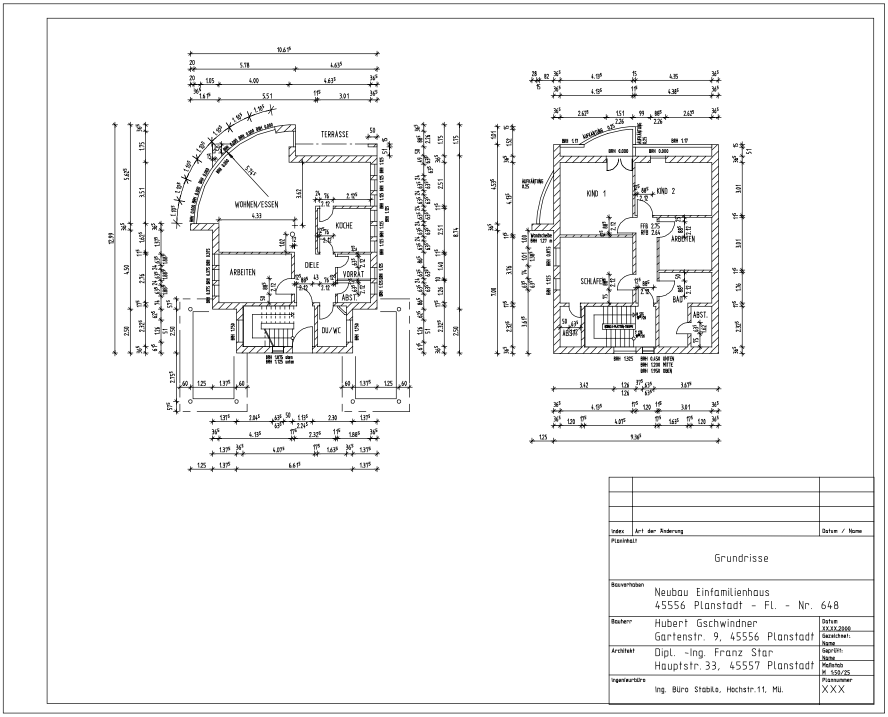
17 Press ESC to quit the tool.
The title block is now saved as a label style.

Layout output

Printing out finished layouts is a critical step. In Allplan 2005, a layout is the element that you bring to paper. As opposed to design using a conventional drafting board, the scope of the layout does not have to be defined in advance.

Generally, you leave the layout (which involves arranging and laying out drawing files and/or filesets) until you're finished with the design. This is also the stage where you define the paper size, scale, border, angle, etc

Each project can contain up to 3000 layouts.



Index	Art der Änderung	Datum / Name

Planinhalt
Grundrisse

Bauvorhaben
Neubau Einfamilienhaus
45556 Planstadt - Fl. - Nr. 648

Bauherr
Hubert Gschwindner
Gartenstr. 9, 45556 Planstadt

Datum
XX.XX.2000

Gezeichnet:
Name

Architekt
Dipl. -Ing. Franz Star
Hauptstr. 33, 45557 Planstadt

Geprüft:
Name

Maßstab
M 1:50/25

Ingenieurbüro
Ing. Büro Stabilo, Hochstr.11, Mü.

Plannummer
XXX

Assembling the layout

In the following exercises you will set up a layout with the floor plans of the ground and first floors of the sample building.
This involves two steps:

- Setting up the layout i.e. defining the sheet size and border
- Selecting the elements for the layout i.e. the filesets/drawing files and the title block.

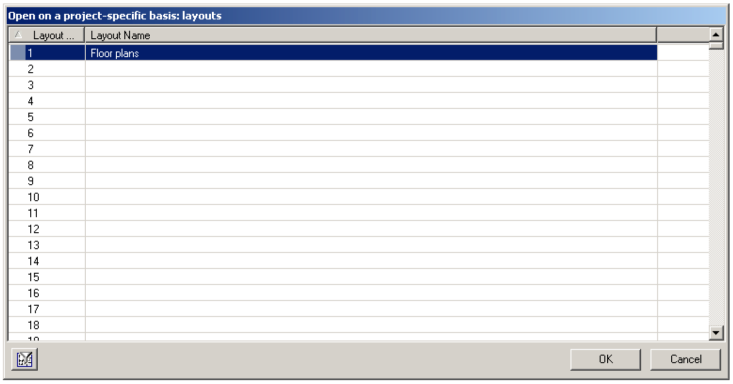
To define the layout

➲ Switch to layout editor mode.
To do this, click **Layout Editor** on the **Standard** toolbar or **File** menu. The icon remains pressed down until you quit the layout editor and switch back to drawing file edit mode.

The **Plot Layout** module is activated automatically.

1 Click **Open on a project-specific basis.**

Tip: The name you enter here will appear as the **Plan name** attribute in the title block!



Open on a project-specific basis: layouts

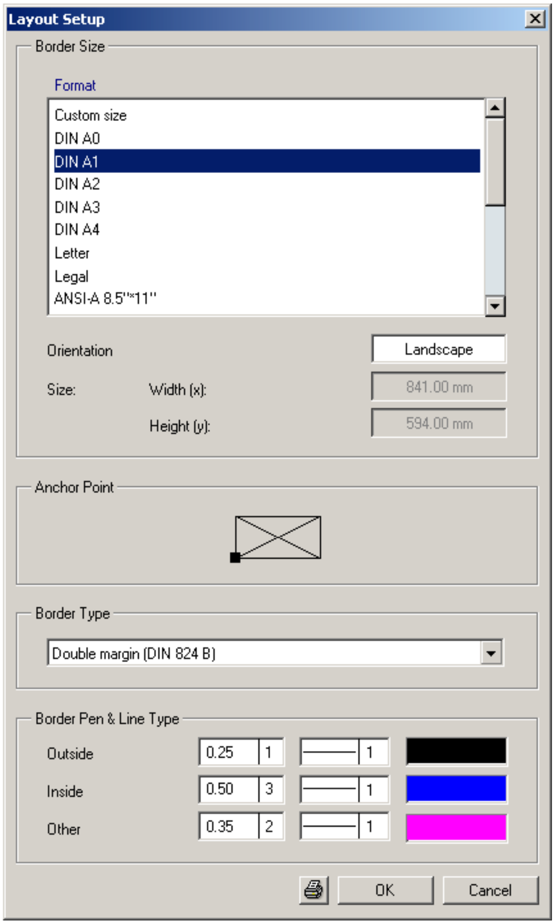
Layout ...	Layout Name
1	Floor plans
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	
17	
18	

2 Click in row **1**, enter **Floor plans** and press **OK** to confirm.

3 Click **Layout Border** (**Create** flyout).

4 Select **DIN A1** for the border size.

5 Set the **anchor point** and
select the border type **Double margin (DIN 824 B)**.



Layout Setup

Border Size

Format

- Custom size
- DIN A0
- DIN A1
- DIN A2
- DIN A3
- DIN A4
- Letter
- Legal
- ANSI-A 8.5"*11"

Orientation: Landscape

Size: Width (x): 841.00 mm

Height (y): 594.00 mm

Anchor Point

Border Type: Double margin (DIN 824 B)

Border Pen & Line Type

Outside	0.25	1	────	1	■
Inside	0.50	3	────	1	■
Other	0.35	2	────	1	■

6 Press **OK** to confirm.

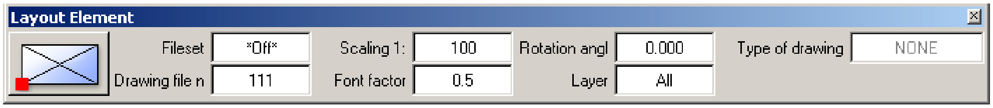
7 Place the border in the bottom left inside corner of the sheet.

Layout elements are mainly drawing files that you place in the layout. You can specify which layers are to be included in the printout by selecting a layer set.

To select layout elements

1 Click **Layout Element** (**Create** flyout).

2 On the Context toolbar, click the **File** box and select the drawing file number **111 Ground floor, model.**



Layout Element

Fileset: *Off*
Drawing file n: 111
Scaling 1: 100
Font factor: 0.5
Rotation angl: 0.000
Layer: All
Type of drawing: NONE

3 Click the **Layer** button, enable the **Layer set** option and select the **LS Design** layer set.

4 Place it in the layout.

Drawing file **112** is now automatically displayed attached to the crosshairs.

5 Click **Layer** and select the layer set called. **LS Design**. Press **OK** to confirm.

6 To position the drawing file correctly, click within the boundary of the drawing file already placed.

The outline of drawing file 116 is now attached to the crosshairs.

7 Click **File**, select number **121** and select the layer set **LS Design**.

8 Place it in the layout.

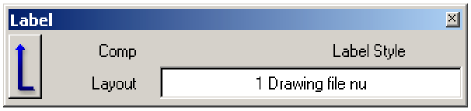
9 Press ESC to finish selecting layout elements.

10 Click **Label** (**Create** flyout).

11 Click the layout border.

Tip: To change the annotation for the layout, switch to the **Text** module and use the standard text editing tools.

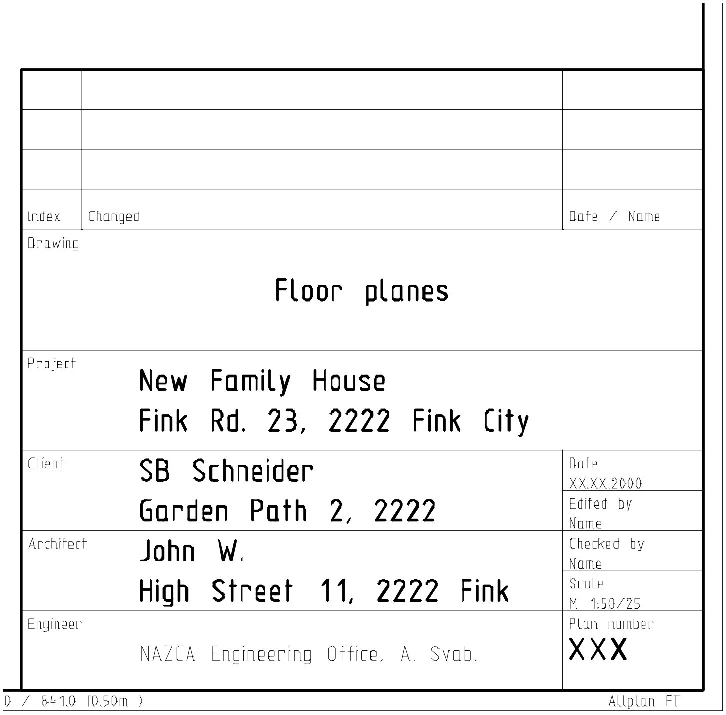
12 Click in the **Label Style** box.



Label Style
1 Drawing file nu

13 In the **Office** folder, select the label style called **Structure** and press **OK** to confirm.

14 Place the title block in the bottom right corner.
Instead of attributes, the values assigned are now displayed.



Index | Changed | Date / Name

Drawing
Floor planes

Project
New Family House
Fink Rd. 23, 2222 Fink City

Client
SB Schneider
Garden Path 2, 2222

Architect
John W.
High Street 11, 2222 Fink

Engineer
NAZCA Engineering Office, A. Svab.

Date
XX.XX.2000

Edited by
Name

Checked by
Name

Scale
M 1:50/25

Plan number
XXX

D / 841.0 (0.50m) Allplan FT

The finished layouts are saved and can be plotted straight away or later, as you choose.

Plotting layouts

The finished layout now needs to be plotted.

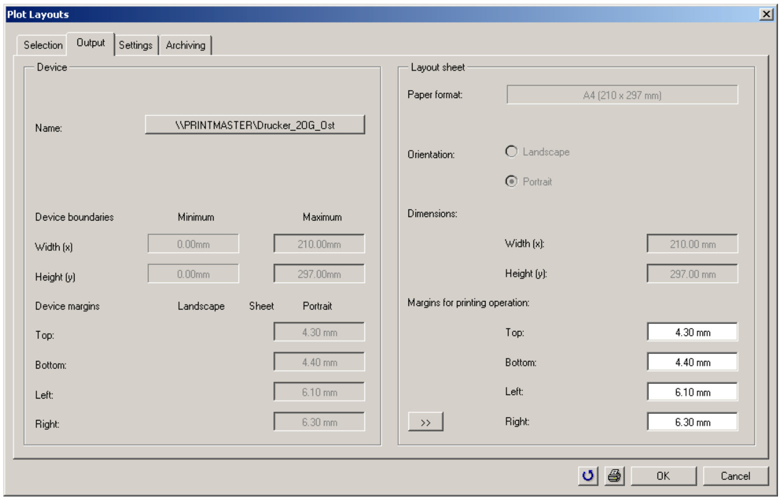
Before you follow the steps in the exercise below, check that the plotter has been correctly installed and configured.

To plot layouts

1 Click **Plot Layouts** (**Create** toolbar).

2 Select the output device (printer / plotter) in the **Output** tab.

Tip: If you configured Nemetschek drivers in the **Services** application, they will also be presented in the device list.



Device

Name: \\PRINTMASTER\Drucker_20G_Ost

Device boundaries	Minimum	Maximum
Width (x)	0.00mm	210.00mm
Height (y)	0.00mm	297.00mm

Device margins	Landscape	Sheet	Portrait
Top:			4.30 mm
Bottom:			4.40 mm
Left:			6.10 mm
Right:			6.30 mm

Layout sheet

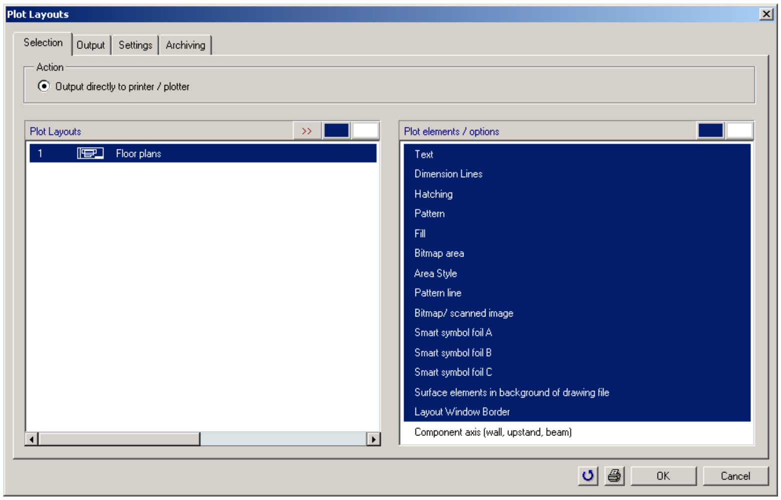
Paper format: A4 (210 x 297 mm)

Orientation: ○ Landscape ● Portrait

Dimensions:
Width (x): 210.00 mm
Height (y): 297.00 mm

Margins for printing operation:
Top: 4.30 mm
Bottom: 4.40 mm
Left: 6.10 mm
Right: 6.30 mm

3 Select layout 1 in the **Selection** tab.



1 Floor plans

Text
Dimension Lines
Hatching
Pattern
Fill
Bitmap area
Area Style
Pattern line
Bitmap/ scanned image
Smart symbol foil A
Smart symbol foil B
Smart symbol foil C
Surface elements in background of drawing file
Layout Window Border
Component axis (wall, upstand, beam)

4 *Do you want to start plotting?*
Click **Yes**.
The layout will then be plotted out.

See Also

*Further information on the **Settings** tab is available in the online Help (F1).*

Layout windows

You can use layout windows to place just portions of drawing files or filesets in a layout. This is useful if you want to display just specific areas or elements that are far apart in the building model. In the following exercise you will create layout windows and display sections of individual drawing files.

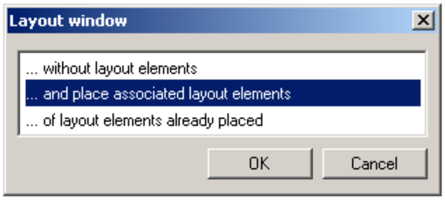
To create layout windows

➲ **Open** an empty layout.

1 Click **Layout Window** (**Create** flyout).

We will create the window so that the drawing file it is to display is immediately available for selection.

2 Click **...and place associated layout elements.**


Layout window
... without layout elements
... and place associated layout elements
... of layout elements already placed
OK
Cancel

3 Select drawing file **111** (File) and place it in the layout.

4 Press ESC as no other drawing files need to be selected for this layout window.

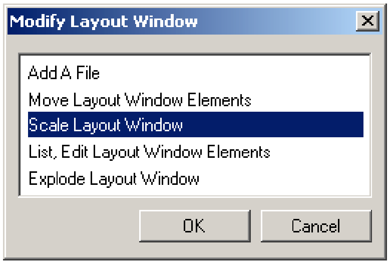
5 Define the size of the layout window by placing two opposite points (bottom left and top right) using the left mouse button.

6 Repeat steps 3 through 5 to create a layout window for drawing file **121**.

If available, you can also use the drawing files with the **West elevation** and **South elevation.**

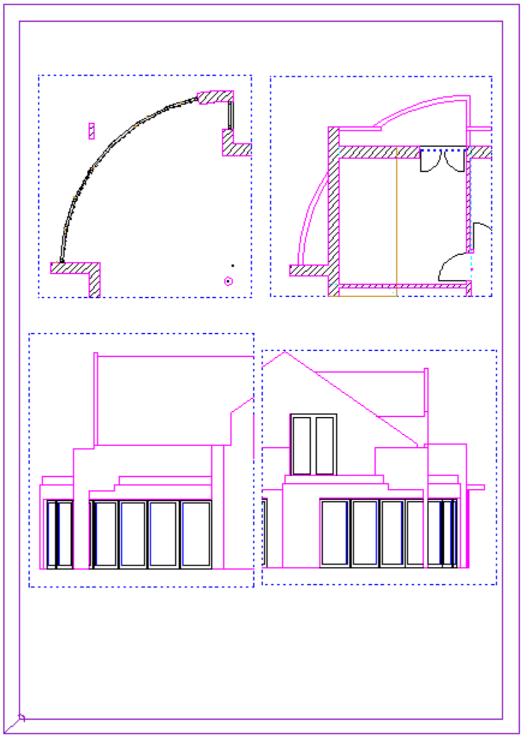
7 Click **Modify Layout Window** (**Modify** flyout) and select **Scale Layout Window**.

This lets you change the size of the window.



8 To change the arrangement of the layout windows, you can use **Move** (**Edit** flyout).

The result might look like this:



Unit 11: Presentation

➲ The exercises in this unit require the modules in the **Presentation** family. Check in **CAD Navigator** to see whether you have licensed these modules.

The ability to make presentation drawings - be it for clients or for competitions - is important.

This is why powerful presentation modules are integrated in Allplan. These include tools for simple hidden-line images to real-time walk-throughs.

You can create a realistic, three-dimensional image of your design at any time during the design process – with colored surfaces, lighting, and shadows. This unit shows you how.

The Presentation Family

Allplan 2005 contains powerful presentation modules. We will work in the **Animation** module; the other modules in the **Presentation** family are introduced only briefly.

The Paint module

You can use the tools in the **Paint** module to create and edit colors, colored areas and color freehand lines. All elements created in this module are saved in vector format which means that the elements can be moved, mirrored, resized, enlarged etc. without loss of picture quality. You can also apply a specific hue to color images in a single operation.

You work with 256 predefined colors. Alternatively, you can mix your own colors using red/green/blue values or based on hue/saturation/brightness.

Besides the Allplan standard color palette, you can purchase additional color sets (RAL 840 HR, RAL Design System, for example) or assemble your own RGB color palettes.

The Shadow module

The **Shadow** module provides tools for generating full-surface, color representations of 3D models including shadows cast by two light sources. Natural daylight can also be taken into account by specifying a latitude, date and time. This way, you can study the effects of light and shadow on a building during the course of a day.

Furthermore, you can make photo-realistic images of building models created using the modules in the **Architecture** family or using the tools in **3D Modeling** module. The program calculates photos based on the perspective view that you set. You can also study the effect of sunlight on a building over a period of time.

As opposed to the **Animation** module where the images are bitmaps (based on pixels), the elements you create in the **Shadow** module are saved in vector format which means that the elements can be moved, mirrored, resized, enlarged etc. without loss of picture quality.

The Animation module

In the **Animation** module, you generate and edit bitmap data.

You can use the tools in the **Animation** module to shade (from a palette of up to 16 million colors) the walls, windows, 3D lines etc. created in the 3D and architectural modules.

Using **Setup Lights** you can set any number of colored light source of varying intensity which allow you to create realistic scenes.

Using **Surface Settings** you can assign surface properties to architectural and 3D elements.

With the **Render** tool you can render images based on different methods of computation (flat shading, Gouraud shading, Phong shading and ray tracing) to produce photo-realistic images for presentations.

And you can even integrate the new building in its environment by placing a bitmap (a scanned photograph of the neighboring buildings, for example) in the background while you render.

Textures such as wood, marble, stone, sand etc. that are supplied with the program or bitmap images such as scans of tile structures can be used for material simulations.

Animation Window – Entire Model on the **Window** menu or on the Shortcut menu lets you open up to 16 Animation windows parallel to all the other windows. Thus you can enter a world of virtual reality that you navigate with the mouse. This way, you can check each design or construction stage and demonstrate the future appearance of an object.

Tip: If you wan to view only one element in the Animation window, use **Animation Window – Selected Elements** provided on the **Window** menu or on the Shortcut menu.

The individually camera positions can either be set intuitively in the animation window, entered in plan view, or entered as coordinates. Movie scenes created in this manner can then be recorded with **Record Movie** and saved as shows or AVI movies before being transferred to video.

Shows can be converted to AVI movies using the **Open, Convert Show** tool. You can also use this tool to assemble an AVI movie based on several shows.

Until now you have used the modules in the **Basic** and **Architecture** families to design your building model. In these modules, bitmap data is created and processed whereas the **Animation** module works with data in vector format.

Vector data

CAD systems that aim to produce precise drawings work with CAD data that is geometry-oriented. The elements in a CAD drawing are saved as vectors. These vectors serve to define the elements and allow them to be identified as such.

A straight line, for example, is defined by its start point, end point and the direction; a circle consists of a center point, a radius and an angle. Complex geometric entities such as splines are approximates using mathematical formulas.

A CAD drawing thus consists of a series of geometric values entered via the keyboard or using the mouse. These values are exact values and are based on the defined coordinate system.

Vector data are ”intelligent”: When you resize vectors or zoom in on details, the vectors themselves are still mathematically precise. The representation adapts to the different scales and sizes which is why there is no loss of quality even when vectors are printed out as large-format drawings.

Bitmaps

Bitmaps consist of a series of picture elements (hence the term pixel). Information on the position and color of every pixel within a dot grid is stored.

Together, the pixels form an image somewhat similar to a photograph in a newspaper (these are also merely a series of dots). The nearer you are to the image, the more visible the individual dots. The finer the grid of dots, the better the resolution.

When you render an image in the **Animation** module, you cannot enlarge it without suffering loss of quality. This is because only the pixels themselves are enlarged thus leading to deterioration in the quality of the picture - even with small pictures: the image appears coarse, sloping lines look like steps and even smooth transitions from one color to another increase in contrast.

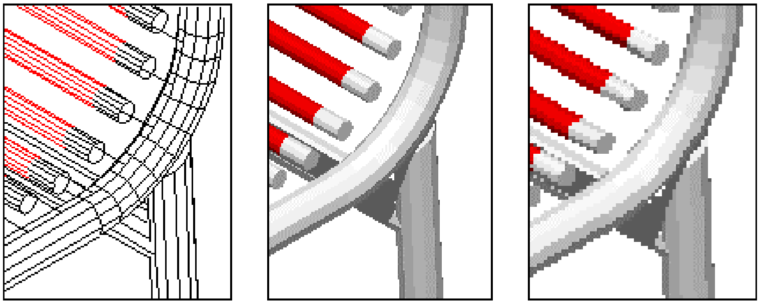
In the **Animation** module, you can render images using different resolutions. The higher the resolution of the image, the better the quality. However, the amount of data generated also increases significantly and the operation can take much longer as a result. When rendering an image, keep the printout format in mind and set an appropriate resolution.

Vector and pixel data

Elements that you create in Allplan 2005 are generally saved as vector data; the exception is the images you generate in the **Animation** module.

The following modules generate the following types of data:

- **Paint** and **Shadow** modules: vector data - no loss of quality + pictures can be manipulated at will.
- **Animation** module: pixel data.
- **Scan** module: hybrid data processing (i.e. both). This means that you can resize, move the bitmap data in a scanned image as if it were vector data. The scanned image's bitmap data behaves like vector data. However, with high factor enlargements, the Aliasing will become more evident.



Getting Ready

Real-time animation is only ’real’ time if you have a computer that is powerful enough to perform the complex calculations.

To demonstrate more clearly the effects that can be achieved in this module and to shorten processing time, the following exercises will use just the walls in the ground floor. You can follow this procedure with the entire building model.

Floor slab

To see the shadows and lighting effects more clearly, we will first draw a flat slab under the building to simulate a flat terrain.

To draw the slab

➲ In the **CAD Navigator** select the **Walls, Openings, Components** module.

➲ Open an empty drawing file (make it **current**) and set **111** and **112** to edit mode.

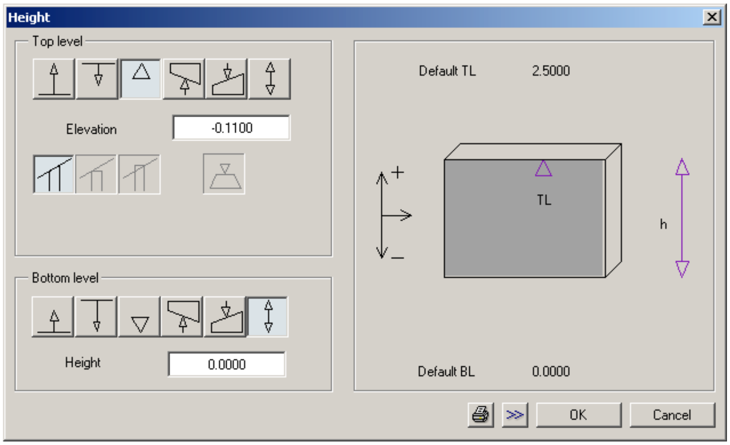
➲ Make the layers **AR_WALL**, **AR_CHIMN** and **AR_COL** visible and hide all the other layers.

1 Click **Refresh** (border of viewport) and **Reduce View** to center the image.

2 Select pen (8) **0.18** and color **(4) green**.

3 Use **Slab** (**Architectural Components** flyout) to draw a floor slab under the building with a wide border at the edges.

Make the following height settings in **Properties:**



Elevation -0.1100

Height 0.0000

Default TL 2.5000

Default BL 0.0000

The Animation module

The following shows how to create a movie model in just five steps. In the process you will learn about basic tools in the Animation module.

Please bear in mind that making complex animations using sophisticated effects requires practice and experimentation. You should therefore consider the following as an introduction and try to spend some time exploring the different possibilities.

Procedure:

- Set the animation parameters and define the first view
- Set up the lighting
- Define materials and surface properties
- Choose a rendering method and render the image
- Assemble the movie model: position cameras

Exercise 15: Displaying the Entire Model in Animation Mode

In the **Animation Window – Entire Model** tool (you can have 16 animation windows open simultaneously), you can define how the object is viewed using the mouse. You can specify advanced mouse settings (direction and sensitivity) in the **Animation Window Options**. Lights and surface properties are also visible in animation windows.

To open an animation window and to set parameters

➲ In the **CAD Navigator** select the **Animation** module (**Presentation** family).

1 Press the F4 key or click **Animation Window – Entire Model** on the **Window** menu.

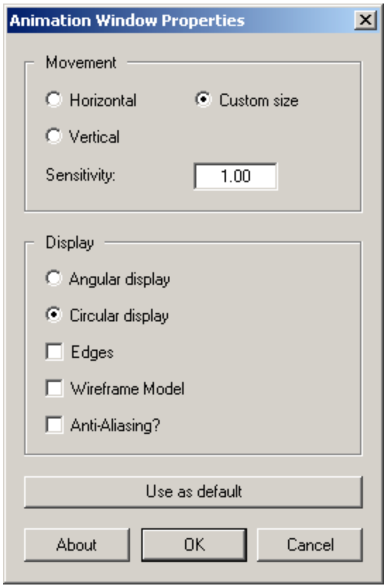
The animation window opens and the building is displayed in the middle of the animation window (view from front and top).

Tip: You can make the mouse react faster or more slowly by changing the **Sensitivity** setting.

2 Click with the right mouse button in the workspace and select **Animation Window Properties** on the shortcut menu. .

3 In the **Animation movement** area, select **Any**.
This setting controls mouse movement.
For example, if you want to walk through a building while retaining the same eye level, you would use the **Horizontal** and **Vertical** settings.

■ ***See Also***
To learn about the animation tools in more detail, we recommend the step-by-step guide entitled "Presentation, which you can order from our training center.



Movement

○ Horizontal ● Custom size

○ Vertical

Sensitivity: 1.00

Display

○ Angular display

● Circular display

☐ Edges

☐ Wireframe Model

☐ Anti-Aliasing?

4 Press **OK** to confirm.

When you have defined the properties of the animation window, you can navigate in and around the building using the mouse.

Animation using the mouse

1 Navigate by pressing one of the following mouse buttons and gently moving the mouse:

- left: camera on the surface of the sphere about the object
- middle: turns the camera right/left, up/down.
- right: ”zoom” forwards/backwards

2 Close the viewport to exit animation mode.

Tip: Pressing and holding down the SHIFT key accelerates the movement of the mouse.

The default setting is **Sphere mode.** In this mode, the eye point pivots about the target point and its movement is constrained to an imaginary sphere. You have already encountered the movement of the mouse in sphere mode. This topic was dealt with in the unit called “Building Design”.

Mouse navigation in Sphere mode

Left mouse button pressed and held down: turns camera about object on the surface of an imaginary sphere

Middle mouse button pressed and held down: moves camera laterally/up/down (camera movement)

Right mouse button pressed and held down: moves camera towards/away from object (zooming)

If you keep the CTRL key pressed down while in animation mode, you switch from **Sphere** to **Camera Mode.** This mode can be visualized as the view through a camera with the observer at the center, ’looking’ around.

Mouse navigation in Camera mode

CTRL + left mouse button pressed and held down: “camera pan” - this is rotation about the viewer

Middle mouse button pressed and held down: moves camera laterally/up/down (camera movement)

CTRL + right mouse button pressed and held down: moves camera towards/away from object (zooming)

Exercise 16: Lights and Surfaces

Lights

The choice and setup of appropriate lighting is an important factor if a presentation is to be a success. The program provides a wide range of lighting options:

- **Sunlight**: simulates natural sunlight. Sunlight is defined by specifying the latitude, the time and the angle of the North arrow in plan.
- **Ambient light**: a non-directional, even light that can also be allocated a color and degree of brightness. Ambient light gives objects a constant color.
- **Four corner lights**: parallel light, each corner light can be allocated a color and can cast shadows.
- **Nine individual lights** (particularly important for lighting interiors): for each light, you can define a color, the type of light source and the exact location of the light source and its target.
  - **Point light**: is diffused evenly in all directions from a single light
  - **Spotlight**: the intensity of the light drops the further away from the point it is.
  - **Conical light**: is similar to the spotlight except that the intensity of the light pool cast is uniform.

Sun path studies can be generated quickly and easily using the **Sun Study** tool.

In the following exercise, you will set the sunlight.

To set up lights: sunlight

Tip: Use ↺ to restore defaults.

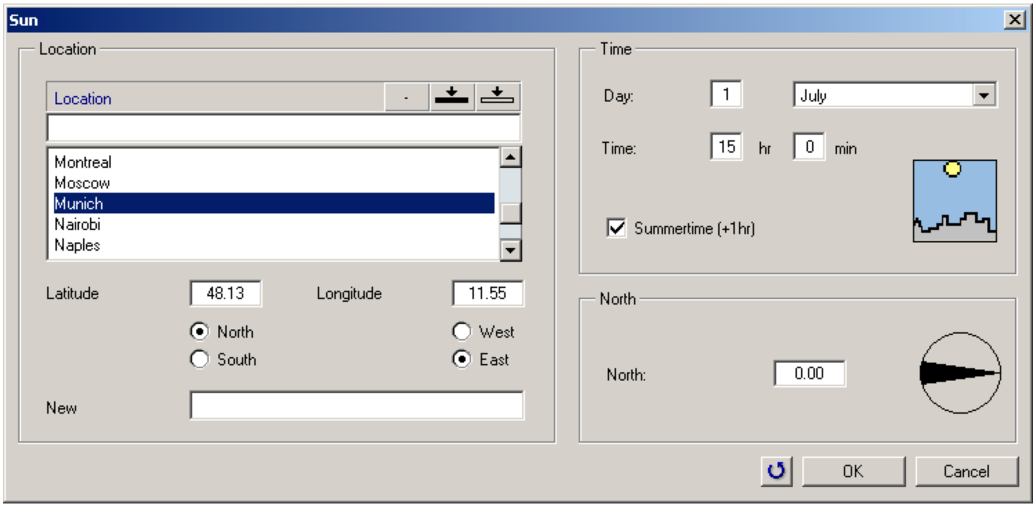
1 Click **Setup Lights** (**Modify** flyout) or right-click in the animation window and select **More Tools** - **Setup Lights** on the shortcut menu.

2 In the **Light Settings** dialog box, **Light sources 1** tab, click **Sun...**.

3 Select a city in the list.
You can add cities to the list: enter the latitude and longitude and a name for the location of the building in the **New** area.

4 Activate the **Summertime** check box and
enter the date and time: **1. July, 3 p.m.**.

5 Enter the direction of North: **0** (on the side with the kitchen).



Sun

Location

Location

Montreal
Moscow
Munich
Nairobi
Naples

Latitude 48.13 ● North ○ South

Longitude 11.55 ○ West ● East

New

Time

Day: 1 July

Time: 15 hr 0 min

☑ Summertime (+1hr)

North

North: 0.00

6 Press **OK** to confirm the dialog boxes.

7 You can see in the animation window how these settings affect the image (if the animation window is not open, press F4).
The shadows cast by the lights are not visible due to the rendering method employed here. The direction of lighting, however, is evident from the illumination of the surfaces.

Note: Due to various factors (e.g. local time, time zone etc.), the calculated position of the sun might not exactly match the actual position in reality, even if you have defined the location and time parameters correctly. For further information and possible solutions, see the section entitled ”Sun and Longitude, Notes” in Allplan’s online Help system.

Surfaces

Each line color can be assigned a surface color as well as a value for transparency, luster, refraction and a texture.

Defining colors

In the **Color Mix** dialog box, you can define and mix colors using any of the following methods.

These methods can also be combined. Click a basic color.

- Click on a shade of that color. Mix the color using the RGB (red, green, blue) model.
- Mix the color using the HSB (hue, saturation, brightness) model. First, select a color (where saturation and brightness are set to 255) and mix in some white (saturation) and black (brightness).
- Select a color system, a color file and then a color name in the file. You can also define your own custom palettes.

Note: The **Color stands for pen** option, which can be enabled/disabled in **Show/Hide**, has no effect on the colors in animation; surface properties are always assigned based on 256 element colors.

We will now define the surface properties of the windowpanes and assign the walls a different color.

To define surface properties

Tip: You can also use **Surface Settings** (**Modify** flyout in the **Animation** module) to define surfaces.

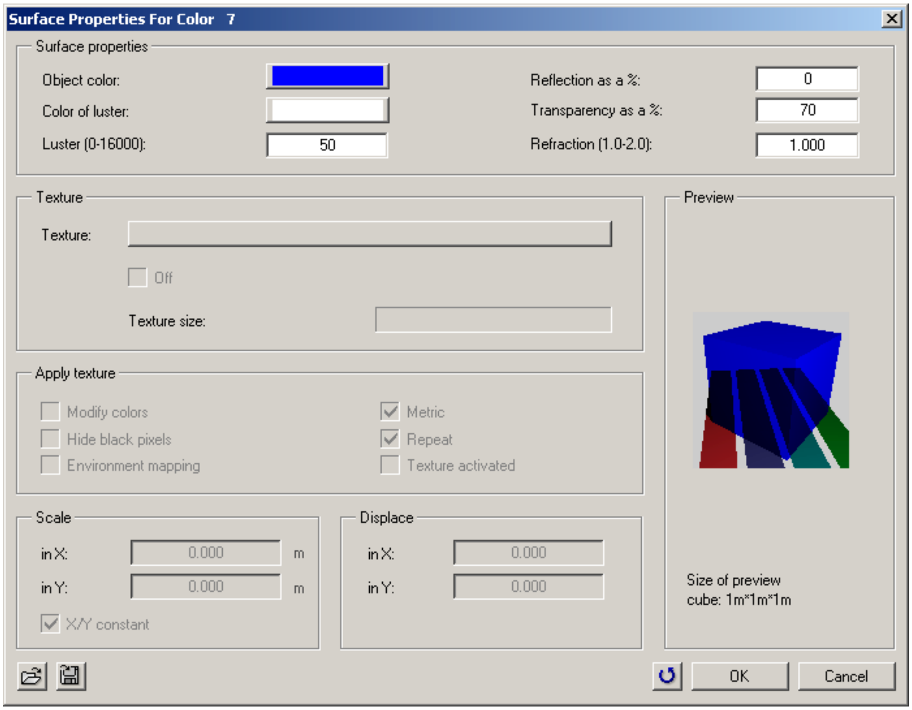
➲ The animation window is still open.
If it isn't, press the F4 key.

The windowpanes were drawn using pen 7 (dark blue) and are displayed inside the smart symbols.

1 In the animation window, right-click one of the blue windowpanes and select **Surface Settings** on the shortcut menu.

The **Surface Properties for Color 7** dialog box is displayed.

2 Set the **transparency** of the glass to **70** (%).



Surface Properties For Color 7

Surface properties

Object color: 🟦

Color of luster: ⬜

Luster (0-16000): 50

Reflection as a %: 0

Transparency as a %: 70

Refraction (1.0-2.0): 1.000

Texture

Texture:

☐ Off

Texture size:

Apply texture

☐ Modify colors

☐ Hide black pixels

☐ Environment mapping

☑ Metric

☑ Repeat

☐ Texture activated

Scale

in X: 0.000 m

in Y: 0.000 m

☑ X/Y constant

Displace

in X: 0.000

in Y: 0.000

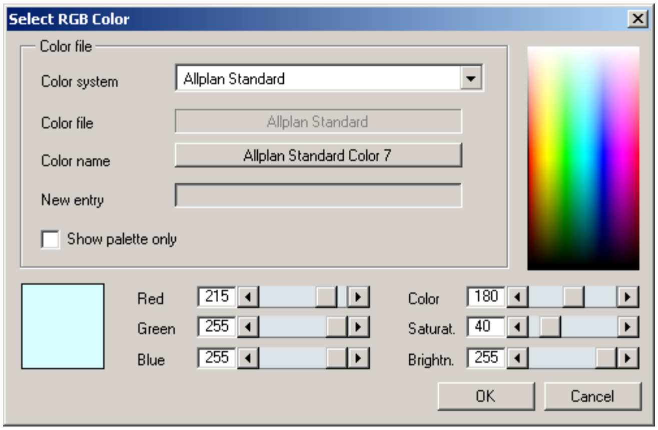
Preview

Size of preview cube: 1m*1m*1m

3 Click the **Object color** button.

Tip: You can save your own colors under a name of your choice. You can also save entire color palettes in color files.

4 Change the saturation of the blue to **40**.
This will add white to the blue and make it a shade lighter.
Change the value for color to **180**.
This will add white to the blue and make it a shade lighter.



Color system: Allplan Standard
Color file: Allplan Standard
Color name: Allplan Standard Color 7
New entry:
☐ Show palette only
Red: 215
Green: 255
Blue: 255
Color: 180
Saturat.: 40
Brightn.: 255

5 Press **OK** to close the **Select RGB Color** dialog box and the **Surface Properties for Color 7.**

The glass panes are made transparent.

The walls have been drawn using color 1.

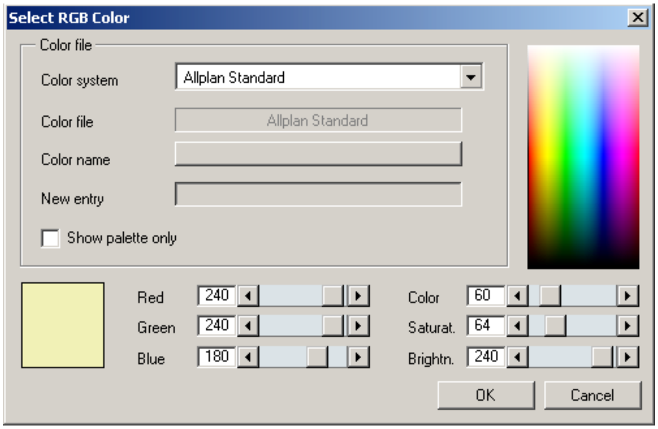
Tip: You can still see the lines of the opening symbols on the window panes.
To hide them, disable the **Smart Symbol Foil A** in **Show/Hide.**

6 In the animation window, right-click one of walls and select **Surface Settings** on the shortcut menu.

The **Surface Properties for Color 1** dialog box is displayed.

7 Click the **Object color** button.

8 Define a color using the RGB color model and the following settings:
Red: **240**
Green: **240**
Blue: **180**


Select RGB Color
Color system: Allplan Standard
Color file: Allplan Standard
Color name:
New entry:
☐ Show palette only
Red: 240
Green: 240
Blue: 180
Color: 60
Saturat.: 64
Brightn.: 240

9 Press **OK** to confirm.

You can see the effect in the model in the animation window.

10 If you want, you can use the same approach to assign a dark green to the floor slab. Click **Object color** and select a suitable color in the dialog box.

Changing the surface properties affects **all** visible elements with the same color!

As an alternative to **Surface Settings**, you can use **Assign Custom Surfaces to3D/Archit. Elements** or **Custom Surface Properties** on the shortcut menu of the animation window to assign animation surfaces to 3D elements, regardless of the element color.

Exercise 17: Rendering

The Render tool will render your model taking all the settings you have made for the view, lights and surfaces into account. A number of different rendering methods are available: Flat shading, Gouraud, Phong, QuickRay and ray tracing.

> The **Render** tool always uses the view you set last in the animation window. You should therefore never render directly in the design viewport. Rather, set a suitable view in the animation window prior to rendering.

Please bear in mind that the more sophisticated the rendering method you choose and the larger the window in which the model is rendered, the longer the whole process will take.

The following exercise uses the ray tracing method.

To render the model

➲ In the animation window, select the view you want to render.

1 Press the F2 key.

Or:

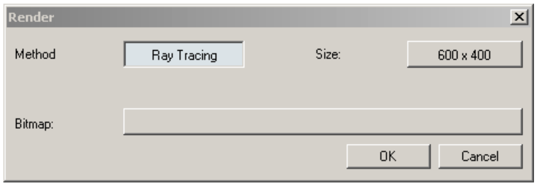
Click △ **Render** (**Create** flyout).

Or:

Right-click in the animation window, point to **More Tools** on the shortcut menu and select △ **Render**.

2 Set the rendering method to **Ray Tracing**.

3 Now define the size of the image you want to generate. Click the button beside **Size** and define the size of this window by placing two diagonal points. A quarter of the workspace will be sufficient for a first impression.

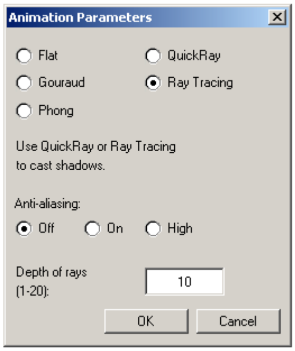


Render

Method: Ray Tracing

Size: 600 x 400

Bitmap:



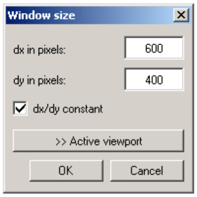
Animation Parameters

○ Flat
○ QuickRay
○ Gouraud
● Ray Tracing
○ Phong

Use QuickRay or Ray Tracing to cast shadows.

Anti-aliasing:
● Off ○ On ○ High

Depth of rays (1-20): 10



Window size

dx in pixels: 600

dy in pixels: 400

☑ dx/dy constant

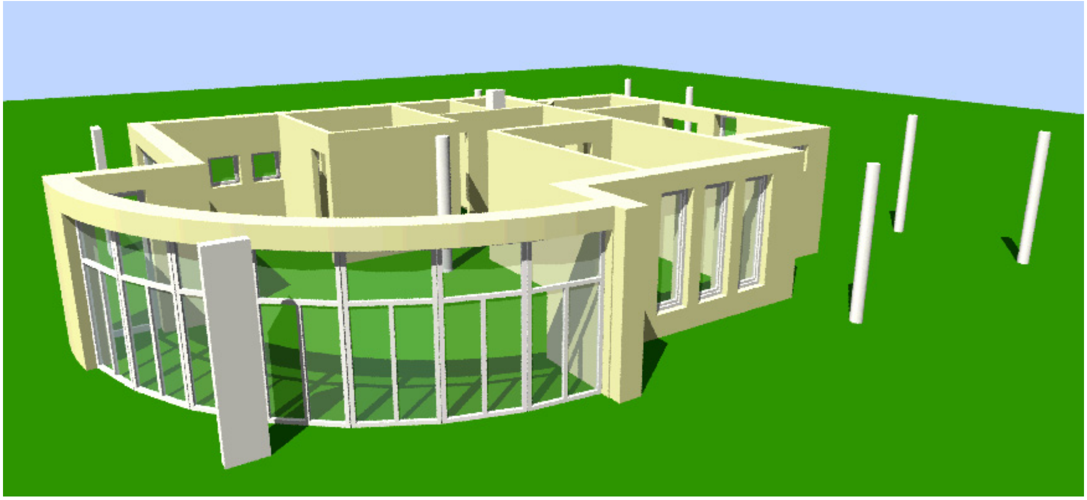
Tip: You can use the menus displayed at the top of the **Render Result** window to edit and/or save the bitmap. The options available are the same as those for the **Edit Bitmap** tool. (Detailed information is provided in the online Help.)

4 Press **OK** to confirm.

The rendering process starts.

5 Close the **Render Result** window.

If you want, you can save the result to a folder of your choice.



Exercise 18: Camera Path, Movie Model, AVI Movie

We will now simulate a fly-by around the ground floor.

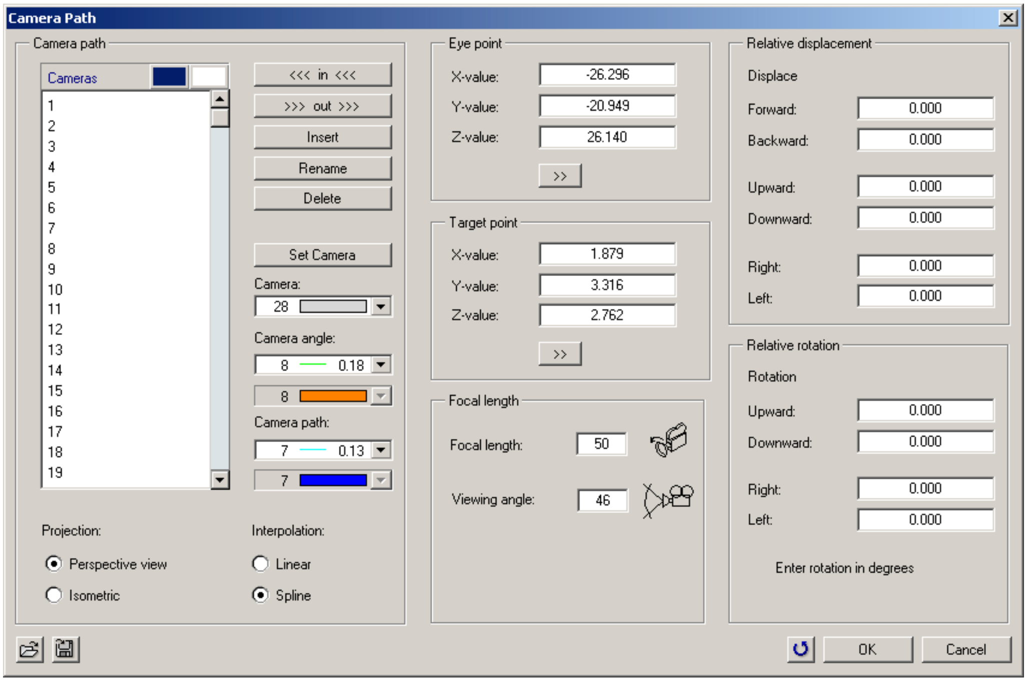
To do this, you will set camera positions and save these together as a ’movie model’.

In the following exercise you will create a movie by placing several cameras in the floor plan.

To create a movie

➲ Divide the workspace into a number of viewports so that an animation window and a plan view are open.
For example, use **2+1 Animation Window**.

1 Click **Set Camera Path** (**Modify** flyout) or right-click in the animation window and select **Set Camera Path** on the shortcut menu.



Camera Path

Camera path

Cameras: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19

Camera: 28

Camera angle: 8 0.18; 8

Camera path: 7 0.13; 7

Projection: ● Perspective view ○ Isometric

Interpolation: ○ Linear ● Spline

Eye point

X-value: -26.296
Y-value: -20.949
Z-value: 26.140

Target point

X-value: 1.879
Y-value: 3.316
Z-value: 2.762

Focal length

Focal length: 50
Viewing angle: 46

Relative displacement

Displace
Forward: 0.000
Backward: 0.000
Upward: 0.000
Downward: 0.000
Right: 0.000
Left: 0.000

Relative rotation

Rotation
Upward: 0.000
Downward: 0.000
Right: 0.000
Left: 0.000

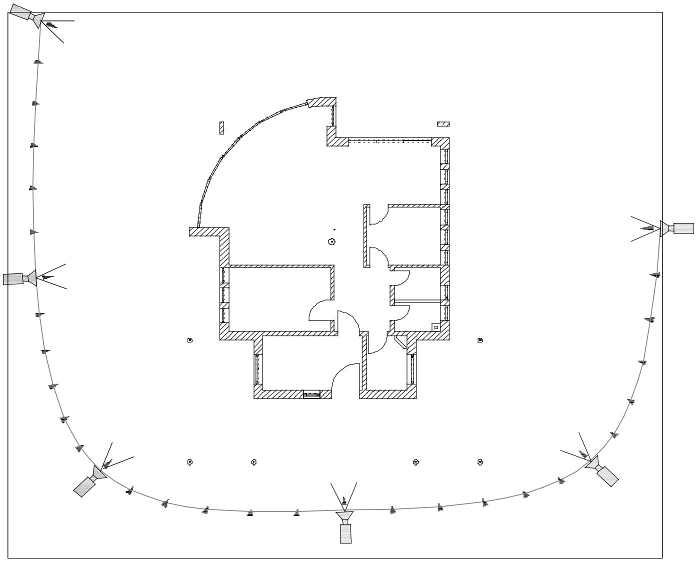
Enter rotation in degrees

2 Click **Set Camera.**
The dialog box closes and the floor plan of the building is displayed.

3 Place the camera.

Tip: The animation window displays the view through the camera you just placed in the workspace.
You can thus check the movie as you go along!

4 You can now rotate the camera freely – click to turn the camera in the required direction (defines the target point).



5 Position the next camera in the same way.

6 *Number of intermediate entries to interpolate*
Enter the number of steps between the two cameras: **5.**

7 Set more cameras (see figure) and
press ESC to finish entering the camera path.

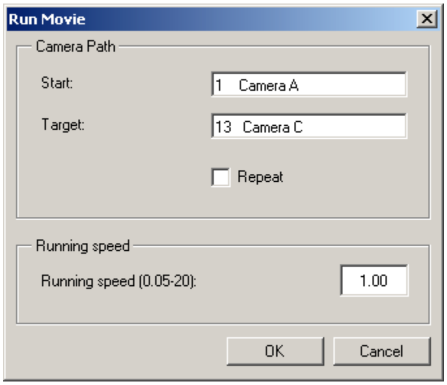
8 The **Camera Path** dialog box appears again and the cameras (A to F) you have just placed in the floor plan are displayed in the **Camera entries** area.

9 Press **OK** to confirm the dialog box.

10 The animation window is still open (if it isn’t, press F4).

11 Right-click in the animation window and select **Run Movie along Camera Path** on the shortcut menu.

Tip: The first and last camera are always set by default. You can select a different starting or finishing point by clicking in the boxes.



Run Movie

Camera Path

Start: 1 Camera A

Target: 13 Camera C

☐ Repeat

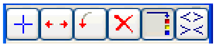
Running speed

Running speed (0.05-20): 1.00

12 Press **OK** to confirm.

The movie will be displayed once. If you activated the **Repeat** option, the movie will run in an endless loop until you press ESC.

The **Dynamic toolbar** includes tools you can use to modify the camera path:
Insert, **move**, **rotate** and **delete** camera.



With **Camera Information** you can change the coordinates of the eye and target point by entering numerical values.

An Allplan movie model consists of the **3D model**, the **surface definitions**, the **light settings** and the individual **camera positions**. All four components are saved.

To save the movie model

1. Open the shortcut menu of the animation window and select **Save movie model ...** .
2. In the **Save File** dialog box, enter a name and specify the path where to save the movie model.
   The **FIL movie model** is best saved in the project; this is the default setting.
3. Click **Save.**
4. *The current perspective view was not saved as a camera. Save anyway?*
   The program will issue this prompt if you have changed the perspective view in the animation window after running the movie. Press **Yes** to acknowledge it.
5. *Would you like to save the textures used in the movie?*
   When you save the textures (and other attributes) in the movie model, you can exchange it with partner offices without any problems.
   Press **Yes** to acknowledge this prompt.

This ”movie model” serves to save the **surface definitions, lighting settings** and **camera positions**.
The building – merely a surface model in this example – can no longer be edited in a single drawing file.

However, you can insert a different building as an alternative in the movie model in order to view it using the same surfaces and lighting settings.

Recording an AVI movie

You can also record the movie model you just created and saved as an AVI movie. Please note that this operation can take some time.

To record an AVI movie

1 Click **Record Movie** (**Create** flyout).

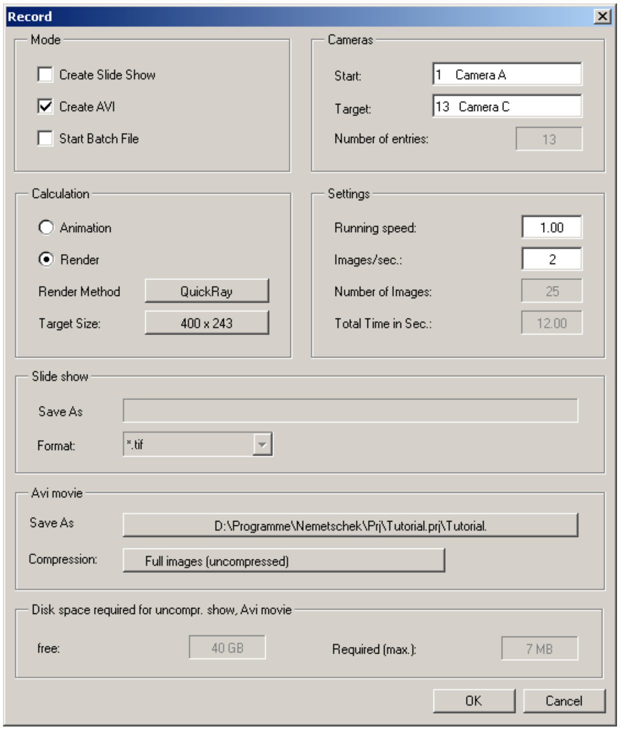
2 Select **Create** AVI.

3 Define the **target size** (=size of output window), by entering the height and width in pixels or using the size of the Animation window.

4 Select the rendering method **Quick Ray** so that shadows are cast.

5 Select a compression type or disable compression if you want to obtain optimum quality (requires a lot of disk space!).

Note: In the **Compression** area, all compression methods installed on your computer are presented. The **Windows Media Player** allows codecs (compression/decompression) to be updated automatically. Further information is provided in the online Help system of the **Windows Media Player**.



Record

Mode
☐ Create Slide Show
☑ Create AVI
☐ Start Batch File

Cameras
Start: 1 Camera A
Target: 13 Camera C
Number of entries: 13

Calculation
○ Animation
● Render
Render Method: QuickRay
Target Size: 400 x 243

Settings
Running speed: 1.00
Images/sec.: 2
Number of Images: 25
Total Time in Sec.: 12.00

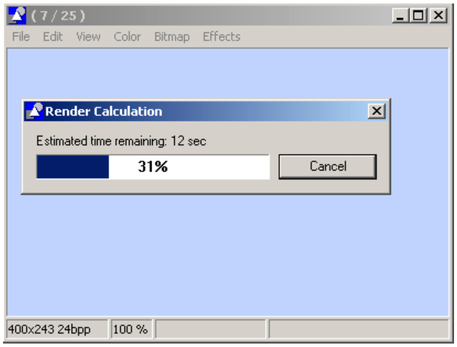
Slide show
Save As:
Format: *.tif

Avi movie
Save As: D:\Programme\Nemetschek\Prj\Tutorial.prj\Tutorial.
Compression: Full images (uncompressed)

Disk space required for uncompr. show, Avi movie
free: 40 GB
Required (max.): 7 MB

6 Press **OK** to confirm and start recording.

During recording, the render window provides information on the progress (number of images calculated, remaining time).



(7 / 25)

Render Calculation

Estimated time remaining: 12 sec
31%

400x243 24bpp | 100 %

The final movie is located in the project directory. To view it, double click it.

Using the settings above, it will take a few minutes to record the movie.

For a high-resolution, flicker-free movie select the following settings:

- Render method: Ray Tracing
- Target size: Get from Animation window
- Images/sec.: 16

. . . and start recording just before you leave work.

Appendix

Project Organization using the Default Layer

Allplan 2005 is a very flexible system that allows you to develop your own custom solutions for projects within the office. The layers used in this tutorial provide essential support.

However, it is also possible to structure projects without using layers. In this case, the individual elements are arranged in drawing files.

The structure presented here for large-scale projects is intended only as a guide.

Drawing file organization "without layers"

- General project-related information is stored on drawing files **1-99**. This is universally required data (plan layout, axis system etc.).
- Story design starts at drawing file **100**. The first digit indicates the number of the story. The last two digits provide information on the contents. The sequence in which the drawing files are named should be identical on each floor.
- Other material is stored starting at drawing file **2000**. Numbers **2000-2099** contain sections. Numbers **2100-2199** contain the elevation views while **2200-2299** include the presentation data and **2300+** the detail drawings.

Fileset	File	Contents
Grid	1	Axis system (coarse)
	2	Axis system (fine)
	3	Axis dimensions
	4	Axis labeling
Layout	5	Title block
	6	Legend
Surveying	11	Survey points
	12	Dimensions
	13	Labels
	:	
Site plan	21	Boundaries of lot
	22	Neighboring buildings
	23	Existing building
	24	New building
	25	Hatching
	26	Dimensions
	27	Text
	:	

Fileset	File	Contents
Outdoor facilities	51	Draft
	52	Symbols
	53	Dimensions
	54	Design
	55	Text
	:	
Foundation	71	Foundations
	72	Hatching
	73	Sections
	74	Hatching
	75	Dimensions
	76	Text
	:	
1st floor	100	Background pattern, fill
	101	Load-bearing walls
	102	Non-bearing walls
	103	Beams
	104	Stairs, elevator
	105	Slab
	106	Doors (2D)
	107	Windows (2D)
	108	Wall recess (2D)
	109	Slab recess (2D)
	110	Reflected ceiling
	111	Reflected plan
	112	Furniture
	113	HVAC
	114	Grids, axes

Fileset	File	Contents
	115	Dimensions
	116	Additional dimensions
	117	Text
	118	Additional text
	119	Rooms
	120	Area
	121	DIN 277 areas
	122	DIN 276 costs
	123	Prelim. roof design
	124	Special components
	125	Adjacent components
	126	Foreground patterns, fills
	:	
2nd floor	200	Background pattern, fill
	201	Load-bearing walls
	:	
3rd floor	300	Background pattern, fill
	301	Load-bearing walls
	:	
Section A -A	2000	Section (hidden-line)
	2001	Details
	2002	Hatching, pattern, fill
	2003	Fixtures
	2004	Dimensions
	2005	Text
	2006	Outdoor facilities
Section B - B	2010	Section (hidden-line)
	:	
	2019	

Fileset	File	Contents
East elevation	2100	Hidden-line image
	2101	Details
	2102	Hatching, pattern, fill
	2103	Dimensions
	2104	Text
	2105	Outdoor facilities
South elevation	2110	Hidden-line image
	:	
	2119	
Perspective views	2201	Hidden-line image
	2202	Hatching, fill, textures
	2203	Outdoor facilities
	2204	Text
	:	
	2299	
Detail A	2300	Draft
	2301	Details
	2302	Hatching, patterns
	2303	Dimensions
	2304	Text
	:	
	2309	
Detail B	2310	Draft
	:	
	2319	

Overview of Tools

The Tutorial makes extensive reference to flyouts and the icons they contain.

We recommend photocopying this page and placing it somewhere near your monitor so that you can refer back to it as you work through the workbook.

Viewports

Refresh
Zoom Section
Pan
Regen
Reduce View
Enlarge View
Scroll Left ...

3D View
Navigation Mode
Previous View
Next View
Save, Load View
Always on Top (on)
Always on Top (off)

Plan
Rear Left Iso.
Rear Elevation
Rear Right Iso.
Left Elevation
Right Elevation
Front Left Iso.
Front Elevation
Front Right Iso.

Hidden-Line Image
Activate Section
Copy to Clipboard

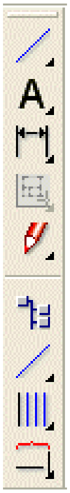
The "Height" dialog box

You can use these icons to define how the component you are drawing – e.g., walls, rafters etc. – is attached to the reference planes.

TL relative to the lower plane **TL relative to upper plane**	Use this to set the offset between the **top level** of the component and the **lower/upper reference plane.**
BL relative to the lower plane **BL relative to upper plane**	Use this to set the offset between the **bottom level** of the component and the **lower/upper reference plane.**
Absolute height TL **Absolute height BL**	Use this to set the top or bottom level of the component as an **absolute height**.
Relative to TL (component or plane) **Relative to BL (component or plane)**	Use this to associate the top or bottom level of a component with the top/bottom level of another component or plane. When you select this option, the **reference level** has to be clicked immediately.
Absolute component height	Enter the component height here.
Vertical offset **Abstand lotrecht zur Ebene**	This toggle controls whether the offset entered is to be interpreted as a **vertical offset** or **perpendicular to the plane.**
Component top	This makes the component adapt to the upper plane in its entirety.
Attach outer component edge to plane	With this, the top, outside edge of the component will adapt to the upper reference plane.
Component edge above plane	With this, the component will pierce the upper reference plane by the value you specify.
Maximum component height	When the top level of the component is attached to the upper reference plane, you can use this to have the component not exceed a certain height and to run horizontally at that height.

The main flyout toolbars

Basic Tools toolbar



Draft flyout

Text flyout

Dim. Lines flyout

Layout flyout

Edit flyout

CAD Navigator

Create flyout

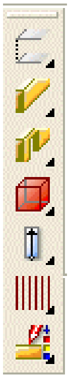
Create II flyout

Modify flyout

Basic tools
(always available)

Module-specific
tools

Architecture toolbar



Roofs and Planes flyout

Architectural Components flyout

Architectural Openings flyout

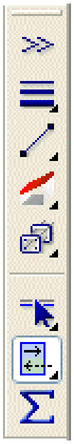
Rooms flyout

Stairs flyout

Rafter Design flyout

3D Modification flyout

Filter Assistant toolbar



Match

Format Filter flyout

Element Filter flyout

Architecture / Allfa Filter flyout

Engineering Filter flyout

Selection Aids flyout

Selection Region flyout

Brackets flyout

Index