



# GRAFIS CAD









## Textbook GRAFIS CAD Shoe construction

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## Introduction

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This textbook is designed to allow for an autodidactic introduction to Grafis shoe construction (hereafter referred to as Grafis) and/or can be used as learning support material during Grafis training courses. Good knowledge of construction of shoe uppers and insoles is a requirement for learning to use Grafis.

Grafis consists of a programme for generating and editing 2D upper patterns and insoles, their grading and output to plotters and printers, export of finished pattern pieces as DXF files and an industry standard marker making system.

The basis for working with Grafis are 2D lasts, which are inserted as an import file or a picture file and then reconstructed interactively. These 2D lasts can be for ready-to-wear shoes, orthopaedic shoes or made-to-measure shoes. The interactive upper constructions included in the Grafis package relate back to these lasts.

The Grafis constructions are saved as construction instructions, which can be recalculated with different adjusted lasts. These interactive upper constructions can easily be altered with click and drag or value entry and therefore offer a vast array of possibilities for style modification and fit optimisation.

During the styling process Grafis imperceptively creates a record of the modification steps. The record can then be re-called to create other sizes automatically.

Grafis also records how patterns are derived from one another, capturing the interdependence between the pieces. Alterations made to one piece are automatically applied to all interdependent pieces.

A programming language is available within Grafis for programming your own constructions and tools. The two chapters on 'Grafis Programming Language' are available via download or from the Grafis Team.

Grafis can only be used at its optimum if the user is comprehensively trained. To advance training, the Grafis Team plan to make available a free training version. Current information and downloads are published under [www.grafis.de](http://www.grafis.de).

Viersen, March 2019





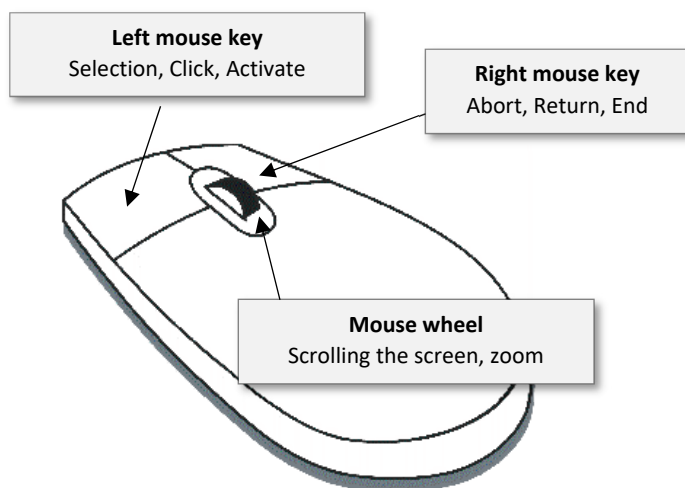
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In Grafis, first patterns are originally developed in the base size. All construction and modification steps are registered by imperceptibly creating a record. This construction record can be recalled with other sizes, thus creating the patterns in the respective size automatically.

### 1.1 Important rules for work with Grafis

#### Mouse keys in Grafis



Picture 1-1

In all texts of this book the symbols  and  are used for the left and right mouse button. The **left mouse button** is the “do-key” in Grafis and is used for selection, click and activating (Picture 1-1). The **right mouse button** is the “retreat key” and is used for abort / end of a function or return to the next higher level menu. The

position of the cursor is of no consequence. The **mouse wheel** is used for scrolling the screen and zoom.

### Function key assignment

The function keys F1 to F12 are assigned special functions in Grafis. Here, an overview of the functions with reference to the chapter where they are explained in more detail:

	Function	Chapter
<b>F1</b>	call context related help	1.3
<b>F2</b>	zoom screen content in / out	1.5
<b>F3</b>	move / rotate / flip parts and roll two parts	11.3 11.4
<b>F4</b>	refresh screen	1.5
<b>F5</b>	part positioning	5.1
<b>F6</b>	centre screen content	1.5
<b>F7</b>	show / hide measurements	8.2
<b>F8</b>	toggle between pieces in their original position and their position after dragging with <F3>	11.3
<b>F9</b>	show/ hide pixel image	2.2
<b>F11</b>	calculator function for calculation of z values	12.5
<b>F12</b>	display of called interactive constructions in the style	2.4

### Grafis measurements

Grafis works with the following measurements:

<b>length, distance, radius</b>	<b>mm (millimetres)</b>
<b>body measures</b>	<b>mm (millimetres)</b>
<b>angle, direction</b>	degrees (right angle =90°)
<b>area</b>	mm <sup>2</sup> (square millimetres)
<b>percent, relative length</b>	0-100%

Please note that all length and distance values are displayed and entered in millimetres.

### Further important rules

The **decimal symbol** is the point (.).

e.g.: 10.4 45.2° 67.9% 127mm<sup>2</sup>

**Text and value entries** are to be completed with <ENTER>.

To **abort** a text or value entry press <ESC>.

## 1.2 Starting Grafis

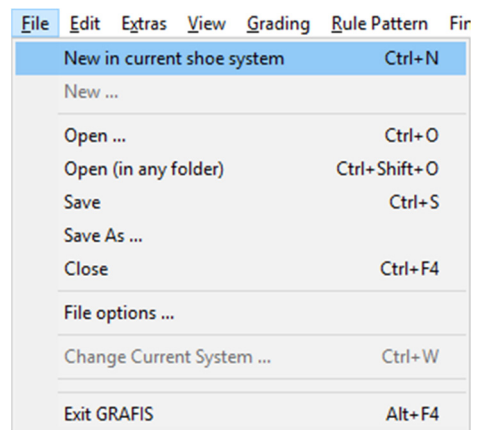
Step-by-step guide

- ⇒ Click the relevant icon on the desktop or double-click onto **grafis.exe** in the folder \Grafis
- ⇒ Open the *File* pull-down menu (Picture 1-2) and click on *New...* or *Open...*
- ⇒ Select the required shoe system
- ⇒ For the option *Open...*: Select drive and collection folder
- ⇒ For the option *Open...*: Double-click onto an existing style or enter a new style name in the *File name* field and press <Enter>.

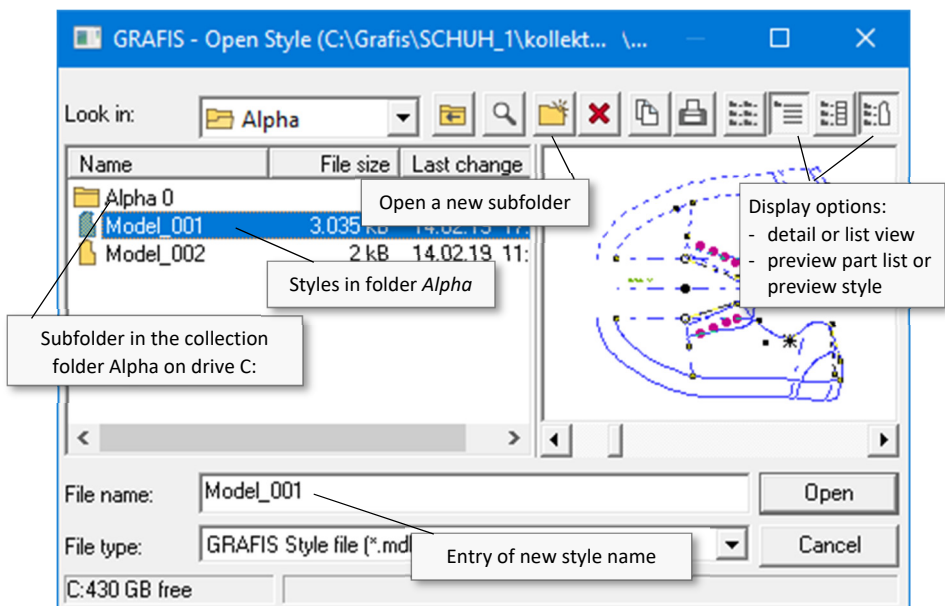
### The *Select shoe system* dialogue

The *Select shoe system* dialog opens only if several shoe systems are available. If only the system *10-Werte-Schuhsystem* exists, this dialog is skipped. The examples and exercises relate to the shoe system *10-Werte-Schuhsystem* (*SCHUH\_1*). The information also applies to all other shoe systems.

As soon as you have selected a shoe system, more information about it is displayed in the right part of the screen.



Picture 1-2



Picture 1-3

The selected shoe system is started by pressing <ENTER> or double click on the respective line or clicking *Select shoe system*.



In the case of *Open...*, after having started a shoe system, the *Open style* dialogue appears (Picture 1-3).

### The *Open style* dialogue




In the *Open style* dialogue first select the drive and then the required collection folder. Styles can be generated only in collection folders and their sub-folders. The *File name* field remains blocked until a collection folder has been selected by double-clicking. Then, a new file / style name can be entered (Picture 1-3).

### Create a new collection folder

Select the drive where the collection folder should be created. If applicable, go up one level to the parent folder with  and then open the new folder with . The collection folder can be structured with up to 7 subfolders.


### Delete styles and folders


The *Open style* dialogue (Picture 1-3) also permits deleting folders and styles. Select the folder or the style and click  to delete it. The style or the folder including all styles is deleted after a security check.

Note: If Grafis cannot delete the folder, there are further files situated within this folder. Make regular backups of your styles and sizes from the beginning. This is the only way your data can be restored after a hard disk failure, for example.

### Quit Grafis

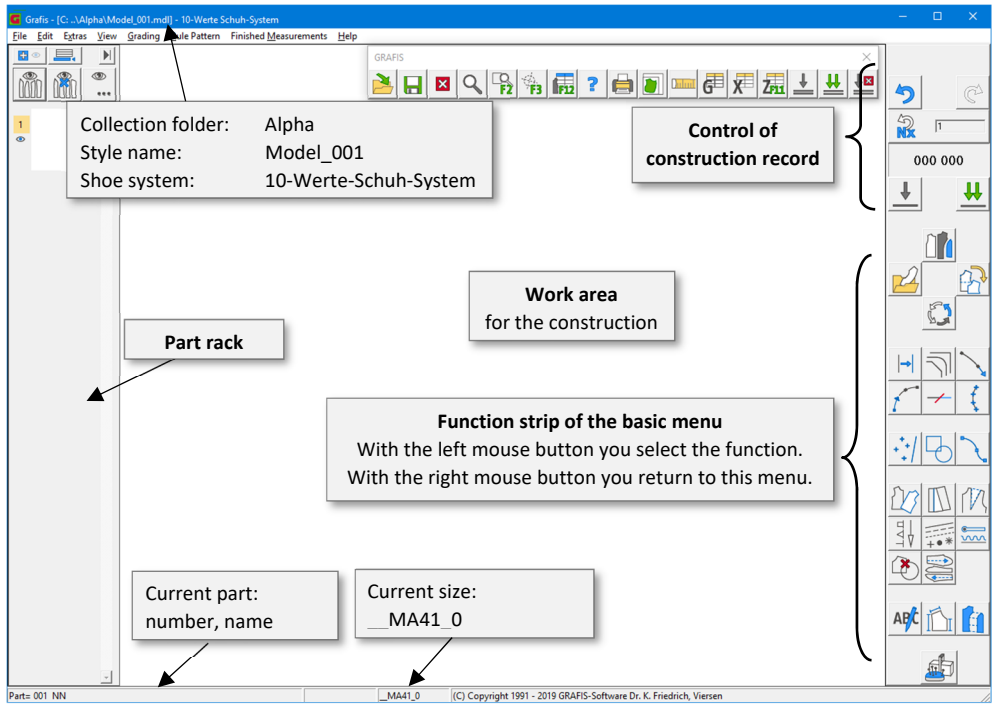
To quit Grafis select between the following in the pull-down menu *File*:

**Save**  save the current state of the style under the current name. **Save as...** save the current state of the style under a new name and/or a new drive (disk/ net drive) and/or a new folder.

**Close**  quit Grafis without saving the style. If the style has not been saved a security question appears.

## The Grafis basic menu

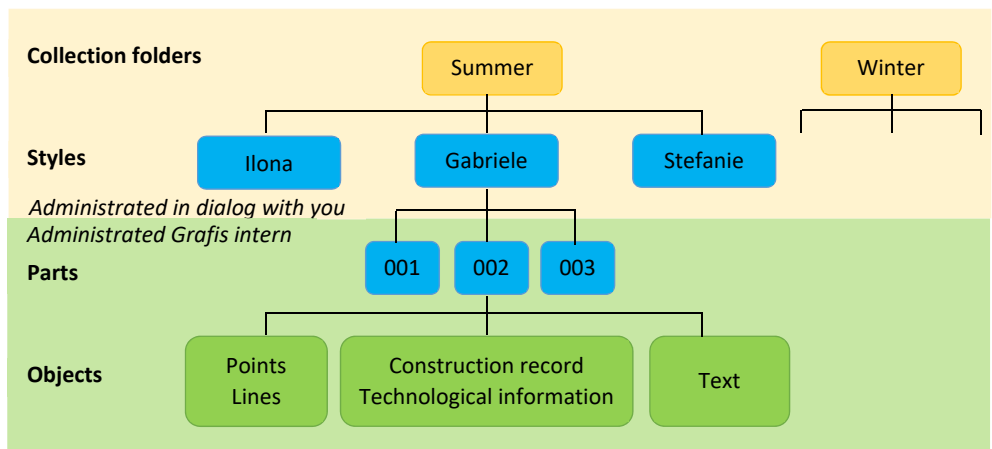
The Grafis basic menu appears on screen (Picture 1-4). Compare it with your screen.



Picture 1-4

## The Grafis data structure

In Grafis construction data is organised according to collection folders, styles and parts (Picture 1-5). The number of folders and styles is unlimited.



Picture 1-5



Each style can contain up to 999 parts, which will be named by Grafis with a 3-digit number. The parts consist of objects, e.g. points, lines and texts.

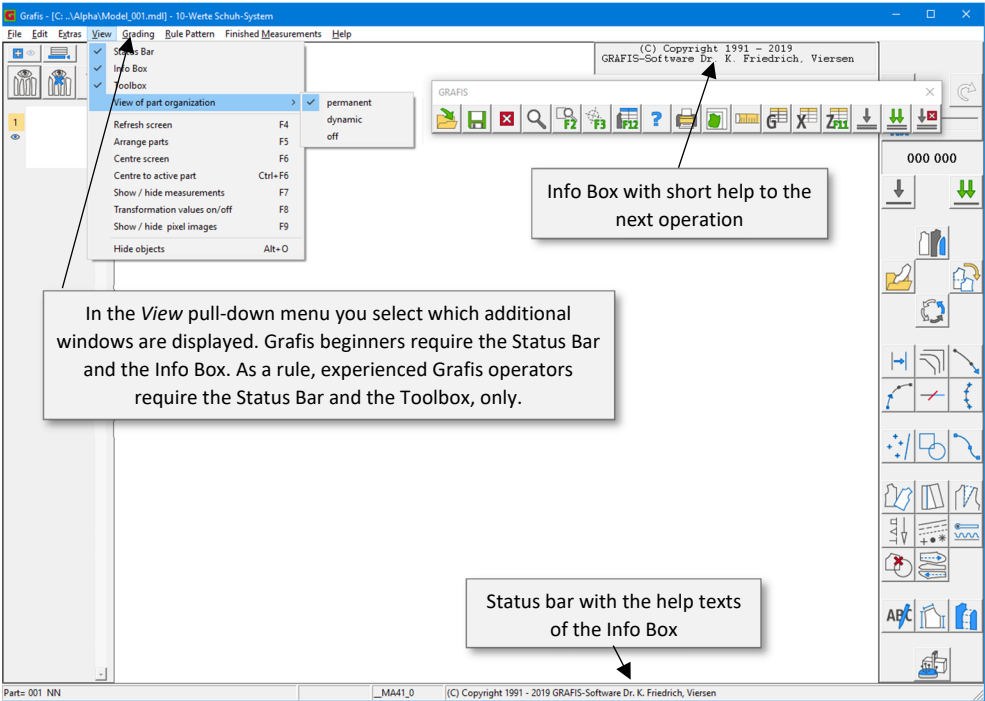
The dialogue to open or delete styles opens automatically after having selected a measurement system or via *Fila* → *Open*.

<b>drives</b>	according to hard and software A:,...,Z:
<b>collection folders</b>	folders and subfolders in \Grafis\Schuh_1\Kollekt
<b>styles</b>	saved as *.mdl files in the collection folders or sub-folders
<b>parts</b>	max. 999 parts per style
<b>objects</b>	points, lines, texts, hatching, construction record, construction parameter etc.

### 1.3 When help is needed




#### Overview

- ⇒ Constant help in the instructions window or the status line (Picture 1-6)
- ⇒ Context related help via the <F1>-key or via the pull-down menu *Help* → *Context*.



Picture 1-6

## Constant help


Constant help is given in the instructions window or the status line where the next steps required are explained. The instructions window is located in the top right corner of the working area. The status line makes up the lower border of the Grafis screen (Picture 1-6). Click  on *transformation*  in the basic menu. Read the instructions and close the *transformation* menu with .

## Context related help

Context related help can be found by pressing the <F1>-key or via the pull-down menu *Help* → *Context*. The relevant textbook chapter opens.


**All contents** of the help function can be obtained with *Help* → *Help topics*.

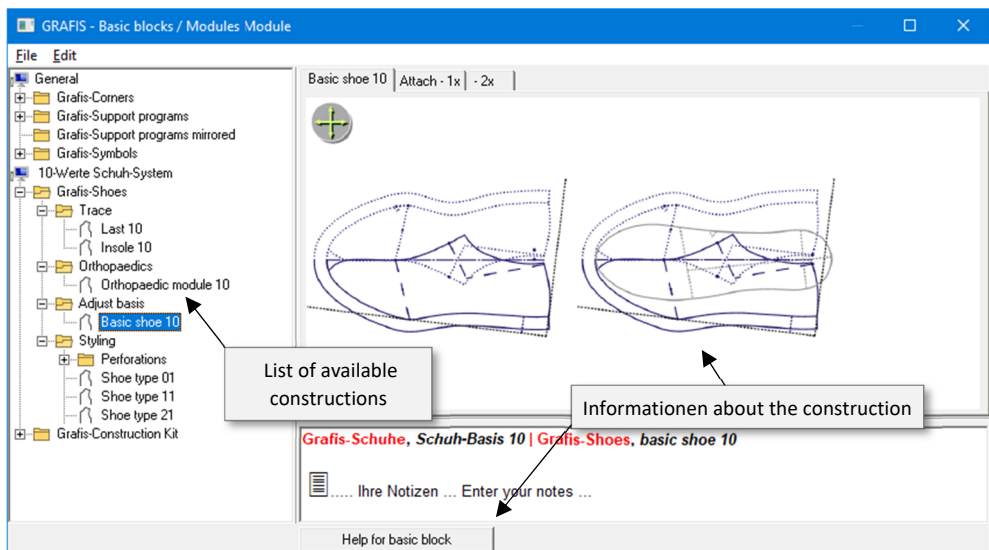
## Exercise

Open the *delete* menu in Grafis by clicking on  in the basic menu. Press <F1>. The textbook chapter on the subject 'delete' opens.

## 1.4 Calling basic blocks

### The function call

All basic blocks available in the selected shoe system can be started with the function call .



Picture 1-7

Under *General* you can find constructions that can be called in a number of shoe systems. The section *10-Werte-Schuhsystem* contains constructions that can only be called in the current measurement system.

### Calling a basic block

A selected basic block (Picture 1-7) is called by double-click. Call *Last 10* from *Gafis Shoe*. Your first basic block is displayed on screen. Before calling a different basic block click on *reset* in the basic menu and then click on *test run*. The previously called basic block is thus reset.

#### Basic menu (extract)

- reset ▀ restore record
- N amount of reset
- record counter
- test run ▀ grading
- part organisation
- call basic blocks ▀ insert

## 1.5 Alter the screen display

### Overview

The patterns can be displayed on screen in scales from approx. 100:1 to 1:100. The setting is infinitely variable or can be controlled with certain values. The function keys F2, F3, F4, F6, the arrow keys and the mouse wheel are used for adjusting the screen display. They have the following significance:

	Function
<b>F2</b>	Zoom in/ Zoom out screen contents
<b>F3</b>	Drag/ turn parts towards one another and roll two parts (sections 11.3 and 11.4)
<b>F4</b>	Refresh screen
<b>F6</b>	Centre screen contents

*The construction is not influenced by the changes to the screen display.*

## Move/ Zoom with the mouse wheel

The screen display can be altered at any point with the mouse wheel. The following applies:

<b>move up/down</b>	wheel only
<b>move right/left</b>	<Shift>+wheel
<b>zoom</b>	<Ctrl>+wheel



### Drag/Zoom

Patterns can be enlarged/ reduced in stages or moved on the screen with the *Drag/Zoom* function in the *Edit* pull-down menu or from the toolbox. After having clicked *Drag/Zoom* a magnifying glass with the following functions appears:

<b>enlarge</b>	click left mouse button
<b>reduce</b>	click right mouse button
<b>move</b>	keep left mouse button pressed

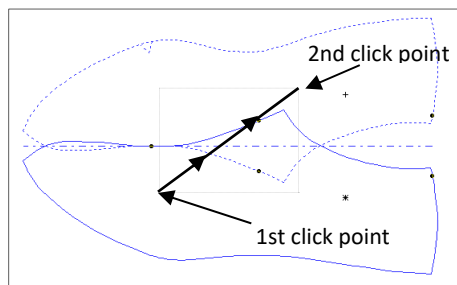
Enlarging and reducing ensues with the magnifying glass as the centre. Click the relevant points or lines with . Reduce with and move the mouse with pressed left mouse button.

### Centre picture with <F6>

Pressing the <F6>-key automatically adjusts the scale and position of the whole construction to display all objects on the screen. The construction is centred on screen.

### Zoom in with <F2>

Press <F2> to zoom into the screen contents. First click in the lower left corner of the area to be enlarged. Move the mouse to open a rectangle. Extend the rectangle to the top right (Picture 1-8) and click again .



Picture 1-8

The rectangle content becomes the screen contents. Press the <F6>-key and your complete construction re-appears on screen. Practise zooming in on various areas of your construction. Press <F6> after each zoom operation.

### Move with arrow keys

Use the arrow keys to move the picture. The moving speed is increased by keeping the keys pressed down.

Reduce the construction and move the screen contents with the arrow keys.

### Refresh screen with <F4>

The <F4>-key rebuilds the whole screen content.

Identical objects lying on top of each other twice, four or six times cannot be seen on screen as they delete each other's image. Objects lying once, three or five times on top of each other can be seen. After pressing <F4> objects deleting each other's image are always displayed.

Please use this key from time to time as a means of control.

## 1.6 Pattern output



### Clipboard

Grafis supports the Windows clipboard for processing patterns in other Windows applications. The function *Copy (clipboard)* in the *Edit* pull-down menu copies the visible contents of the Grafis screen to the clipboard. The contents of the clipboard can be inserted into other Windows applications such as Word, Paint or Excel to create further material about the style or teaching material for example.



### Output to plotter/printer

Output of patterns to plotters (drawing devices) or printers ensues via the *Plot/Print* menu. A special feature of the pattern output function in Grafis is the automatic wrap. It allows for quick output of full size patterns to small scale printers by dividing the pattern into partial pictures which can be joined subsequently. The *Plot/Print* menu is opened via the *File* → *Plot/Print...* pull-down menu or from the toolbox.

### Preparation of plot picture

- ⇒ Set up or change the plotter/printer (plotter type, paper format,...)
- ⇒ Click *centre frame* and press <F6> to get an overview
- ⇒ Adjust the following settings:
  - *portrait* or *landscape*
  - plot scale with *enlargement*
  - activate the *automatic wrap*
  - position the plot frame with *align/centre* and/or dragging
- ⇒ Position the frame text

### Output of plot picture

- ⇒ *Start output* (plot picture is generated internally)



## Change plotter/printer

The selected output device is displayed under *plot device*. The extensions mean:

**to LPT1** Direct output to the parallel port LPT1.

**to File** A file with control information for the output device is generated.

**(WIN)** Output to a device with Windows driver.

**(DOS)** Output to a device without Windows driver.

**(WINSPOOL)** The control information is sent to a device attached to the USB port.

The Windows driver is used to spool the vector data to the device. Please note that not every driver can perform this function.

For the following exercises, a Windows-installed A4 printer is sufficient. Further information can be found in the Appendix of the Grafis help function.

### The plot format

The measurements of the active format are displayed in millimetres under *plotformat*. The other plot formats of your output device can be adjusted via the *Plotter/Printer Setup*.

The plot frame on your screen corresponds with the printable area of your output device. The content of the plot frame is printed. Press the <F6>-key to display the plot frame as well as the plot picture.

### Selection of portrait or landscape

Clicking *portrait/ landscape* toggles between portrait and landscape.

### Plot/Print menu

printer/ plotter setup

enlargement

adapt enlargement

portrait/landscape ▪ place frame ▪  
centre frame  
text position ▪ +/- seam allowance

horizontal wrap ▪ automatic wrap

vertical wrap

start output



### Selection of plot scale

The plot scale is adjusted by entering the scale factor in the *enlargement* line. The pattern will be reduced/enlarged for output according to this scale. The scale factors mean the following

- 1.0 scale 1:1
- 0.5 scale 1:2
- 0.25 scale 1:4 etc.

Adjust to scale 1:2 by entering 0.5 into the field below *enlargement* (click, type, <ENTER>) and press the <F6>-key. You will notice that the plot frame now covers a greater area of the pattern. Repeat with other scales. Change also between portrait and landscape.

The **adapt** option adjusts the scale so that the whole screen content fits the plot frame. Use this option only for scaled printouts and sketches as it alters the scale!

The scale can also be entered in the *Plot file* dialogue, which is accessed via *Change plot device*.

### Position the plot frame

Positioning the plot frame ensues either by dragging (cursor on plot frame, press left mouse button and move mouse) or via clicking on the menu functions *align* or *centre*. Practise these options! *Align* always positions the pattern at the lower right edge of the frame, optimised for plot output. *Centre* positions the plot frame centred over the plot image. Use *align* for full-scale plots and *centre* for scaled output in A4. Practise positioning the plot frame in conjunction with format and scale changes.

### Activating automatic wrap

The automatic wrap is useful for output of full size patterns to devices with small format, i.e. A4 printers. A raster is superimposed onto the pattern (Picture 3-5 and Picture 3-6) and each field is output separately. The partial pictures can then be joined together frame by frame. The raster is generated or eliminated by clicking *horizontal wrap* or *vertical wrap*. *Automatic wrap* adjusts the number of raster so that the complete pattern lies within the raster.

Practise the automatic wrap in conjunction with adjustment of plot scale, portrait/landscape and positioning of the plot frame. Apply scale 1:1 also and press the <F6>-key from time to time.

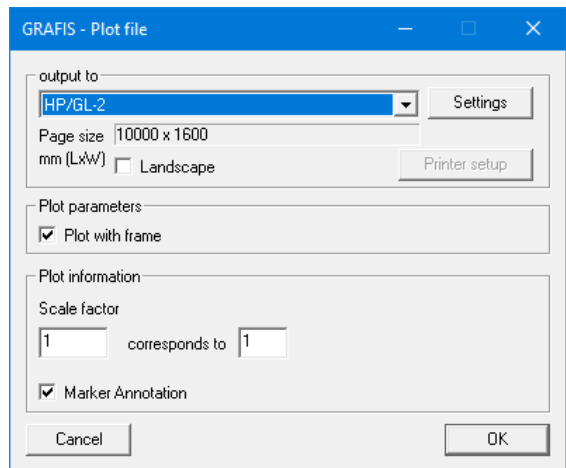
## Positioning the frame text

A standard annotation at the plot frame can be output with the picture for easy identification of the plot, especially on partial pictures when using automatic wrap. It contains collection and style name, part number and field co-ordinates. By clicking on *text position* the text is positioned at the left, right, upper or lower edge of the plot frame or it is not visible. Position the text at the left plot frame.

## Select with/ without plot frame

Clicking on *Printer/plotter setup* opens a dialogue with further plot options (Picture 1-9). Activating *plot with frame* outputs the frame on the plot. This option should be active for output with wrap.

Detailed information on the *Settings* and *Print options* dialogues including details on how to set up plotters/ printers can be found in the appendix.



Picture 1-9

## Output of plot picture

Clicking on **Start output** transmits the control information directly to the attached output device (printer/plotter) for output as an image or in partial images. Naturally, the output device must be online.

## Output to file

Output to file is required if your plots are to be output onto a plotter not directly attached to your computer and not accessible via a network or are to be transferred into a text or drawing software as HPGL files.

Plot to file is only possible for printer/plotters without windows driver. If the target for the plot device in the menu on the right is not yet displayed as *to FILE:*, open the *Grafis – Plot file* dialogue via *Printer/plotter setup*. Select the plotter, click on *Settings*, activate the *Edit* button, set the option *connected to* to *FILE* and accept the settings. To generate HPGL data select the *HPGL-2* plotter.

If output to file is active, the control information is saved in one or more files (for automatic wrap). After initiating *start output*, you are requested to enter a file name.

Grafis is not required for output of plot files to a plotter inland or abroad. It is important that the control information was generated especially for this plotter. For example, plot files generated with the 'Algotex (to FILE)' setting can only be read by an Algotex plotter.

To transfer the file to the plotter click on *Start* → *Run...* and enter  
`copy C:\test.plt com2:`

in the *Open:* dialogue.

`c:\test.plt` must be the complete path to the plot file including the name of the plot file. `com2:` must be the port to which the plotter is connected. The copy command cannot be used for output to USB ports.

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## 2.1 Style structure

The shoe style development with Grafis ensues in four stages:

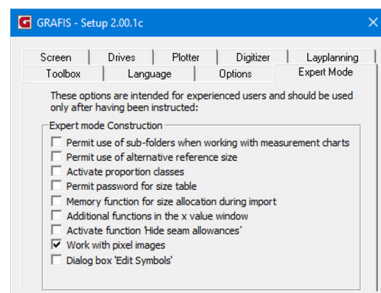
- Load the background image of a last
- Call and adjust the interactive *Last 10*
- Develop a draft with all required design elements
- Derive the production patterns such as vamp, tongue, outer and inner lacing, heel, lining etc.

The parts from these developmental stages are connected so that alterations to the basic block are applied to the draft pattern und thus, to the production patterns.

More detailed explanation on part organisation and hereditary automatic can be found in Sections 5.1 and 13.1.

## 2.2 Load and manage Pixel images

In Grafis, photos or scans can be loaded as pixel images. The loaded pixel images serve as templates for tracing the last. To enable loading of photos into Grafis, the option *Work with pixel images* must be activated in the Grafis Setup (see Appendix B of F1 Help) under *Expert Mode* (Picture 2-1). The images are loaded into a part in the part organisation of an opened style file.



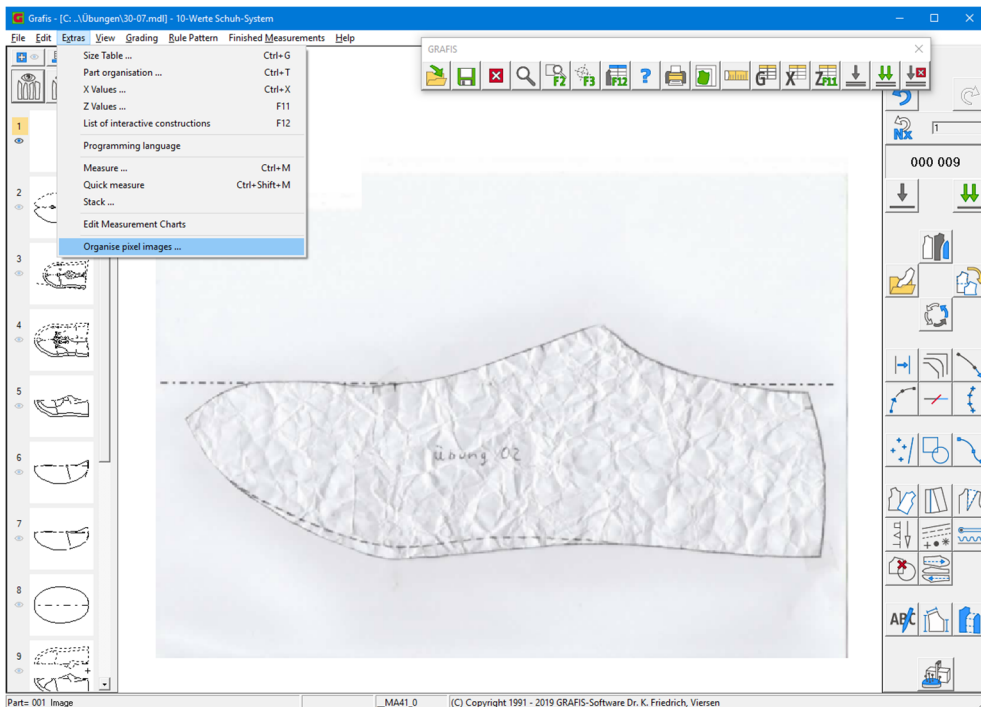
Picture 2-1

## Load pixel images


Pixel images of bmp, gif, jpg, tif and png formats can be loaded into Grafis.

### Step-by-step guide

- ⇒ Open a style or marker file
- ⇒ *Extras* or *Marker information* → *Manage pixel images*
- ⇒ *Load image* in the menu
- ⇒ Select the pixel image file
- ⇒ possibly, assign the image to a part
- ⇒ select type of use for the pixel image:
  - Select in Grafis Patternmaking: *Background image* or *Symbol/Logo*
  - Select in Grafis Marker making: *Material background*, *Transparent material background*, *Fill/Brush* or *Symbol/Logo*



Picture 2-2

- ⇒ possibly: assign ID for symbol/logo, flip or rotate pixel image, determine reference point in pixel image, determine image size in Grafis, determine reference point in Grafis, adjust visibility, greyscale, transparency or invert image
- ⇒ End with 



With the functions pixel images are loaded into the image list or removed from this list and the list is opened and folded. All further functions on the right of the menu relate to the image selected in the image list.

### Manage pixel image menu

load image ▪ delete image ▪ +/- show image list

Image	Part	Path	Properties	Image type	Position
Fox.png	<input checked="" type="checkbox"/>	001 NN	R:\Sabine\CI	Background image	...

#### Image selected in the list of images...

vertical ▪ mirror horizontal ▪ nil

rotate +90° ▪ rotate -90° ▪ fine tuning

width/height of image in pixel

reference point (X/Y) in image in pixel

resolution in dpi

target width/height in Grafis in mm

reference point (X/Y) in Grafis in mm

visibility ▪ greyscale ▪ invert image

gamma correction

select type of use

select symbol/logo ID

Grafis Patternmaking

Grafis Marker making

Material background  
Material background  
Material background with tra  
Brush  
Symbol/Logo



522 601 px

0 0 px

299,95 299,95 dpi

44,2 50,9 mm

0 0 mm

Symbol/Logo

Hintergrundbild

Symbol/Logo

Logo ID # 101

### Functions of the image list ...

Clicking on the last column in the image list opens a context menu with further functions for the pixel image. The pixel image can be assigned to a part or moved up/ down in the image list. With *Save image file as...* it is sorted from the style/ marker file and saved outside of Grafis. The function *Duplicate image...* is needed if the image in the current style/ marker is also required in other parts or as a duplicate with other settings.

Flip/ rotate image

With this block of functions, the selected pixel image can be flipped, rotated or returned to its original state.

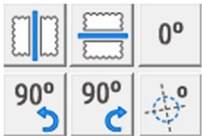
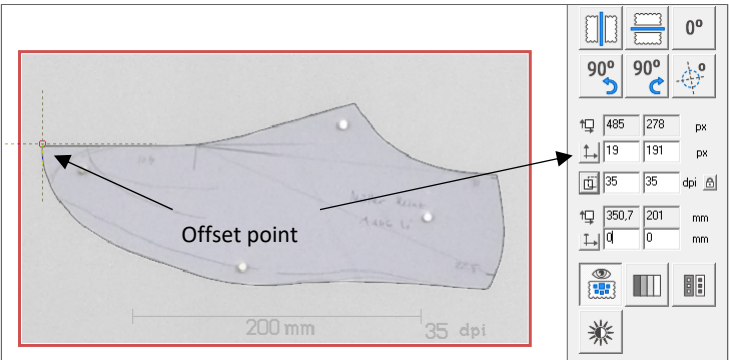



Image size and image position




With the following functions in the menu, the target size in Grafis and the position





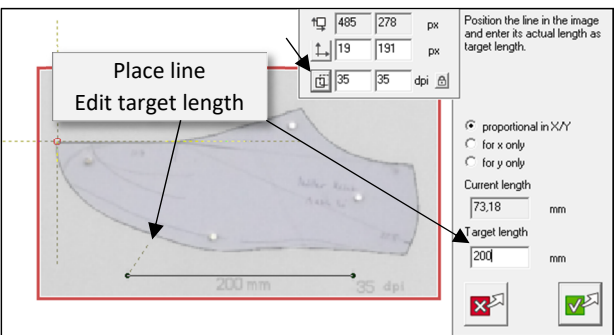
Picture 2-3

of the image in Grafis are determined. The value in the first row shows the actual size of the pixel image. For transformation in Grafis, the offset

point in the image can be selected specifically with  in the second row (Picture 2-3).

For **size/ scale** in Grafis, the dpi  200 200 dpi  value in the third row is critical. It determines the calculation from pixel to inches and thus, indirectly into mm. If the dpi value of the pixel image is not known, it can be established in its own dialogue via the button  to the left of the dpi value, see Picture 2-4.


In this dialogue, the start and end point of a line is placed in the pixel image and the known target length of this line is entered. You can select if the scale is to be applied proportionally in x and y direction or in one direction only. If  is active in the menu, the scaling is carried out proportionally.  accepts the scaling. The dpi value results from these data.





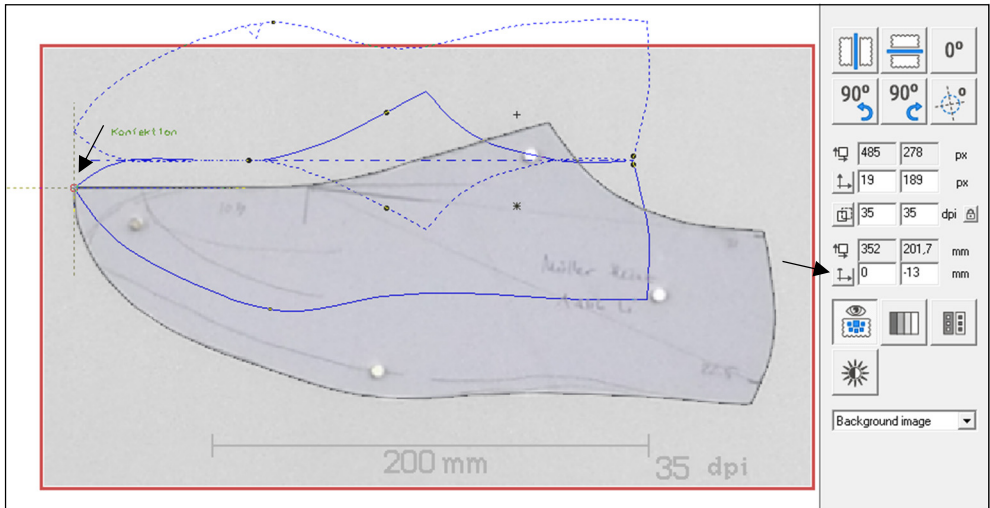
Picture 2-4

The size of image in Grafis in mm, shown in the fourth row, results from the dpi value.




The **target position of the offset point** can be determined through value entry in the **fifth row** or through clicking  and constructing the target point in Grafis (Picture 2-5).




	44,2	50,9	mm
	0	0	mm



Picture 2-5




### Visibility, colour values, greyscale, transparency, repeat

Activating  determines that the pixel image is visible in the style/ marker. The tick ☒ only controls visibility of the image and the corresponding part during work in the *Manage pixel image menu*.

 converts the image into greyscale. Clicking on  inverts the colour values of the image.  is for gamma correction. Clicking again on the respective icon reverses the correction. Further settings for background images are available in Grafis Marker making, which are explained in Section 18.3.

## 2.3 Open and label parts

### Step-by-step guide

- ⇒ Open part organisation via: *Part rack* → button  or *basic menu* → *part organisation*  or *Extras* → *part organisation...* (Picture 2-6)
- ⇒ Create new parts with *Open part*
- ⇒ Enter/Edit the name of the selected part with text  or after double-click.

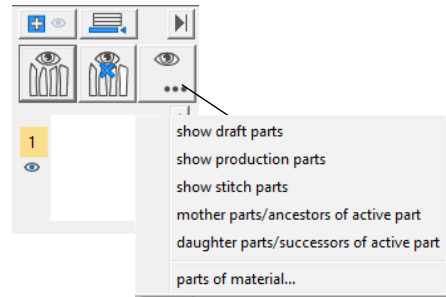
### Part rack menu (extract)

show invisible parts ▪ open part organisation

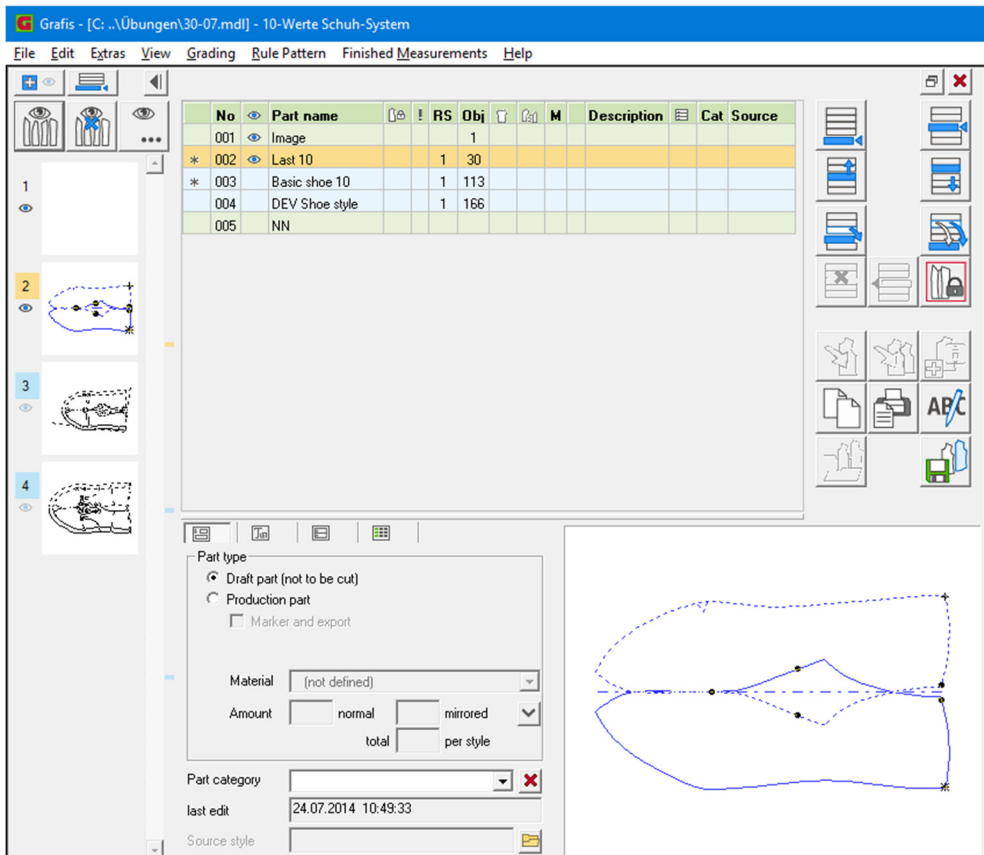
show all parts ▪ hide all parts ▪

show parts ...

1st part active and visible



Create a new style „Model\_001“, load the picture of a last as a background image and set the zero point of the image with *Manage pixel images*. Click on *part organisation* in the menu on the right. The dialogue shown in Picture 2-6 opens. In the left window you can find the list of all parts of the style. Initially, only part 001 with the temporary name “NN” is available. By clicking on *open new part* in the menu on the right you can create further parts in this list. The active part is





Picture 2-6

highlighted and a preview of the part appears at the bottom of the window. Open three further parts.

Double-click on the first part and enter the name “background image”. Name the second part “Last 10” in the same way. To label the other parts use a function from the menu on the right. First, select part 003 and then, click on **text** and enter the part names one after the other according to Picture 2-6. As opposed to editing with double-click, the line of text for the next part opens automatically after pressing <ENTER>. Abort text entry with <ESC>. Parts can be deleted or removed from this list with the functions *delete* and *remove*. *Delete* means that all record steps are reset; *remove* means the part is removed from the list.



The part list also contains other important information. The character “\*” in front of the part number indicates that this part is a mother part. A **mother part** has successor parts that are affected by alterations to the mother part. Further information can be found in Chapter 13.

	<b>Partorganisation menu (extract)</b>
	lock/ unlock window ▪ close
	open new part ▪ insert part
	move part up ▪ move part down
	duplicate part ▪ duplicate part with daughter parts/successors
	delete part ▪ remove part ▪ reduce part
	view all ▪ hide all ▪ view parts ...
	insert reference ▪ update reference ▪ +/-part information
	copy ▪ print ▪ edit part names
	call module ▪ save module

The icon  signifies that the respective part is visible on the screen. Clicking this symbol in the part list or the part rack toggles between the part being visible or not visible. The active part, selected by the bar, is always visible. You can switch **all parts invisible** by clicking on **hide all**. You can make **all parts visible** by clicking on **show all**. Removed parts are no longer visible on screen but have not been deleted.

To **quit the part organisation** click the right mouse button or click on a function of the basic menu. The selected part is then available for editing. If the respective part is a mother part, a warning message appears in the status bar at the bottom of the screen.

**During construction the active part is always displayed in blue on a white screen. In the basic menu all visible parts can be activated by clicking. It is not necessary to open the part organisation menu to activate a part!**

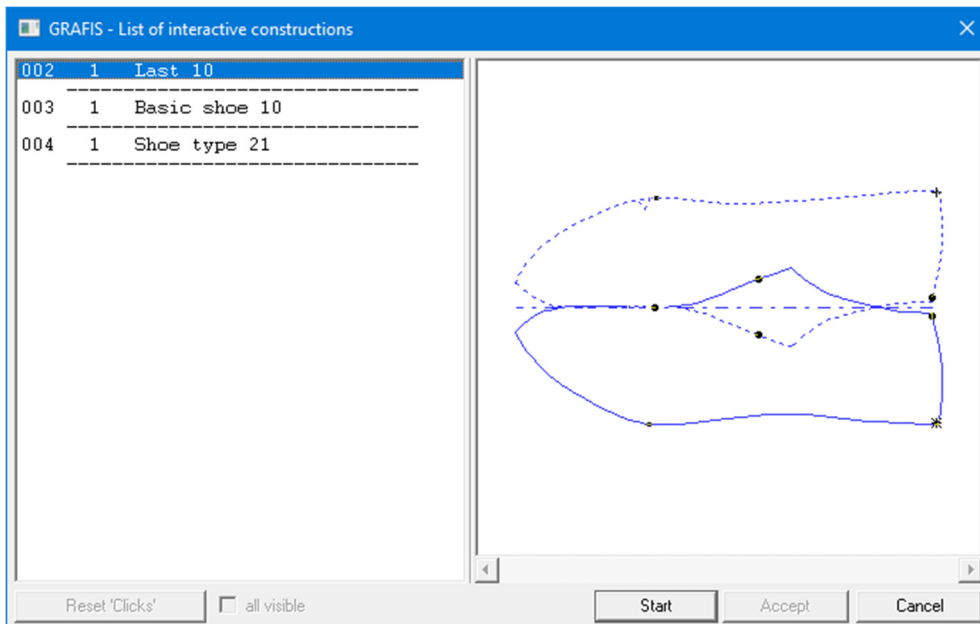
Now select part 002 “Last 10”, mark part 001 “background image” with  for visible and quit part organisation with . You are back in the basic menu. The background image is visible.

Call the construction *Last 10* from the call list under *Grafis-Shoes* → *Trace*.

## 2.4 Adjust interactive construction

Step-by-step guide

- ⇒ Call construction
- ⇒ Activate construction with double-click or from the overview with <F12> or by right click to the contour and selection in the context menu
- ⇒ Set options for the construction
- ⇒ Activate drag areas and adjust the construction; use *raster* and also *compare*.



Picture 2-7

### Activate construction

All constructions loaded into the style can be activated with either


- double-click on the respective construction or
- <F12> in the list of interactive constructions (Picture 2-7).

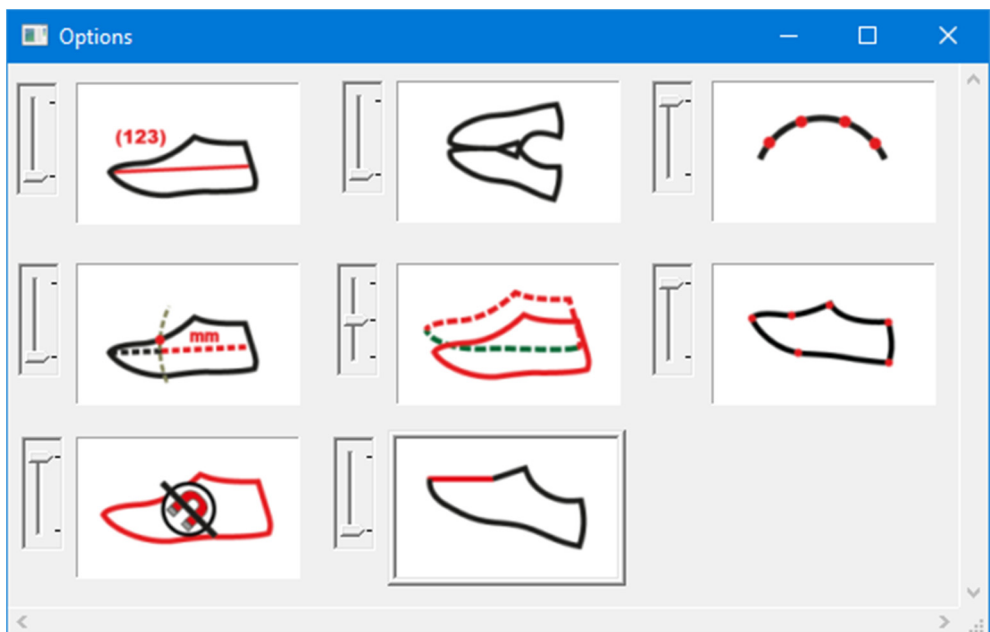
The list of interactive constructions contains all constructions called into the style and the number of the part into which they were called. They are listed according to part numbers. The window on the right contains a preview of the selected construction. A construction is activated with double-click or selection and *Start*.

### Set options

After having activated a construction the menu for interactive constructions appears.

There are a greater or smaller number of options available for each construction.

The list of options (Picture 2-8) opens by switching to *+options*  in the right menu. The options window can be resized as required. A scroll bar appears at the edge of the window if not all options are visible. The active option is highlighted (Picture 2-8 bottom centre). Using the arrow keys, the mouse wheel or altering the slider to the left of the image alters the active option. A different option is selected by clicking.



Picture 2-8

The alteration of an option is immediately applied to the construction behind. We recommend working with a reduced option window so that you can follow the alterations to the construction.

### Exercise

Open a new style and call the basic block *Last 10*. Activate the construction. Set the following options (Picture 2-8):

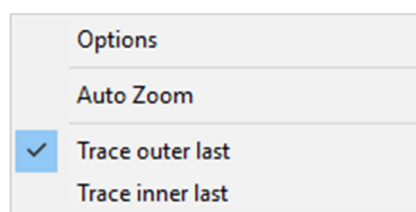
mirrored adjustment

use mirror lines yes

variants of ball point construction in mm.

### Drag areas

Each construction has one or more drag areas. The drag areas are selected via the context menu which opens with right mouse click. The drag areas were introduced to give greater control so that not too many points can be altered at the same time. After having activated an interactive construction the first drag area is active. It is indicated by a tick mark in the context menu (Picture 2-9).




Picture 2-9


### Drag points

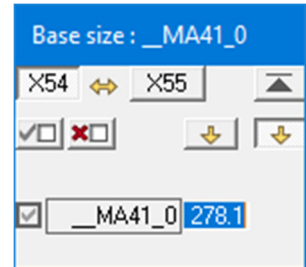
In the drag area small red points appear at the construction.

	The drag point is moved...		The curve is altered ...
↕	free	~	free
↔	in X direction only	~ ~	symmetrical
↑↓	in Y direction only	~	asymmetrical
↕↔	free, symmetrical		The angle is altered ...
↔↔	in X direction only, symmetrical	△	free
↑↓↔	in Y direction only, symmetrical	△ △	symmetrical
↔	free, asymmetrical	△	asymmetrical
↔	in X direction only, asymmetrical		
↑↓	in Y direction only, asymmetrical	↗	The point slides along a line...

With these so-called drag points the construction can be altered interactively. Close to a drag point a symbol at the cursor indicates how this drag point can alter the construction, see overview above.

A drag point is activated by clicking. The point additionally marked with a green rectangle  is the **active drag point**.

The **value window** (Picture 2-10) contains the values for the active drag point. Only one or two size-dependent values can exist per drag point. Two values exist only if the point with cursor  can be moved free in x and y direction.



Picture 2-10

### Dragging a point

Each drag point can be altered interactively by dragging the point or by entering a value directly into the value window.

When dragging a point interactively the **raster** can be switched on. Click on one of the numbers 01 05 10 25 50 in the menu on the right. The value attached to the drag point behaves according to the selected raster. To deactivate the raster set it to 00.

With **+values**  the value is displayed at the cursor during dragging.

### Use of Compare and Test run/Grading



Switching to **+compare** makes a comparison visible. This comparison is either with the state of alteration when last clicked on *set comparison* or with the original state.



When clicking on *undo steps* or *redo steps* you undo alteration steps or redo them. '00' corresponds with the original state.



From Version 12 onwards, the new *test run/ grading* switch is available.

**With +test run/grading the active part and all visible following parts are recalculated in the background and displayed after each drag process.**

The user can understand the impact of the interactive alterations on the following record steps in the active part and in the interdependent parts.

**The final result of the style development is thus immediately visible and is updated after each drag process.**

Only one of the two switches *compare* and *test run/ grading* can be active at any one time. If *test run/ grading* is activated, *compare* is switched off automatically and vice versa. This switch is only useful if subsequent record steps or interdependent parts exist.

## Save/ load shape



Clicking **save shape** saves the current adjustments of the construction as a shape. Clicking **load shape** opens the list of available shapes for the construction. Shapes are saved with date, time, computer name and user name. Double-click opens a different shape from the list.

## Consistent presentation of basic shoe constructions

All basic shoe constructions *Last 10*, *Insole 10*, *Orthopaedic Shoe Style 10* and *Basic Shoe 10* have a consistent presentation with additional information.

Depending on the drag area, at the bottom right you can find the information whether only the outer last, the inner last or both sides are adjusted. The auxiliary lines and texts appear in **beige at the outer last** and in **turquoise at the inner last**, see Picture 2-11.

Above the mirror axis you can find the information whether the style is interpreted as a **ready-to-wear style or as an orthopaedic style**. Ready-to-wear is applied if points 1 to 4 inside and outside are congruent, see Picture 2-12. Only the sole edge may be shaped differently. Otherwise, the ready-to-wear style becomes an orthopaedic style. This information is passed through from the last to *Basic shoe 10* and can still change in case of a manipulation in *Orthopaedic Module 10*.

## Menu for interactive constructions

load shape ▪ save shape

break sizes

raster

+/-magnet ▪ +/-ruler

+/-comments ▪ +/-options ▪ +/-values

+/-measurements ▪ set measurements

+/-compare ▪ set compare

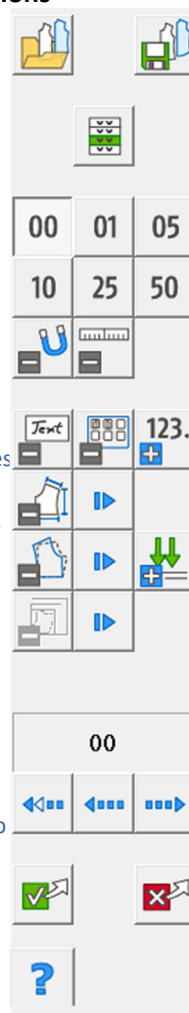
+/-stack ▪ set stack

alteration steps

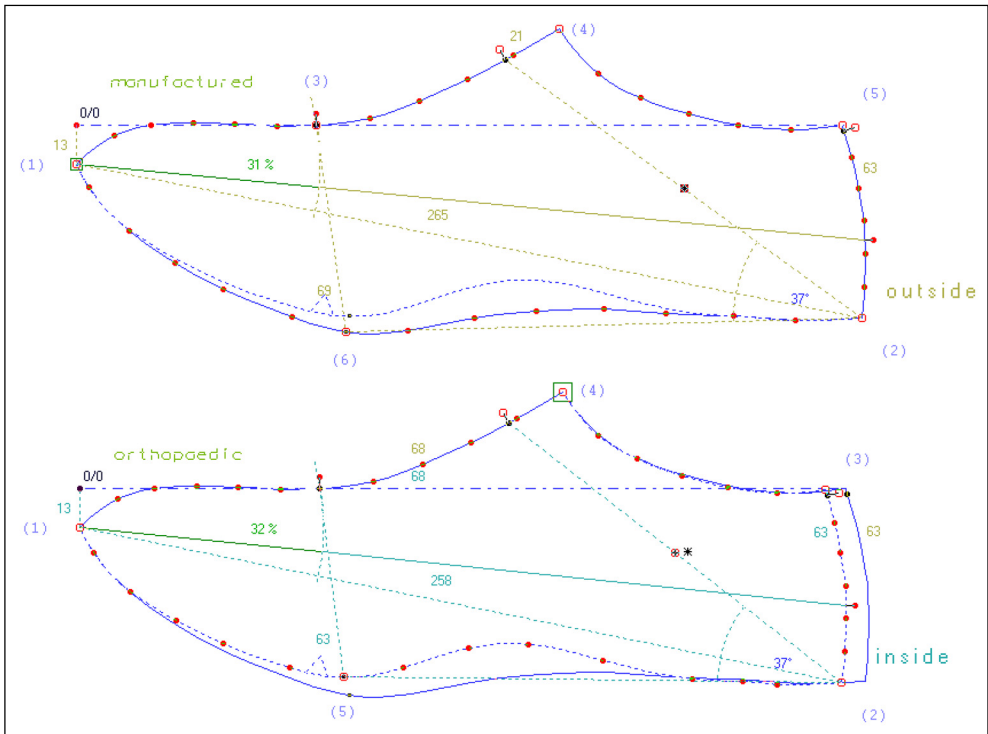
original state ▪ undo step ▪ redo step

end ▪ abort

help for construction

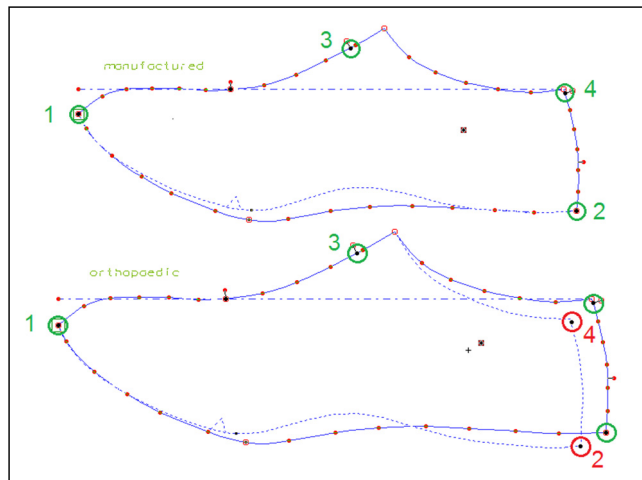






Picture 2-12

If the measurements are switched off via the option *Display measurements* Y/N, they will become visible in connection with certain drag points, making clear the mode of action of these drag points.

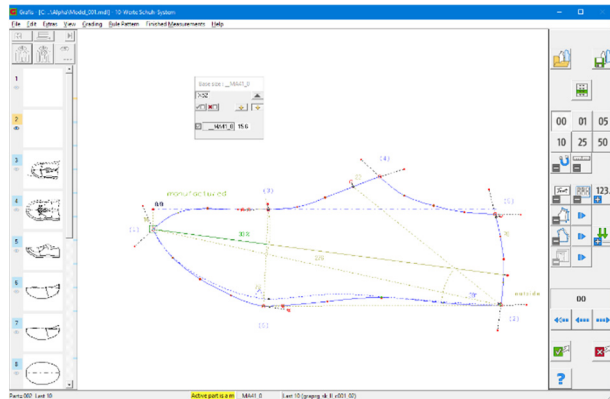


Picture 2-11

## 2.5 Interactive Last 10

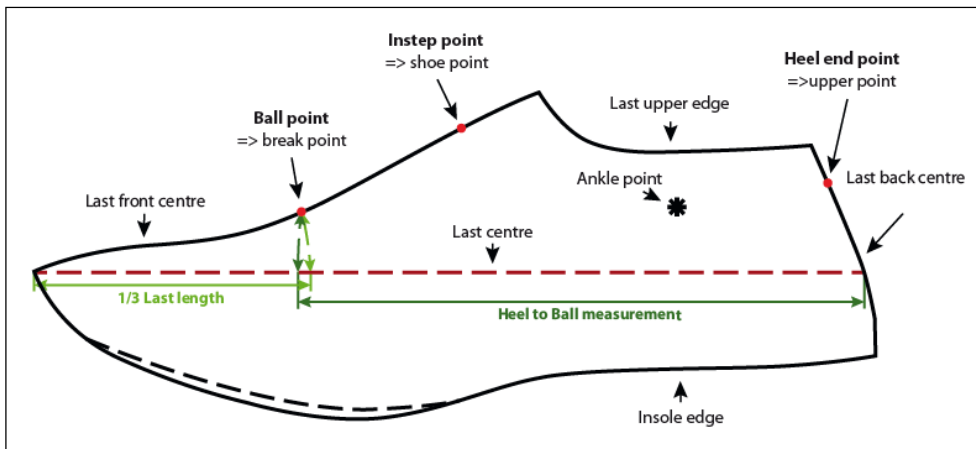
*Last 10* is the basis for all upper constructions in Grafis, Picture 2-13. *Last 10* is used to interactively trace the contour of the last, loaded as a background image.

Tracing the last generates four contour lines for the outer last and four lines for the inner last.



Picture 2-13

When generating the last, the following points are usually defined and marked on the last: ball point, instep, heel end point and ankle (Picture 2-14). They are anatomical fixed points which are important for future styling and are transferred together with the last. Once correctly defined, these points cannot be altered.



Picture 2-14

The instep and the heel end point serve as orientation for the subsequent upper opening. The instep is located on the centre of the last front and indicates the end of the instep, i.e. the bridge of the foot. The heel end point is located on the centre of the last back and indicates the end of the heel.

To draw the upper opening, these points can be moved in the *Basic Shoe 10* module. The fixed points remain unchanged, new points are created: shoe point and upper point.

The ball point is located on the centre of the last front and indicates the place where the shoe width is measured and graded.

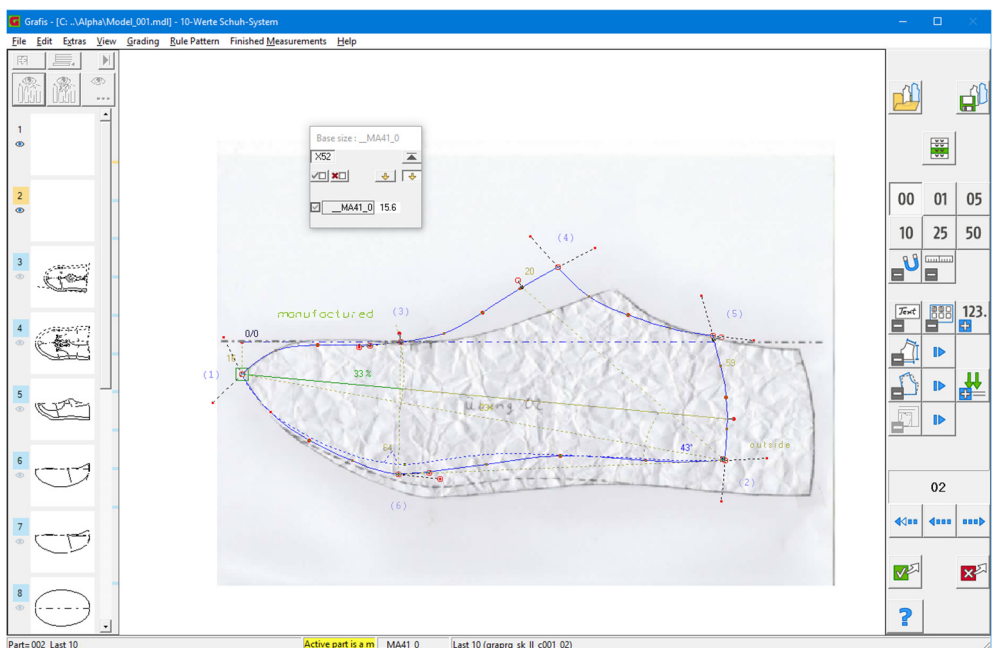
The break point indicates the location where the fold intersects with the inner last and the outer last. Depending on the style, the break point can be defined differently from the ball point.

The ankle point is a further anatomical fixed point. It indicates the point of the ankle bone and can serve as orientation for the upper opening curve. In the *Basic Shoe 10* module the ankle point can be used via an option to position auxiliary lines.

### Method for adjustment of Last 10

#### Schrittfolge

- ⇒ Load background image of a last (Picture 2-2)
- ⇒ Determine zero point in the background image (Picture 2-3)
- ⇒ Open another part in *part organisation* (Picture 2-6)
- ⇒ Call *Last 10*
- ⇒ Activate *Last 10* by double-clicking or via F12
- ⇒ Activate the option *Display measurements*

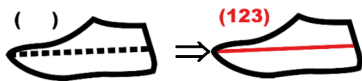


Picture 2-15

If the option *Display measurements* is active, numbers in brackets will appear at some drag points (Picture 2-15). These numbers indicate the order in which adjustments should be carried out. The order should be observed as some points depend on others and will be moved along with the adjustment of points of a higher priority.

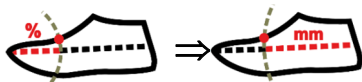
### Options of Last 10

#### *Display measurements*



This option controls the display of measurements and auxiliary lines. These measurements and auxiliary lines offer additional information and simplify the adjustment.

#### *Auxiliary measurement for ball point determination*



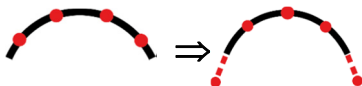
The ball point can be determined in two different ways:

A circle arc with the radius  $\frac{1}{3}$  of the last centre line is drawn from the last tip (can be altered). The intersection with the front last centre gives the ball point.

A circle arc with the radius heel to ball length is drawn from the end of the last centre line. The heel to ball length is measured from the heel to the ball point on the last. The intersection with the front last centre gives the ball point.

This option alters the auxiliary measurement for the ball point determination and becomes inactive if the option *Display measurements* is deactivated.

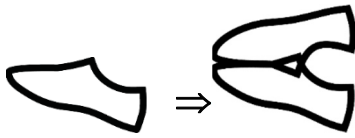
#### *Curve type*



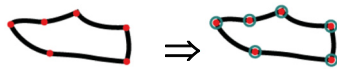
In *Last 10* two different processes for tracing the curves can be selected:

With setting 1 each curve can be recreated with a number of points.

With setting 2 curves are recreated via directions and form points of the 1st and 2nd order. During alteration of this option, the values for the different option are recalculated in the background.

***Mirrored adjustment***

With this option you can determine whether you want to display and adjust the last open or closed. The closed state can be useful to compare inner last and outer last.

***Display drag point marker***

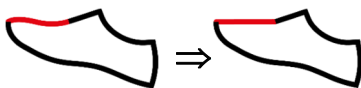
With this option you can display additional markers for easier detection of the drag points.

***Proportion inner last/outer last***

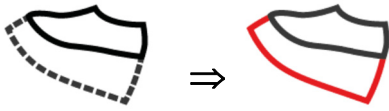
This option controls the advanced adjustments for the inner last.

Setting 1 enables unrestricted adjustment of the inner last (in the same way as the outer last). With setting 2 only the sole edge of the inner last can be adjusted. All other adjustments are transferred from the outer last.

Setting 3 hides the *Inner last* drag area and transfers all values from the outer last to the inner last. This can be used for simple styles and saves a lot of adjustment.

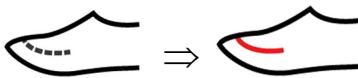
***Trace last folded***

If a style sketch is available with curves straightened from the break point, this option can reduce a number of adjustment steps.

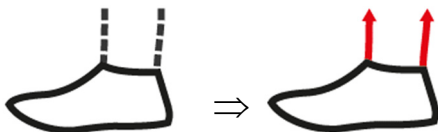
**Cork line**

For some shoe styles a cork line is required. This option enables two further drag areas where the cork line for the inner last and the outer last can be shaped separately.

If in orthopaedic styles the cork line is to be used for one foot only, the use of the line can be adjusted size-dependent or foot-dependent via a switch in the *Outer cork line* drag area.

**Display mirror seam**

Some shoe styles require a mirror seam. Via this option, two further drag areas are unlocked in which the mirror seam for the inner and outer lasts can be shaped separately.


**Boot last**

This option enables simplified tracing of lasts, derived from boot lasts. In the drag areas *Trace outer last* and *Trace inner last* further drag points appear if the option is activated.

**Use outer lines as magnet lines**

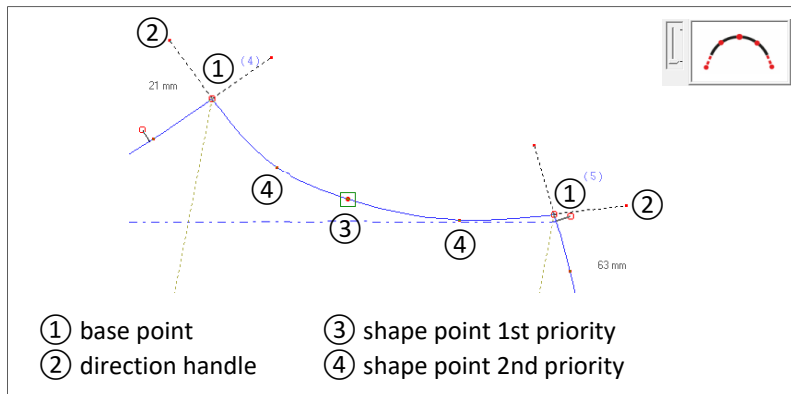
When adjusting the inner last, it can be helpful to use the outer last as a magnetic line, for example when the sole edge of the outer last is identical to the inner last at beginning and end and differs only in the middle.

In other cases, a magnetic outer last can be counter-productive, e.g. when tracing a digitized last.


If this option is active, the outer last becomes magnetic for some drag points of the inner last, when *Magnet*  is active in the drag area.


### Adjusting an interactive curve using the example of *Last 10*

The same principles apply to the adjustment of curves in all interactive constructions. These principles are now explained using the example of *Last 10*, see also Picture 2-16.



Picture 2-16

Base points ① are positioned at the beginning and end of the curve, marked by a point and a red circle. If the cursor takes the shape  at these points, they can be moved along the corresponding line.

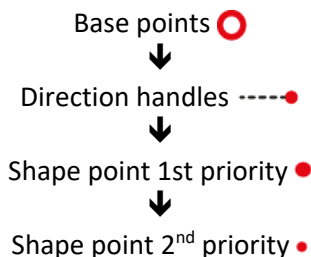
Dashed extensions with little points at the beginning/end of the curve are direction handles ②. If the cursor takes on the shape  at these points, the direction can be dragged.

There are one or three shape points between two neighbouring base points:

- one shape point 1st priority ③, displayed as a slightly larger red point and
- possibly two shape points 2nd priority ④, displayed as small red points.

The position of the shape points is controlled via two values: a value in percent for the position of an imaginary line between the two base points and a second value for the distance to the imaginary line. The second value is usually measured in millimetres. The zero position of the shape points is normally 50% and 0mm.

The above objects have the following **priorities**:



Priority means that the objects of lower priority are changed with the alteration of objects of higher priority, but not the other way around. Moving base points alters the position of the shape points and results in direction changes, if the direction depends on the base point.

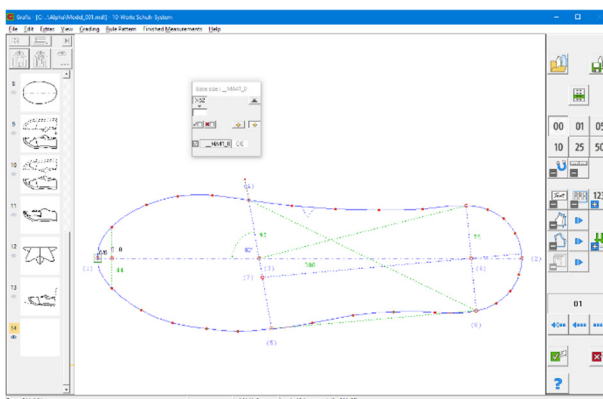
**Important:** *Always start adjusting the objects with the highest priority.*

## 2.6 Interactive Insole 10

With the interactive *Insole 10* the contour of a digitized or scanned insole or foot imprint can be traced.

The insole is not required for every style. Therefore, a separate module is provided to be used if required.

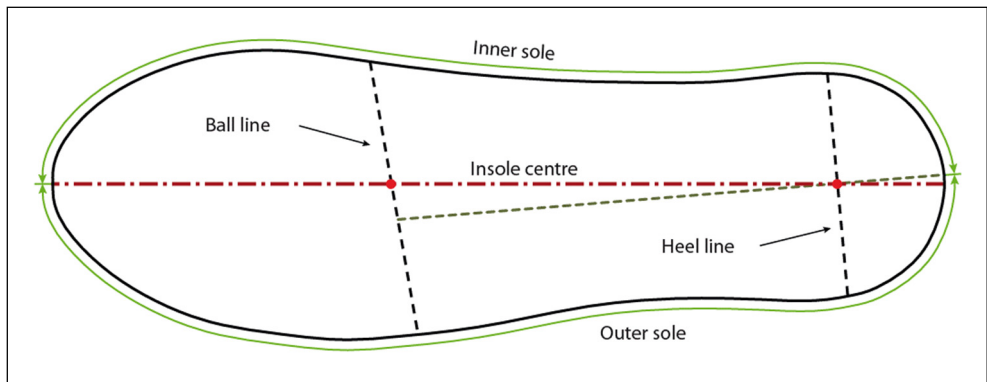
The outline of an insole can be derived from the last. E.g. a last is placed onto a piece of paper and traced with a pen.



Picture 2-17

The outline can then be scanned and traced with this module. The shape of an orthopaedic insole based on a foot imprint can equally be adjusted with this module. The insole consists of three auxiliary lines and two contour lines: the insole centre serves as the base line from which the insole is constructed. The heel line and the ball line are constructed onto the insole centre. The inner sole and the outer sole is a continuous line from the tip to the symmetry point of the heel, Picture 2-18.



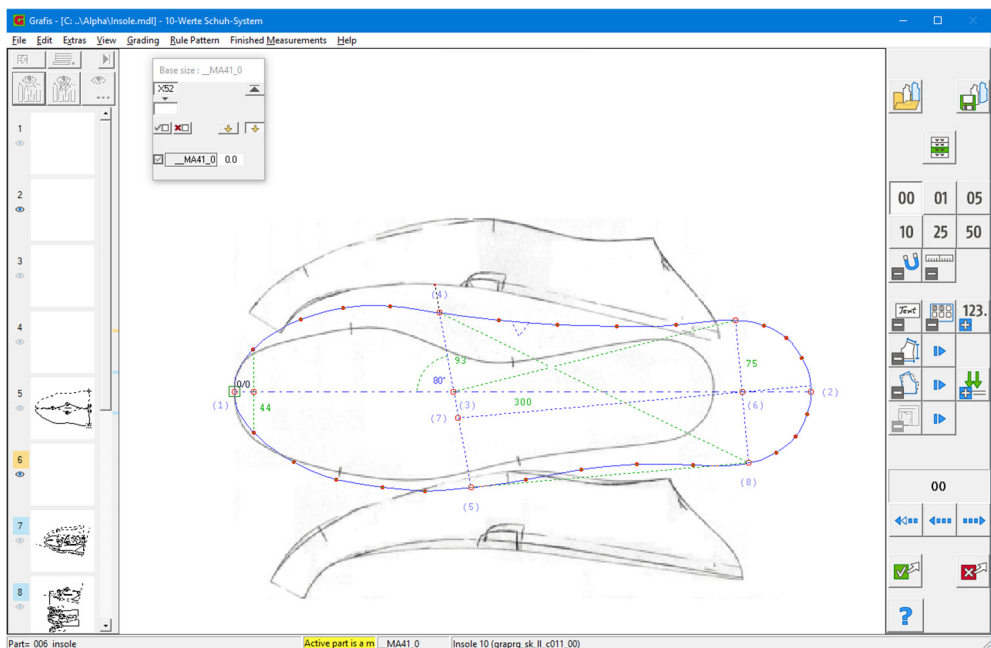


Picture 2-18

### Method for adjustment of Insole 10

#### Step-by-step guide

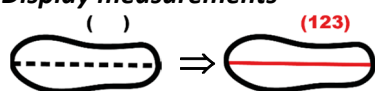
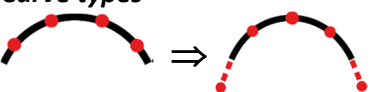
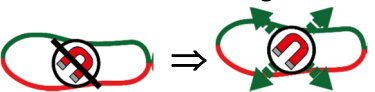

- ⇒ load background image of an insole
- ⇒ Determine zero point in the background image
- ⇒ open a new part in the *part organisation*
- ⇒ call *Insole 10*
- ⇒ activate *Insole 10* with double click or via F12
- ⇒ activate the option *Display measurements*



Picture 2-19

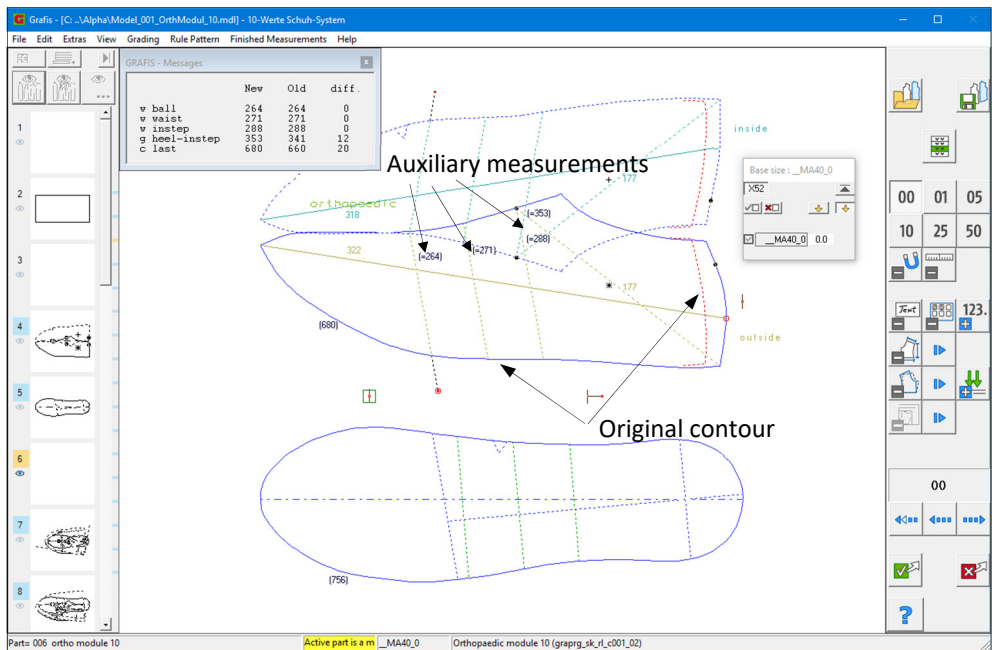
If the option *Display measurements* is active, numbers in brackets will appear at some drag points (Picture 2-19). These numbers indicate the order in which adjustments should be carried out. The order should be observed as some points depend on others and will be moved along with the adjustment of points of a higher priority.

**Options of Insole 10**

<p><b>Display measurements</b></p> 	<p>These options work in the same way as the options for <i>Last 10</i>, see section 2.5.</p>
<p><b>Curve types</b></p> 	
<p><b>Use outer lines as magnet lines</b></p> 	
<p><b>Display drag point marker</b></p> 	

**2.7 Interactive Orthopaedic Module 10**

The interactive *Orthopaedic Module 10* is an optional module for use with existing GRAFIS shoe styles. For example, the foot of a customer for whom a shoe style has already been developed has changed and the original last has been modified, a controlled adjustment of the originally traced last can be carried out with the *Orthopaedic Module 10*. The elaborate creation of a new last is thus omitted. When calling the *Orthopaedic Module 10* the original traced last is clicked. The orthopaedic module adopts its contour. The circumferences measured at different points on the modified last can be adjusted interactively with the *Orthopaedic Module 10*. Display of auxiliary measurements facilitates transfer of the modifications Picture 2-20. Alterations made to the last can be checked at any time.



Picture 2-20

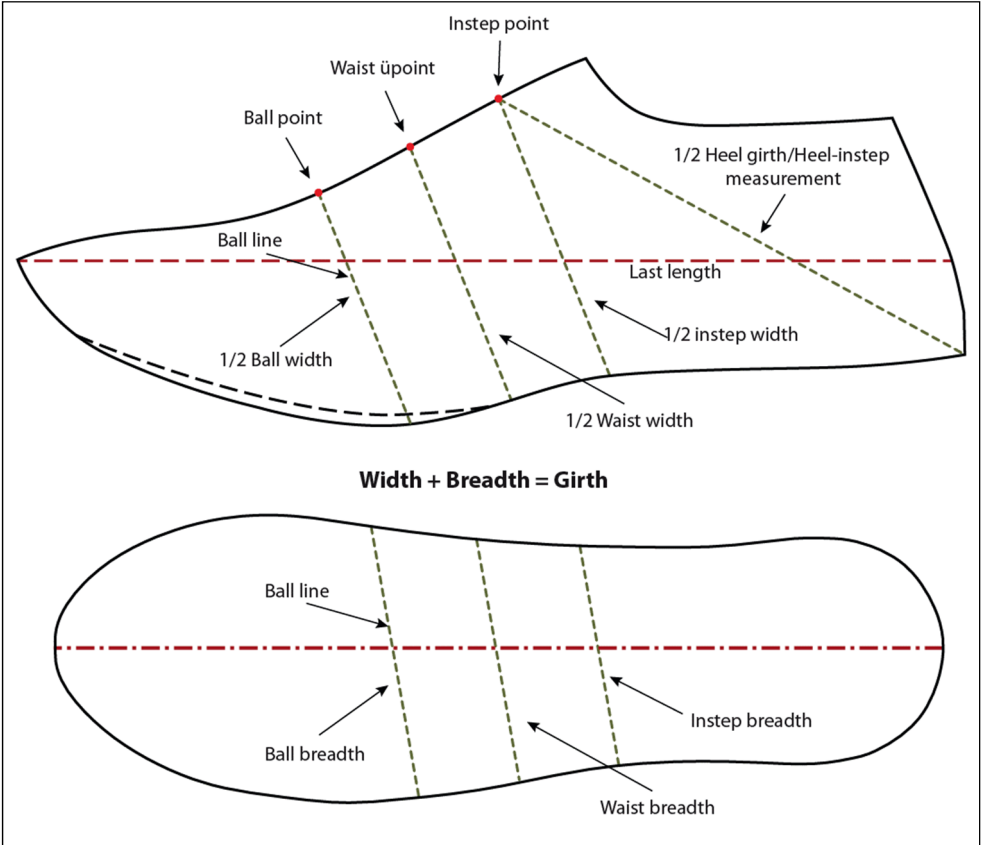
When transferring the measured values to the *Orthopaedic Module 10* it is important to consider whether the circumferences of the last have been measured including the insole or whether the width have been measured across the last.

Three important width and circumference measurements are derived: the ball measurement, the waist measurement and the instep girth.

The **ball measurement** is measured at the widest part of the foot. On the last, this corresponds with the measurement along the ball line. The **instep measurement** is measured from the instep point, parallel to the ball line. The **waist measurement** is measured exactly between the ball and instep line, parallel to the ball line, see Picture 2-21.

These measurements can also be measured on the insole at the same distance from the ball line. These measurements are called breadths. The width of the last plus the breadth of the insole gives the respective girth measurement. Two further important measurements are the **heel girth**, also called heel-instep measurement and the **last length**. The heel girth is measured from the instep point via the heel and back to the instep point. The last length starts at the tip of the last and ends at approx. 1/3 of the back last centre.

**The Orthopaedic Module 10 can be added to Basic Shoe 10 subsequently; see section 13.5 example 2.**



Picture 2-21

Options of Orthopaedic Module 10

<p><b>Display measurements</b></p> <p>( ) ⇒ (123)</p>	<p>The options are applied in the same way as the options of <i>Last 10</i>, see section 2.5.</p>
<p><b>Mirrored adjustment</b></p>	

If the boot last option is active in the last, corresponding adjustment options for the width of leg are also available in the *Orthopaedic Module 10*.

In the addition to the established options a further option is available:

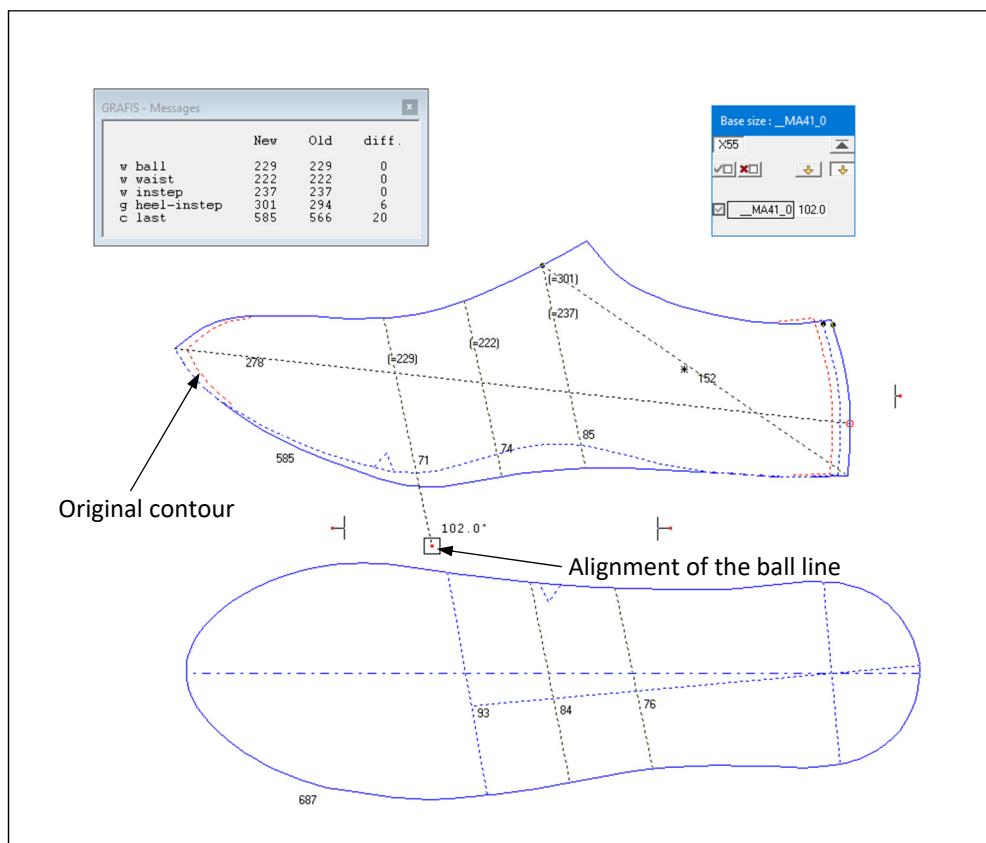
### Display insole



With this option the insole can be hidden if it is not required for adjustment of the *Orthopaedic Module 10*. The insole reappears after quitting the drag environment.

### Adjustment of Orthopaedic Module 10

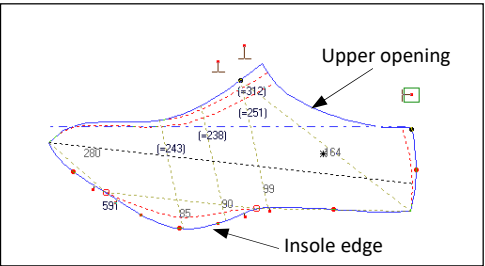
Before transferring the alterations to the last in the orthopaedic module the measurement lines must be aligned. This ensues in the drag area *Adjusting the last* by dragging the ball line, see Picture 2-22.



Picture 2-22

The inner and outer lasts can be lengthened or shortened in the front and back areas via the two controls at the bottom. The control at the rear lengthens the back last centre. The red dashed lines indicate the original contour of the last, see Picture 2-23.

The contours of the outer last are altered in the drag area *Adjustment outer last*. The front last centre can be rotated via the uppermost control. This increases or reduces the width of the upper opening. The control to the left alters this area from the break point (Picture 2-23). The back last centre can be rotated via the uppermost right control. This also gives more or less width for the upper opening. The insole edge is divided into 3 sections. By moving the basic points the specific area for alteration of the contour can be determined. When moving from points of the 1st order to points of the 2nd order, more accurate shaping of the curve can be determined. The new curve transition can be balanced via these points. The back last centre can be shaped in the same way.



Picture 2-23

The drag area *Adjustment inner last* offers the same adjustments for the inner last. To ensure optimum control of the alterations, auxiliary measurements are displayed for the last. An information box comparing the old and new measurements is also displayed. If the insole was included, the following measurements appear:

GRAFIS - Messages			
	New	Old	diff.
g ball	224	227	-3
g waist	224	222	2
g instep	237	235	2
g heel-instep	294	294	0
c last	566	566	0
c insole	687	---	---

g ball = ball girth  
g waist = waist girth  
g instep = instep girth  
g heel-instep = heel girth  
c last = girth last / insole edge

If the insole was not included, the following measurements appear:

GRAFIS - Messages			
	New	Old	diff.
w ball	132	135	-3
w waist	140	138	2
w instep	161	159	2
g heel-instep	294	294	0
c last	566	566	0

w ball = ball width  
w waist = waist width  
w instep = instep width  
g heel-instep = heel girth  
c last = girth last / insole edge

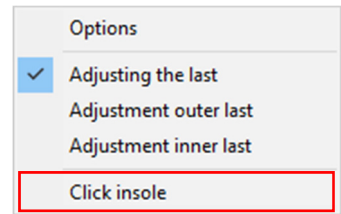
### Attach/ detach insole

If you have used the *Orthopaedic Module 10* without insole originally, you can load the *Insole 10* subsequently. Press the right mouse button and select *Click insole* from the context menu (Picture 2-24).

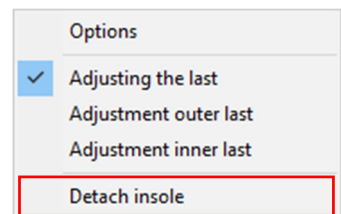
You will be asked to click on the insole. The insole must be visible within the style. As soon as the insole has been clicked, the measurements of the insole are included in the calculations.

If you have used the insole but no longer need it, you can detach the insole. Press the right mouse button and select *Detach insole* (Picture 2-25).

The insole is now detached and the measurements are calculated without the insole.



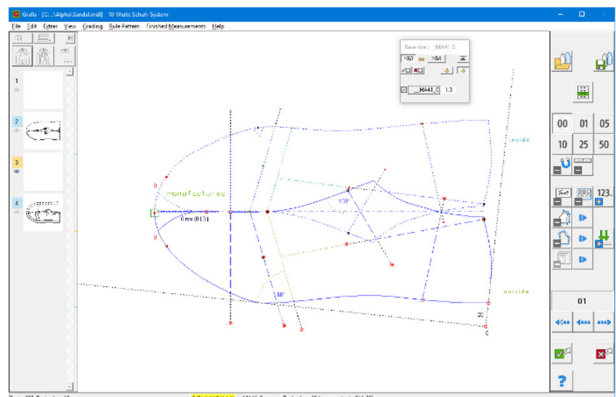
Picture 2-24



Picture 2-25

## 2.8 Interactive Basic shoe 10

A number of tasks for the generation of the upper pattern are processed in the interactive *Basic shoe 10* (Picture 2-26). If required, the last and the insole can be combined and grading is carried out. *Basic shoe 10* also offers construction of auxiliary lines and adjustments for ease as well as options for different boot leg variations.

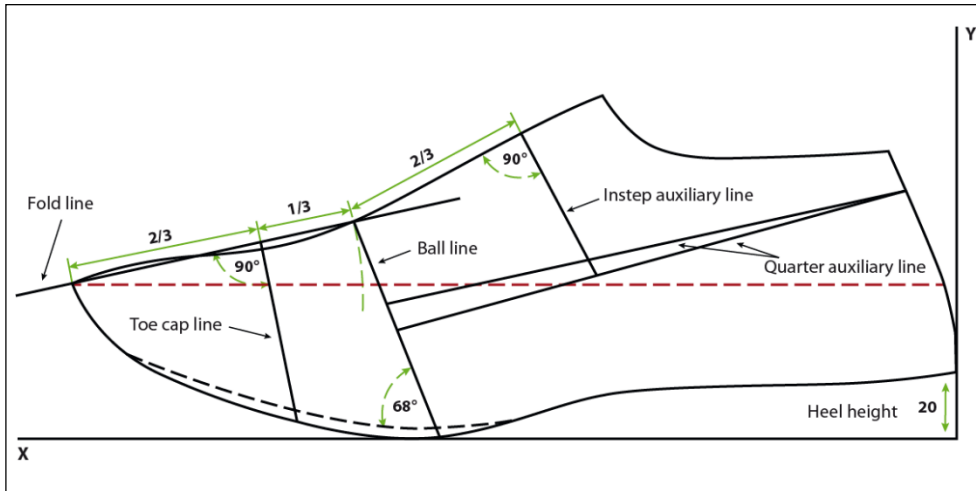


Picture 2-26

### Construction lines

A number of construction lines can be adjusted in *Basic shoe 10* enabling the development of most shoes and boots.

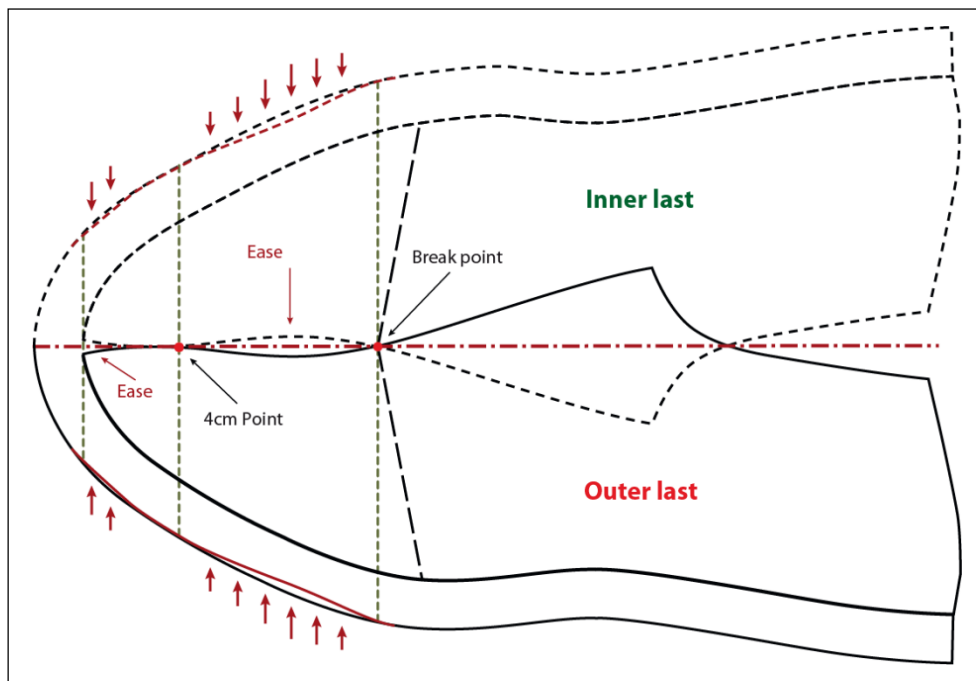
The construction lines are provided to facilitate style development. Some of the lines are style-specific and may not always be required.



Picture 2-27

## Lasting allowance

The ease is required for attaching the upper to the insole in most shoe variations.



Picture 2-28



The ease can also be applied to accommodate overlaps or gaps which have appeared during upper construction. Therefore, the ease is not an exact parallel but a new curve which can have different distances to the sole edge at different points.

The overlaps / gaps occur when drawing the fold line at the vamp. A fold is required for shoe shapes without a seam on the vamp. The rotation point of the fold is directly at the ball point but can be moved slightly forward or backward. The fold line is drawn from this break point forward across the front last centre. The fold line should touch the front last centre approx. 40 mm from the tip and should be drawn to the level of the tip (Picture 2-28).

The fold line cuts off some of the last or a gap occurs, creating excess width and / or negative width at the front vamp which may have a detrimental impact on the fit. This incorrect width can be corrected at the ease without changing the last.

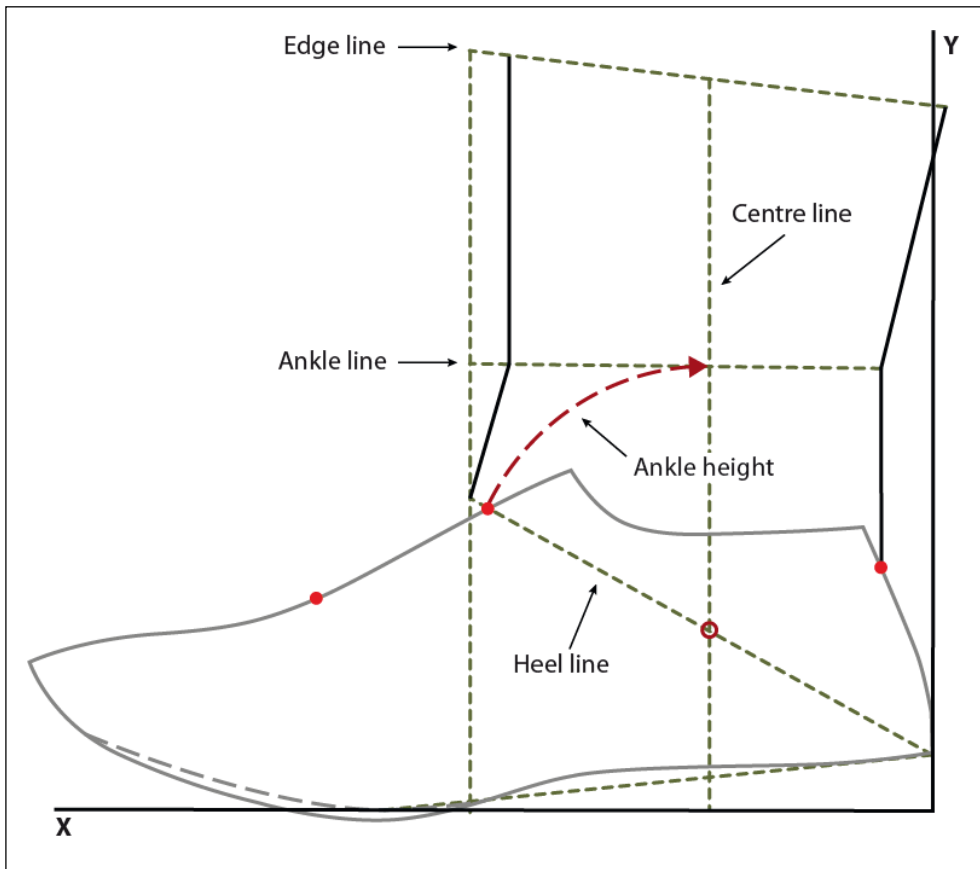
### **Boot-leg**

All shoes can be created from a last. When creating a boot, the construction is complemented by a boot leg. The structure of the boot leg depends on the height of the boot and its application. Walking boots require a different boot leg structure from riding boots.

Construction of a boot always commences with the adjustment of the last and is then complemented by a construction for the boot leg. Depending on the type of boot, a number of different auxiliary lines are constructed for the boot leg, see Picture 2-29.

If the construction is not based on a finished-measurement construction, some of the measurements are generated automatically, such as ankle height and ankle width. In this case, the boot leg auxiliary lines are graded automatically.

Switching one of the options determines that the boot leg structure ensues as a finished-measurement construction. The finished measurements of the boot leg can thus be adjusted in the interactive interface.

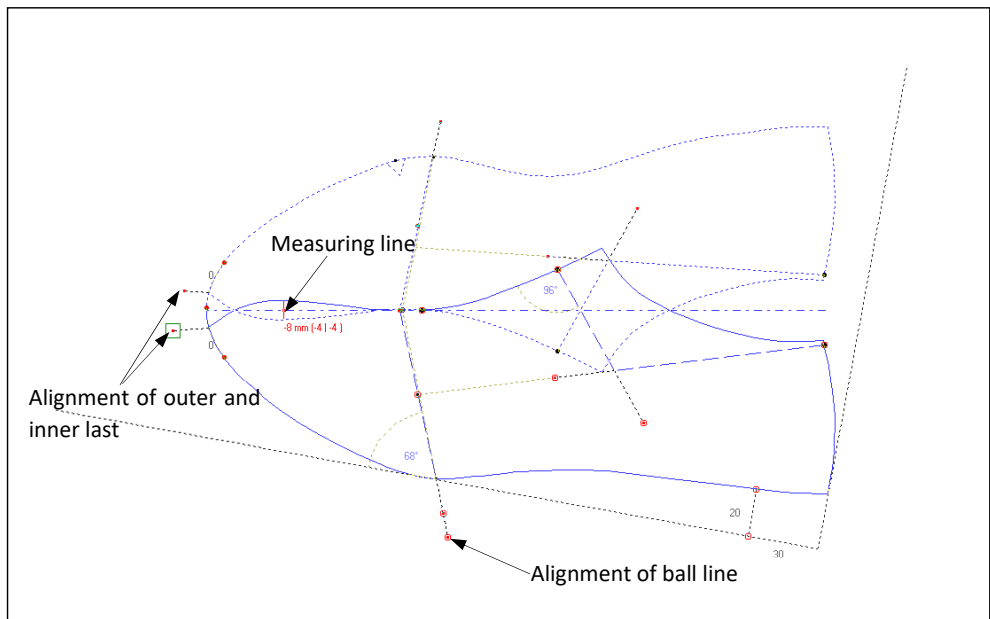


Picture 2-29

### Adjustment of Basic shoe 10

#### Step-by-step guide

- ⇒ Move the break point for alignment of inner and outer last.  
A measurement line is positioned at a drag point on the fold line indicating the overlap amount or gap distance between inner and outer last (Picture 2-30). The inner and outer last can be rotated into the correct position via a handle at the last tip. For an overlap, the overlap amount and measuring line are indicated in red, for a gap they are indicated in black.
- ⇒ Adjust heel height and width.  
Heel height and heel width can be adjusted below the heel. If you work without heel width, this point can remain in zero position.
- ⇒ Adjust alignment of the ball line. The position of the ball line defines the width for grading.





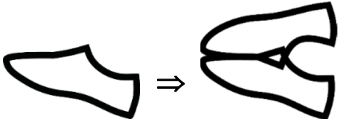
Picture 2-30

Starting at the ball point, an auxiliary line can be moved and altered in direction, see Picture 2-30. Its direction is changed when changing the ball line alignment. An auxiliary point can be positioned on this auxiliary line, for example as a Derby point or bar tack point. The inner last can be adjusted independently. The shoe point can be adjusted from the instep point and the upper point can be adjusted from the heel end point. Auxiliary lines are positioned at both points for the upper opening. If the auxiliary lines for toe and heel cap are active, these can be adjusted here also. The *Boot leg* drag area is activated via the respective option. Here, a number of different adjustments can be made depending on the selected option.

### Attach/ detach Insole

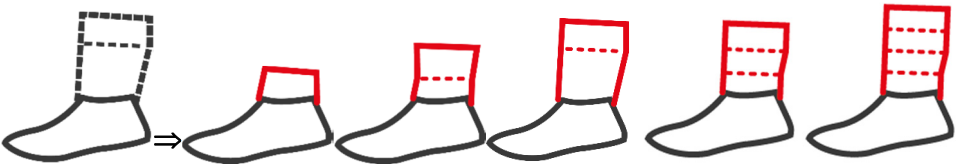
If you have used the *Basic shoe 10* without insole originally, you can load the *Insole 10* subsequently. Press the right mouse button and select *Click insole* from the context menu. If you have used the insole but no longer need it, you can detach the insole. Press the right mouse button and select *Detach insole*, see section 2.7.

Options of Basic shoe 10

<p><b>Display measurements</b></p> 	<p>These options work in the same way as the options for <i>Last 10</i>, see section 2.5.</p>
<p><b>Display insole</b></p> 	
<p><b>Mirrored adjustment</b></p> 	

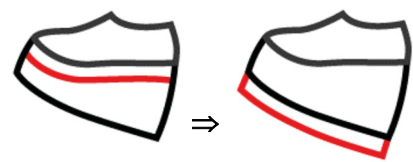
In addition to these established options further options are available:

**Boot leg variations ...**



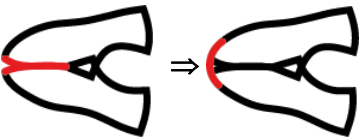
Via these options, different boot leg variations can be activated. Setting 1 does not envisage a boot leg and the *Boot leg* drag area becomes inactive.

**Add ease at Cork line**



This option is only active if the cork line has been activated in the last. This option determines whether the ease and thus future style lines are constructed onto the insole edge or the cork line.

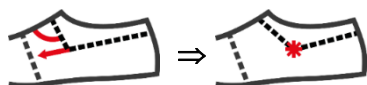
**Construct on the fold**



Boot leg patterns are often constructed on the fold so that there is no seam on the front.

If this option is activated, the section in front of the break point is straightened. Temporary lines appear which indicate some of the course of the line of the original last. At the front where you would normally find a gap or overlap, an adjustment curve slides along the temporary line creating a harmonious transition between the sole edge of inner and outer last. The ease is adjusted accordingly.

### ***Display ankle point***



This option controls whether the ankle point is indicated and applied for the quarter line and the instep line.

### ***Boot leg constructed or with finished measurements or with boot last***

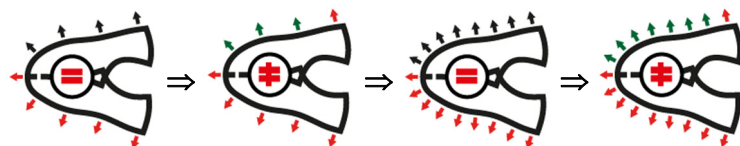


This option determines whether certain measurements such as the ankle height and width are derived via constructive method or set as a finished measurement. With the constructive method, the boot leg is partially graded with the last. With the finished-measurement construction, grading ensues via break sizes, see section 3.4.

In setting 3, the construction of the boot structure is based on the intersection of the levels with the lines of the boot last.

This option can only be adjusted in the *Boot leg* drag area.

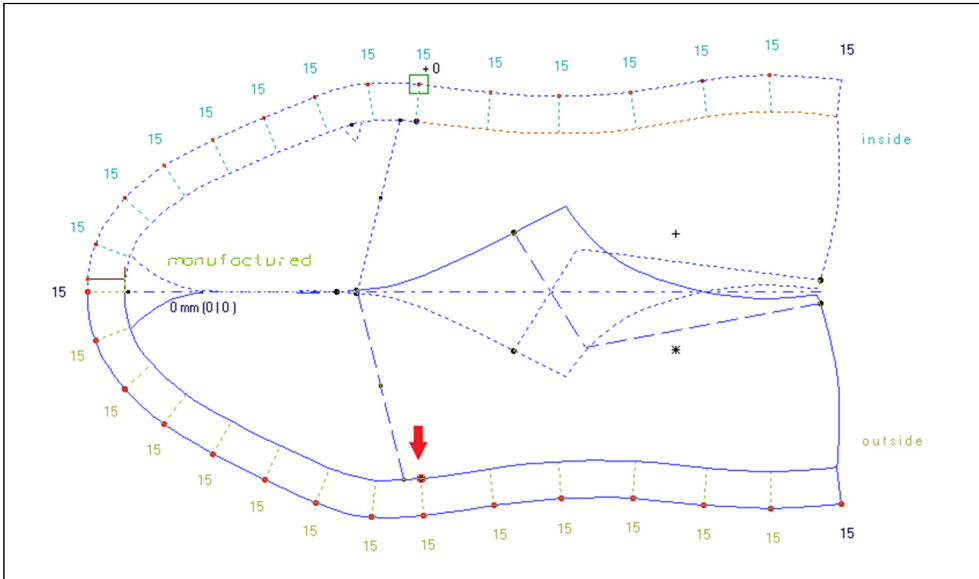
### ***Adjust inner ease separately***



The ease can be adjusted symmetrically or asymmetrically.

Setting 1 applies the same values to the inner last and the outer last. Setting 2 allows for separate value adjustment for the inner and outer last.

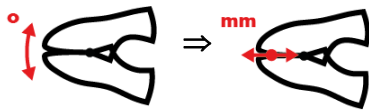
With settings 3 and 4, the ease can be adjusted more precisely, particularly for lasts attached with a Strobel seam. These settings work like settings 1 and 2 but with added points. With the additional marked drag point, the point distribution is moved to the front or the back, see Picture 2-31.



Picture 2-31

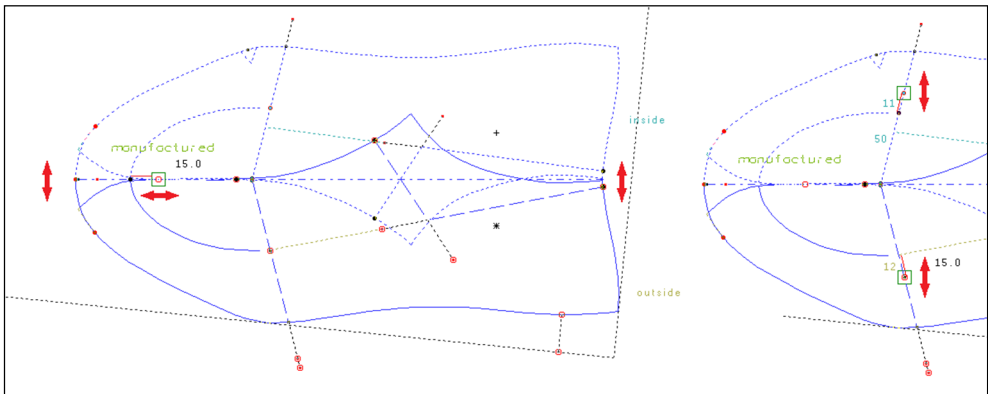
Switching the option from asymmetrical ease adjustment to symmetrical results in nullification of the asymmetrical values.

### Alignment...



In this module, the inner last and the outer last can be aligned. This can be done in two different ways.

With the first option, alignment ensues via rotation. The overlap area at the front vamp can thus be determined. With the second option, the inner and outer last are joined together so that they touch at the tip with a defined changeable distance. The overlap area is a result. If the mirror seam is activated in the last, the position of the mirror seam is the starting point for the alignment, see Picture 2-32 left. If the mirror seam is not active, the point is measured from the beginning of the mirror axis.



Picture 2-32

The construction of the **Derby / Auxiliary point** also depends on whether the mirror seam has been activated in the last. If the mirror seam is active, the point is constructed from the intersection of the mirror seam with the ball line.

### Display toe cap



With this option the toe cap line can be made visible or hidden. You can also determine whether the measurement is applied in millimetre or percentage. This option can only be changed in the *Basic adjustment* drag area.

### Display counter



With this option the counter line can be made visible or hidden. You can also determine whether the measurement at the bottom is applied in millimetre or percentage. This option can only be changed in the *Basic adjustment* drag area.

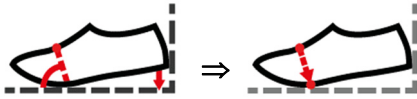
### Counter upper Edge in %/%/mm



This option determines whether the counter at the top is constructed in degrees, millimetre or percentage. If the construction ensues in degrees, the counter seam has the same direction in all sizes as long as no other setting has been applied. The alignment in degrees is useful for industrial standard grading. For orthopaedic

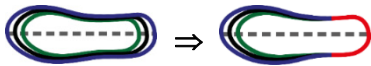
styles the alignment in percentage or millimetre is recommended. This option can only be changed in the *Basic adjustment* drag area.

### ***Ball line constructed or transferred from last***



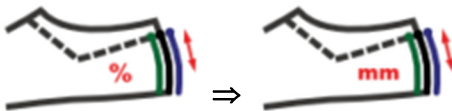
This option influences the ball line. With setting 1, the ball line is constructed according to the angle system and is dependent on the plane, which is determined via the heel height. With setting 2, the ball line is transferred from the last. In the last, the position of the ball line can be determined via the large drag points at the outer and inner last and the ball points.

### ***Coordinated grading of insole***



The insole can be graded proportionally in its entirety or co-ordinated in the toe and /or heel area. Setting 1 selects proportional grading, with Setting 2 different grade values can be entered for the toe and for the heel. The size of the area in which the grading is co-ordinated is also determined here.

### ***Grade heel point in mm***



With setting 1, the heel point is graded proportionally and with setting 2 the heel point is graded in millimetres.



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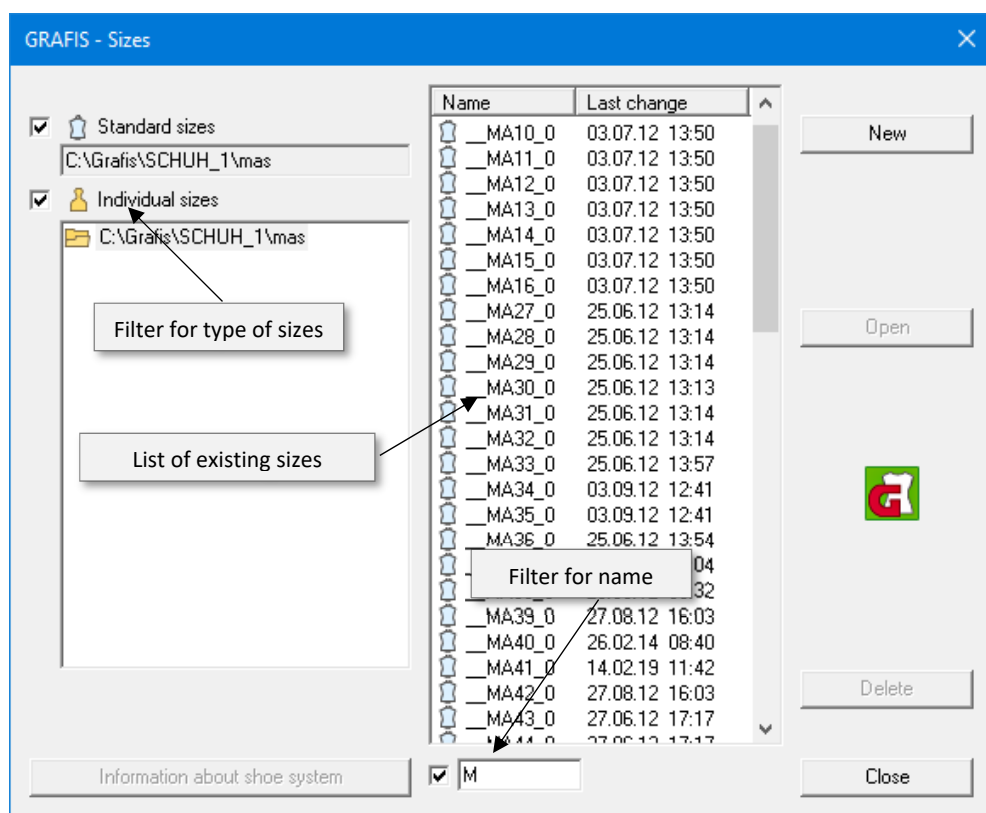
In Grafis, first patterns are originally developed in the base size. All construction and modification steps are registered by imperceptibly creating a record. This construction record can be recalled with other sizes, thus creating the patterns in the respective size automatically.

### 3.1 Sizes

In *GRAFIS CAD Shoe construction* **sizes** are synonymous with size designators. Grafis distinguishes between standard sizes and individual sizes. The values and names of the standard sizes cannot be altered. The designation of standard sizes always begins with “\_”. In addition to the sizes, Grafis differentiates between different last types. The size \_\_\_FA36\_0 is the standard size for size 36 with last type “FA” in the shoe system *10-Werte-Schuhsystem (SCHUH\_1)*.

***Each size is a single file, stored in the indicated folder on your computer. Sizes are not saved within the style.***

Sizes are edited in the *Edit sizes* dialogue (Picture 3-1), which is accessed via the pull-down menu *Extras* → *Edit sizes*. In the center of the window, you can see the existing sizes. On the left hand side of the list you can decide which sizes are to be displayed. A filter for names of sizes can be found below the list. A number of sizes can be selected within the list. A context menu with functions for copying, cutting and deleting amongst other options can be opened with the right mouse button .



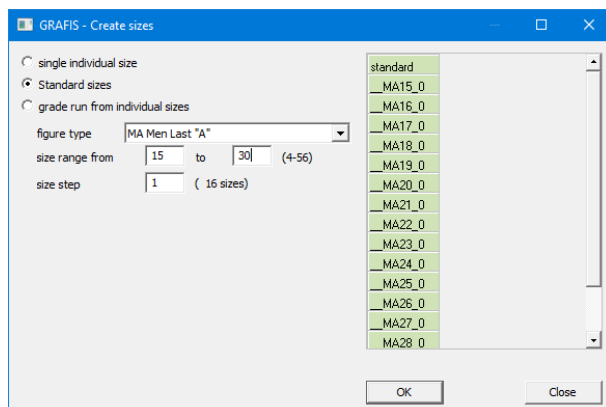
Picture 3-1

## Generate standard sizes

### Step-by-step guide

- ⇒ Extras → Edit sizes
- ⇒ Button New
- ⇒ Set the option *Standard sizes* (Picture 3-2)
- ⇒ Select the type of last required
- ⇒ Enter the required size range and the size difference
- ⇒ Button OK

Grafis automatically generates the standard sizes as they are required during grading.



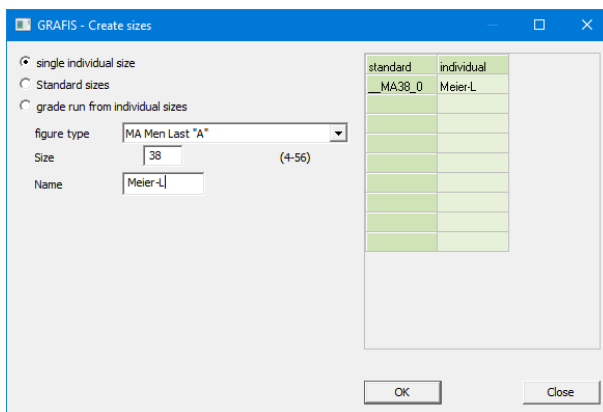
Picture 3-2

## Generate an individual size

Individual sizes are often required for the production of orthopaedic shoes where the right shoe is different from the left shoe.

### Step-by-step guide

- ⇒ *Extras* → *Edit sizes*
- ⇒ Button *New*
- ⇒ Set the option *Single individual size* (Picture 3-3)
- ⇒ Select the type of last
- ⇒ Enter the size *Größe*
- ⇒ Enter the name of the size e.g. Meier-L for the left shoe and Meier-R for the right shoe
- ⇒ Button *OK*



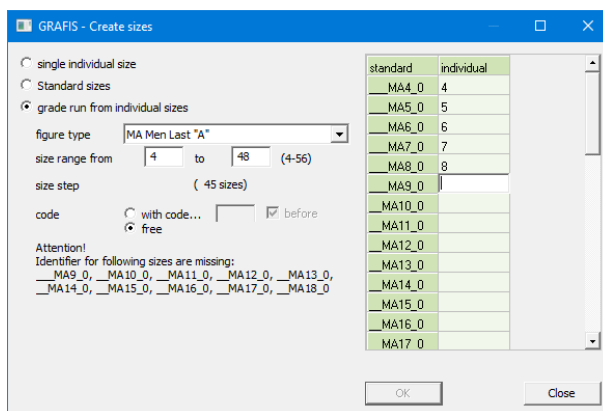
Picture 3-3

Generate an individual size according to the step-by-step guide. Select the last type *MA Men last "A"*. Enter the desired name for the size into the *Name* field, e.g. the name of the person or a customer number with the addition for the right and left shoe. The name can be a maximum of 8 characters long and must not begin with *"\_"*. Having clicked on *OK*, the individual size is created.

## Generating an individual grade run

### Step-by-step guide

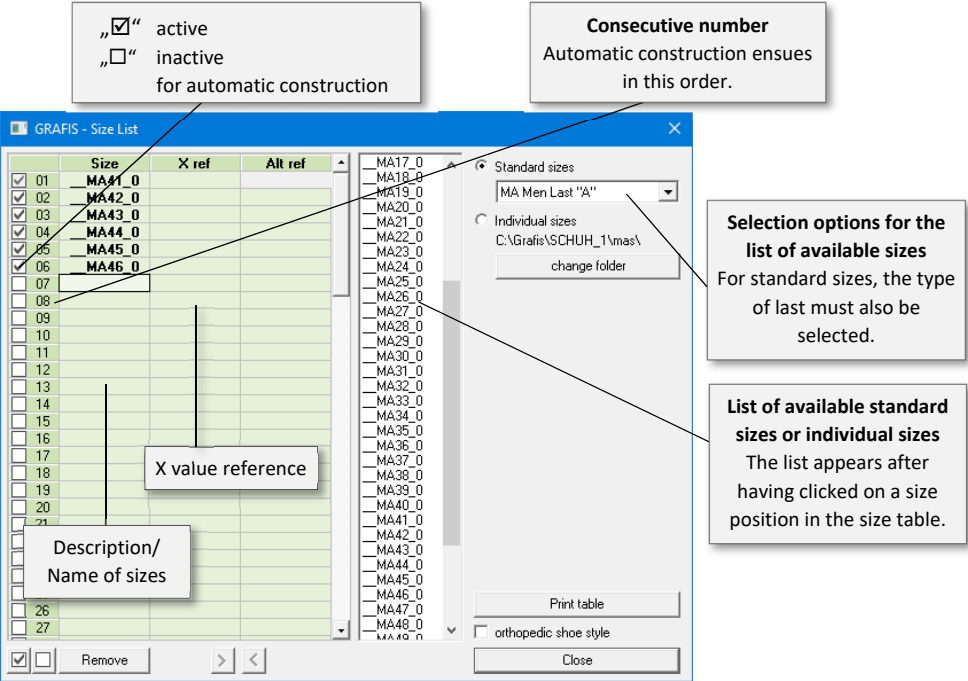
- ⇒ *Extras* → *Edit sizes*  
continue with the button *New*
- ⇒ *Activate Grade run from individual sizes* and select the required last type (Picture 3-4)
- ⇒ Set up size range and size distance
- ⇒ Enter designation, e.g. "A". The designation can be placed before or after the number. Alternatively, with free a free designation can be given, for example for the size designations 4, 5, 6, 7,...
- ⇒ Continue with *OK*.



Picture 3-4

### 3.2 Size Table

Calling this menu ensues via *Extras* → *Size table*. Open the size table and read the explanations in Picture 3-5.



Picture 3-5


#### The contents of the size table

With each style a size table is saved. The first position of the size table shows the size used for pattern development, the **base size**. In the shoe system *10-Werte Schuh-System*, size MA41 is entered automatically. The user can enter a different size as base size at any point, even an individual size. All other sizes required for the style are entered into the other positions of the size table.




Pattern development ensues on the base size. Grading means automatic application of the registered construction record to the activated sizes contained in the size table. Automatic reconstruction is possible because Grafis has registered all construction steps and repeats those with other sizes.


### Entry and alteration in the size table

To insert a size, click on the desired position in the column of sizes. A window appears to the right of the size table showing all available standard sizes and all available individual sizes. If you want to insert standard size into the size table, activate the option *Standard sizes* and select the desired last type. The option *Individual sizes* lists all available individual sizes. In case the required individual sizes does not appear in the list, it has to be created, see section 3.1.

Then, click on the size to be entered into the size table. The current line for entry automatically moves one position downwards so that entry can continue without interruption. A number of sizes can be selected and transferred at the same time. Using the right mouse button  terminates entry.


To remove sizes from the size table select the size or a number of sizes with <Shift> or <Ctrl>. Clicking on the *Delete* button or using the <Del> key removes the size(s) from the size table but not from the list of available sizes. The sizes can be re-entered in the size table to be available for grading.


As not all sizes in the size table are to be graded each time, a selection option is integrated in Grafis. The sizes to be graded are marked with “” in the size table (activated). By clicking you can toggle between activated “” and deactivated “”

A simple operation is offered by dragging the mouse with pressed left mouse button. Thus, entries in the size table can be copied quickly to the next position. This applies to the symbol “” and empty size positions.

### Exercise

In this exercise, a size table similar to Picture 3-5 is to be generated.

After having opened a new style the size table contains size MA41 as base size. Enter size MA40 onto the second position. Click the second position in the size column. The window with all available sizes opens to the right. Select the size type *Standard sizes* and the last type *\_MA Men Last A*. Click on the sizes *\_\_MA40\_0* and *\_\_MA42\_0*. The sizes appear on the 2nd and 3rd position of the size table. Click  to terminate the process.

Toggle between active and not active for these sizes by clicking on the position number “ 02” a few times.

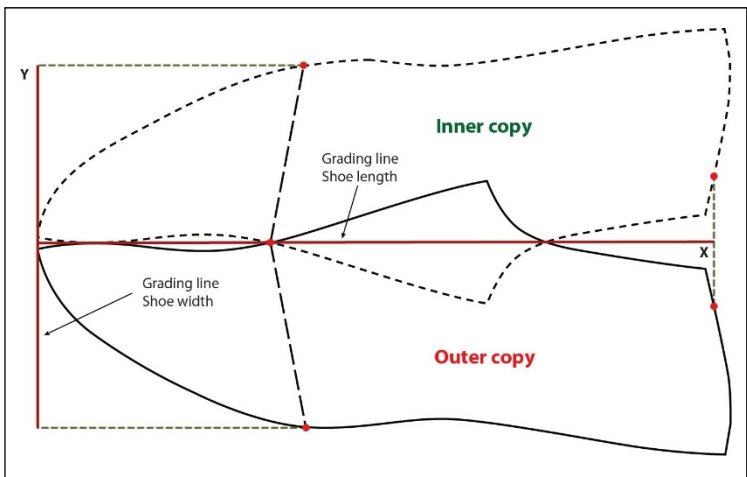
Now select the 4th position and select the sizes *\_\_MA43\_0* to *\_\_MA46\_0* from the list of sizes on the right with the left mouse button pressed down. Select the last type *\_FA Women Last A* for women sizes and transfer the sizes *\_\_FA36* to *\_\_FA46* to the following positions. Select all women sizes and remove them from size table.

### 3.3 Grading in Grafis Shoe construction

In Grafis grading is an automatic similar construction. All construction steps of the base size are repeated with the sizes to be graded. During construction the succeeding similar construction is to be considered, already. Construction with Grafis thus does not become more difficult but more elegant and more interesting.

#### Grading Basic Shoe 10 and Insole 10

Grading in the *10-Werte Schuh-System* is controlled via the interactive basic construction *Basic Shoe 10* by proportionally shrinking/enlarging (Picture 3-7) in x and y direction (Picture 3-6).

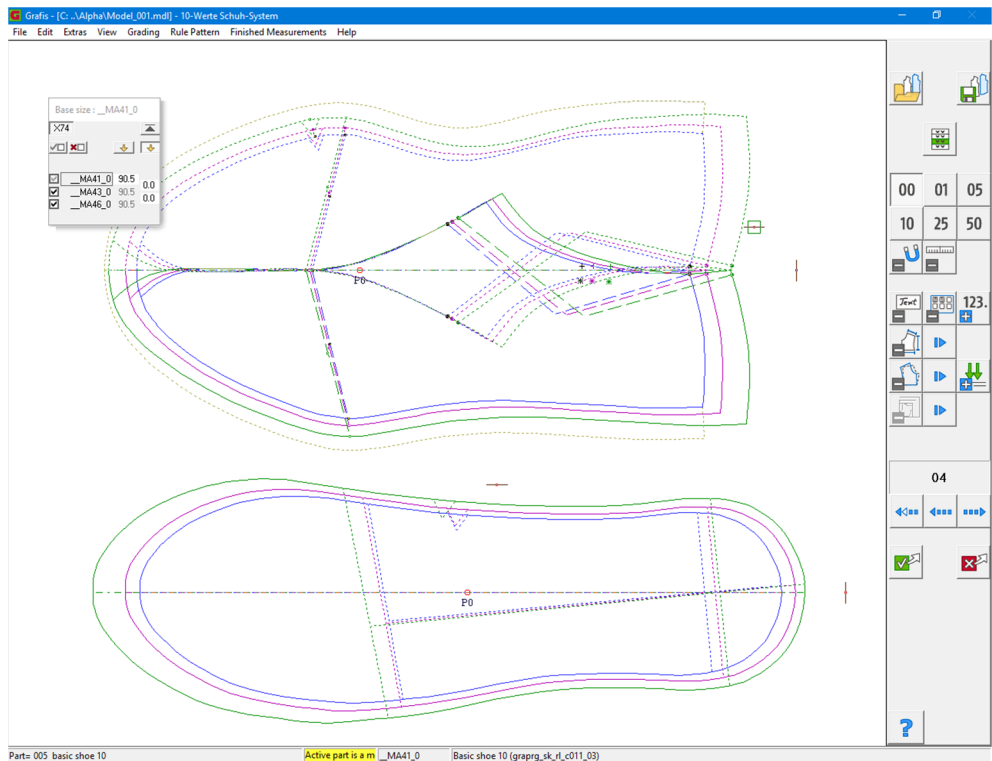


Picture 3-6

The lines of the construction are generated afterwards and can be graded individual and independent from the increments of the Basic Shoe. It is possible to synchronise the girths of *Basic Shoe 10* and *Insole 10* during grading. Auxiliary measurements are displayed in an information box to facilitate this process.

GRAFIS - Messages		
c last	=	677
- c insole	=	687
diff.	=	-10
g ball	=	255
g heel-instep	=	335

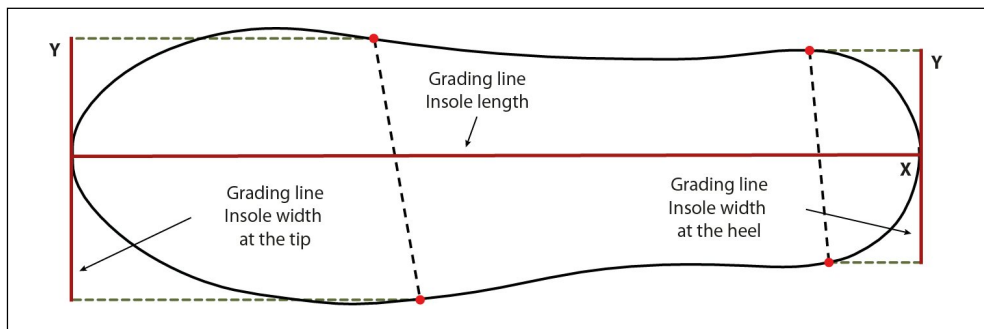
c last	=	basic shoe girth
c insole	=	insole girth
diff	=	difference between both girths
g ball	=	ball Girth
g heel-instep	=	heel girth



Picture 3-7

Grading of *Basic Shoe 10* is adjustable in x and y direction.

Particular rules apply to the insole as it can be graded in a coordinated manner. It is possible to enlarge /shrink the heel by a different value than the tip. The heel or the tip can remain unchanged across a number of sizes, i.e. coordinated. This is necessary for example when creating heel groups to minimize the number of shoe components across a complete size run.



Picture 3-8

### 3.4 Adjust interactive constructions

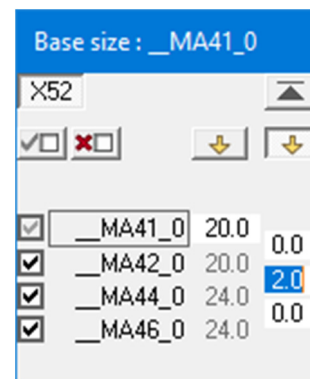
#### Step-by-step guide

- ⇒ Assign size table with at least the sizes to be adjusted
  - ⇒ Activate construction with double-click or from the overview with <F12>
  - ⇒ Select the drag area in which drag points are to be adjusted size-dependently
  - ⇒ Open the *Break sizes* window by clicking on *break sizes* in the menu on the right
  - ⇒ Transfer break sizes
  - ⇒ Make size-dependent adjustments to individual drag points either
    - in each size or
    - in one size, maintaining the set increments
- The aids *stack* and *ruler* can be used during dragging.

#### How does drag work?

Each interactive construction is variably adjustable via a multitude of x values. Further information on reference sizes can be found in section 12.1. The x values of the interactive construction are “visible” through drag points. Moving a drag point alters one or two x values. You can see the value of the current x value and its number in the value window (Picture 3-9). The construction is recalculated after each alteration of the value. The effect on the complete construction is immediately visible.

Size-dependent adjustment of an interactive construction means adjusting the x values of the construction depending on size.



Picture 3-9

#### Select break sizes

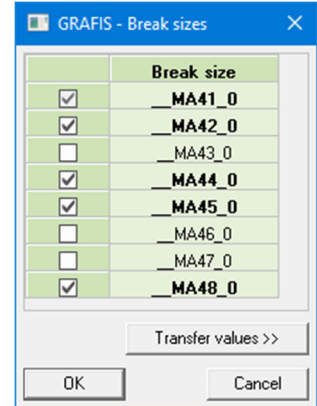
Break sizes are the size of a last type for which grade rules have been stored. Grading is based on these sizes. If only one break size is set, grading remains consistent throughout all size of this last type. If two break sizes are set, Grafis interpolates between the two sizes and extrapolates beyond. Grading for this last type changes evenly. With three and more break sizes, grading groups are created.



First, assign the size table with at least the sizes you are likely to require as break sizes. Then, activate the construction with double-click or with <F12> and select the drag area in which the drag points are to be adjusted size-dependently. Click on *break sizes* in the menu on the right. The *Break sizes* window opens (Picture 3-10).

The list of break sizes in Picture 3-10 contains all sizes which can become break sizes of the active drag area. These are all activated sizes of the size table or their reference size. Further information on reference sizes can be found in section 12.3. The first position of the list is occupied by the base size.

The *base size* of the interactive construction is the size, which is adjusted interactively if no other break sizes are activated. The size in the first position in the size table is automatically also the base size of the interactive construction.





Picture 3-10

***Only sizes (or their reference size – see section 12.3) listed and activated in the size table can be adjusted interactively.***

### The value window

The break sizes activated in the drag area appear in the value window, see Picture 3-10 and Picture 3-13.

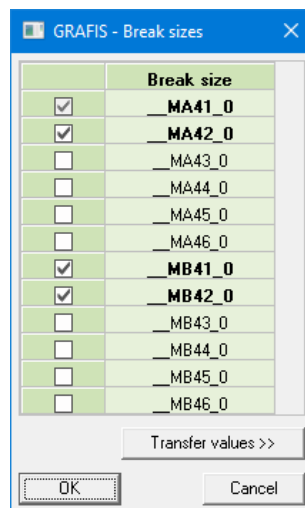
Click on the left of the two buttons . Each size can now be dragged individually or adjusted with values. Use this display option while no grade has been determined for this drag point. Click on the right of the two buttons . In this display option you can

- edit the increments with numeric values or
- adjust one of the offered sizes interactively, maintaining the increments. The other sizes are altered respectively after release of the mouse button.


### Transfer values from break size to break size

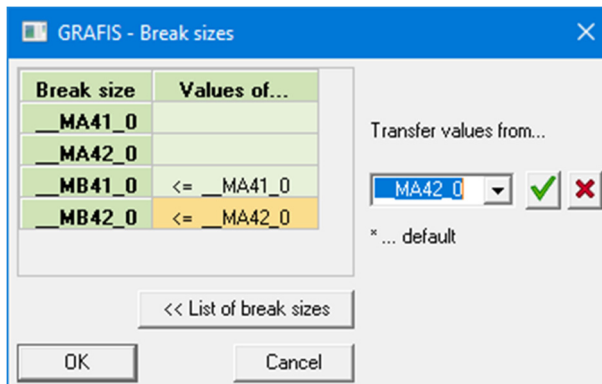
A construction prepared for a men last type \_\_MA size is now also to be produced in last type \_\_MB size. Simply activate the respective size \_\_MB as break size assign the values of the last type \_\_MA. This process is only required in drag areas with more than one break size.

The list of break sizes in Picture 3-11 belongs to a drag area in which initially the men size \_\_MA41 and \_\_MA42, had been adjusted. Additionally, the sizes \_\_MB are to be adjusted. These have already been entered in the size table and activated in the break size table. If the *Break sizes* dialogue is now closed with *OK*, all break sizes of sizes \_\_MB will be assigned the values of base size \_\_MA 41.



Picture 3-11

For a suitable pre-assignment of the short sizes, click on *Transfer values>>*. The *Break sizes* dialogue changes according to Picture 3-12 right. Now click in the column *Values of...*, select the corresponding size from the normal last type in the column *Transfer values of...* confirm with  and continue assigning values with the next size. After having clicked *OK* all sizes of the first column *Break size* will be assigned with the values from the sizes of the column *Values of...*



Picture 3-12

***This transfer of values is a one time operation. There is no permanent link such as is possible with the alternative break size from section 12.4.***



### Start grading

Grading is started with: *Basic menu* → *grading*

Only sizes entered into the size table and activated will be graded.

***The base size always appears in blue on a white screen.***

It is to be recommended to use grading from time to time during construction as a test. A number of extreme sizes should be activated in the size table, e.g. CA23, CA30 and CA39. ***This allows you to check the construction steps as you go and avoids having to reset at a later date.***

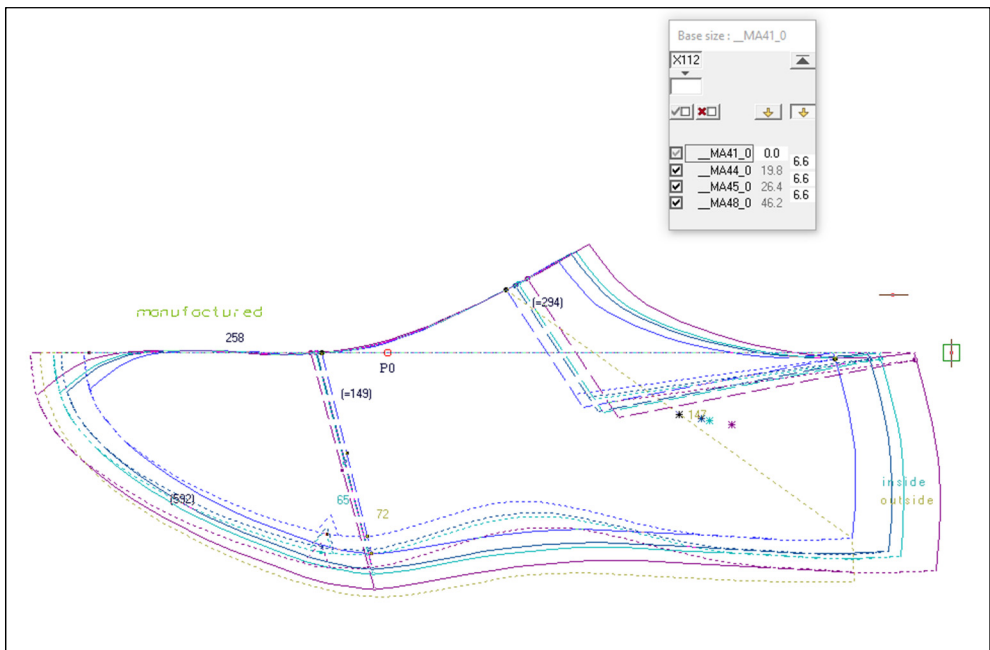
### Exercise

Open a new style and activate the following sizes in the size table:

Men Last "A" \_\_MA41 to \_\_MA48 Base size: \_\_MA41.

Call the tool *Last 10* from the call list. Switch to part organisation and name the first part "Last 10".

Open a new part in the part organisation and name it "Basic 10". Call the tool *Basic Shoe 10* from the call list and link it to the last. Activate the interactive *Basic Shoe 10* and add the sizes \_\_MA44, \_\_MA45 and \_\_MA48 as break sizes in the *Grading* drag area (Picture 3-13). Set an increment of 6.6mm for length grading and an increment of 3.3mm for width grading. Grade the style in all sizes. Save the style as "Exercise Shoe 01".

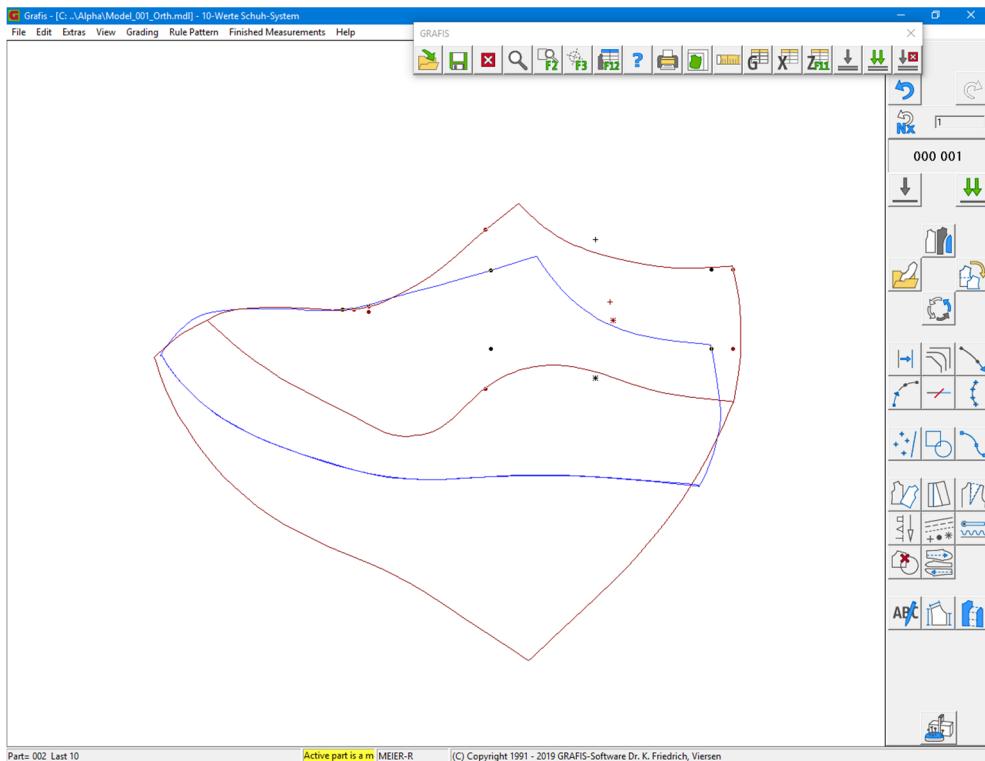


Picture 3-13

### 3.5 Orthopaedic Shoe Style

In the footwear industry, there is no difference between the left and the right shoe. For made-to-measure shoes and in particular for the orthopaedic sector, separate adjustments must be possible for the left and the right shoe.

To enable separate adjustments in a Grafis shoe style, two separate sizes are created for the left and the right shoe, for example with the customer's name plus **R** for right and **L** for left, e.g: Meier-L, Meier-R.



Picture 3-14

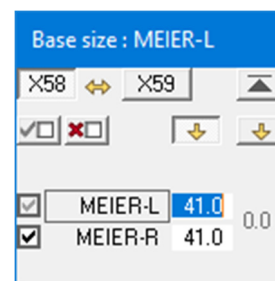
#### Step-by-step-guide

- ⇒ Create individual sizes for the left and right shoe
- ⇒ Open the size table
  - Set the switch *Orthopaedic shoe style* in the size table (Picture 3-16). **Important! Set the switch "Orthopaedic shoe style" before entering the sizes in the size table.**
- ⇒ Enter the sizes left shoe /right shoe in turn into the size table.
- ⇒ Load the scanned last for the left shoe as a background image, see section 2.2.
- ⇒ Set the zero point in the background image with *Manage pixel images*.

- ⇒ Load the scanned last for the right shoe into the next part in the *part organisation*.
- ⇒ Set the zero point for this image.
- ⇒ Call *Last 10* into a further part of the *part organisation*.
- ⇒ Trace the left last, see section 2.5.

Then, the right last is traced. The following steps are required:

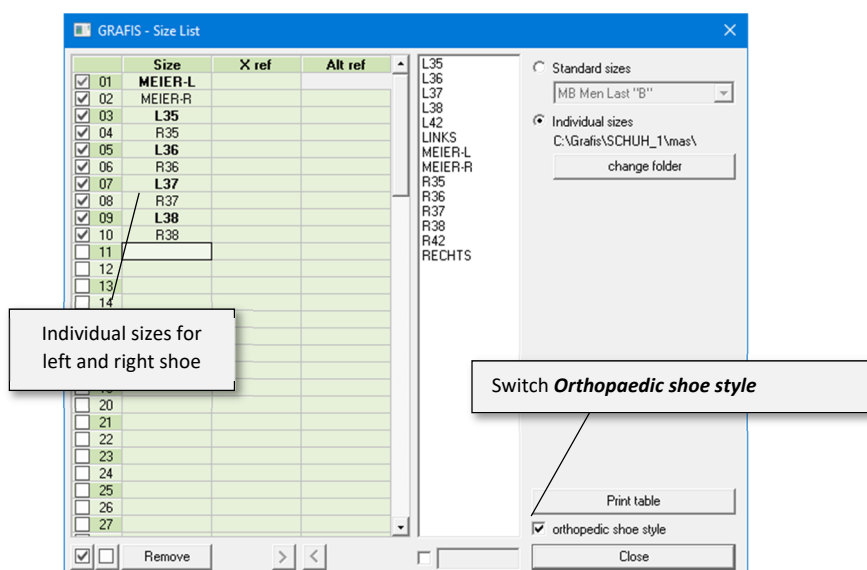
- ⇒ Show the background image of the right last.
- ⇒ Activate the interactive *Last 10*.
- ⇒ In the *Break sizes* dialogue, activate the break size for the right shoe. Now, both sizes are visible (Picture 3-15).
- ⇒ To adjust the right last, the size for the right shoe and the left yellow arrow are activated in the x-value window.
- ⇒ Trace the right last.
- ⇒ Quit the menu for interactive constructions and click on *Grading*.



Picture 3-15

### The switch Orthopaedic Shoe Style

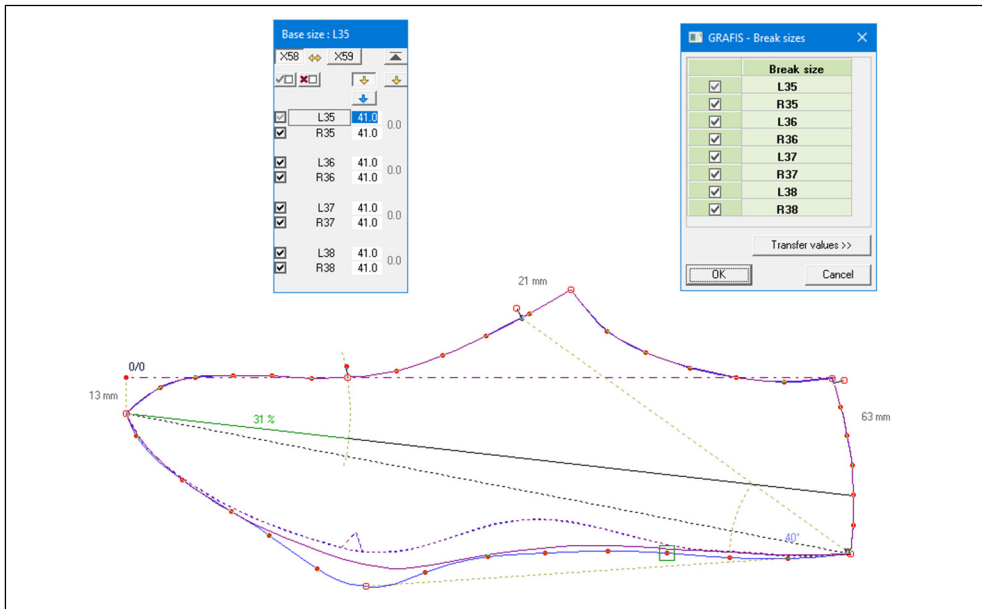
With the switch *Orthopaedic shoe style* (Picture 3-16) consecutive sizes are assigned in pairs. Positions 1 and 2 make a pair as well as positions 3 and 4 etc. The uneven positions are displayed in bold for ease of identification. Each pair per size is treated as a separate last type. Therefore, the lasts of left and right shoe can be adjusted differently.



Picture 3-16

## Exercise

Create an individual size for the left and right shoe respectively. Open the size table and activate the switch *Orthopaedic shoe style*. Thus, Grafis differentiates between the left and the right shoe. Enter the size of the left shoe into the line highlighted in bold in the size table. Enter the size of the right shoe directly underneath.



Picture 3-17

Activate the break sizes in the interactive *Last 10* and carry out the adjustments for each side separately, see Picture 3-17. At the end of the style development, the part parameters for the production pattern pieces are set in the part organisation. In an orthopaedic shoe style, the production pattern pieces for the left and right shoe are automatically displayed in mirrored format.

## Content

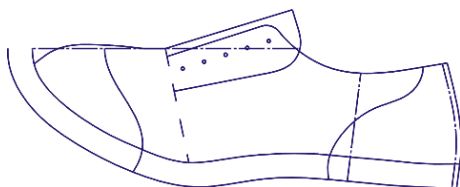
4.1	Overview of interactive shoe types.....	77
4.2	Interactive Shoe type 11 .....	80
4.3	Interactive Shoe type 21 .....	85
4.4	Interactive Shoe type 01 .....	89

### 4.1 Overview of interactive shoe types

In the shoe types, the upper is defined in more detail. From Version 12 onwards, a total of three interactive shoe types are available:

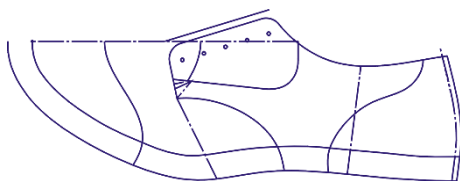
#### **Shoe type 01**

... is a basic style **for free style development** with or without tongue. It does not contain any prepared shaped style lines.



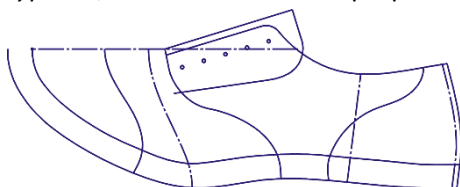
#### **Shoe type 11**

... is the progression of *Shoe type 10*. This module is intended for shoes **with open lacing, i.e. all forms of Derby styles**. *Shoe type 11* contains a number of prepared adjustment options for the style line, the vamp line, lacing, a bartack line at the heel and a collar for boots.



#### **Shoe type 21**

... is the progression of *Shoe type 20*. This module is intended for **closed lacing, in particular for vamp styles**. As in *Shoe type 11*, a number of varied prepared adjustment options are available for the style line, the vamp line, lacing, a bartack line at the heel and a collar for boots.



Calling shoe types

All interactive shoe types are connected by clicking a line of *Basic Shoe 10*. They adopt the shape contour and grading of the basic module. The toe cap line and upper opening or boot leg opening adjusted in *Basic Shoe 10* can be further developed and shaped in the shoe type. In this module the vamp line and the lacing are styled. The lacing can be drawn as a distance from the instep line and altered in length. Curves at the end points can be adjusted in three positions. The inner last can be adjusted independently.

Important lining lines, eyelet positions and the tongue can be adjusted here, as well as a collar or cuff at the boot leg.

Adjusting interactive shoe types

The following step-by-step guide applies to all interactive shoe types, Picture 4-1:

⇒ **Set options**

Under Options, the type of style line defining the design is selected. The corner options may be altered at the end of the process, ensuring that the lines which form the corners are adjusted in their original state.

⇒ **Basic adjustment outside** drag area

Adjustment of heel line, upper line, possibly instep line and adjustment of position or length of the lacing. If a boot leg is active, the transition between boot leg and last is adjusted.

⇒ **Basic adjustment inside** drag area

In case the inner last and outer last are to be adjusted differently, this can be done in this drag area.

⇒ **Styling outside** drag area

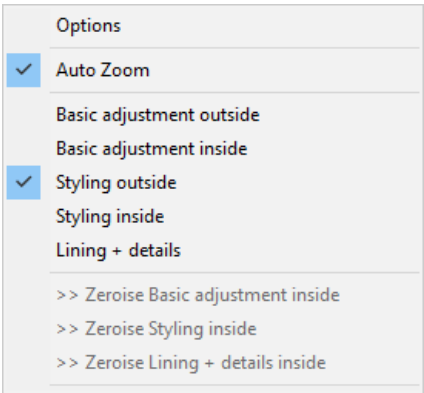
Adjust lacing, style line and tongue, see Picture 4-4.

⇒ **Styling inside** drag area

Adjust differences of the inner last.

⇒ **Lining + details** drag area

The lining lines, eyelets and fold of the heel can be adjusted. As these adjustments are inherently symmetrical and apply only to the lining, the corresponding line on the inner last cannot be regulated differently.

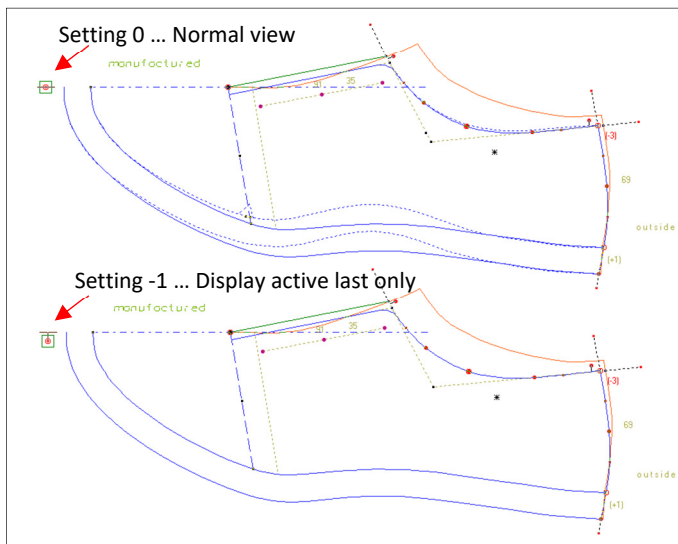


Picture 4-1



## Visibility switch and moveable comparison contour

A visibility switch with two or three settings is available for all interactive shoe types, see Picture 4-2. Setting 0 is the normal view. In setting -1, only the active last is displayed; in the drag area of the outer last, the inner last is hidden and vice versa.

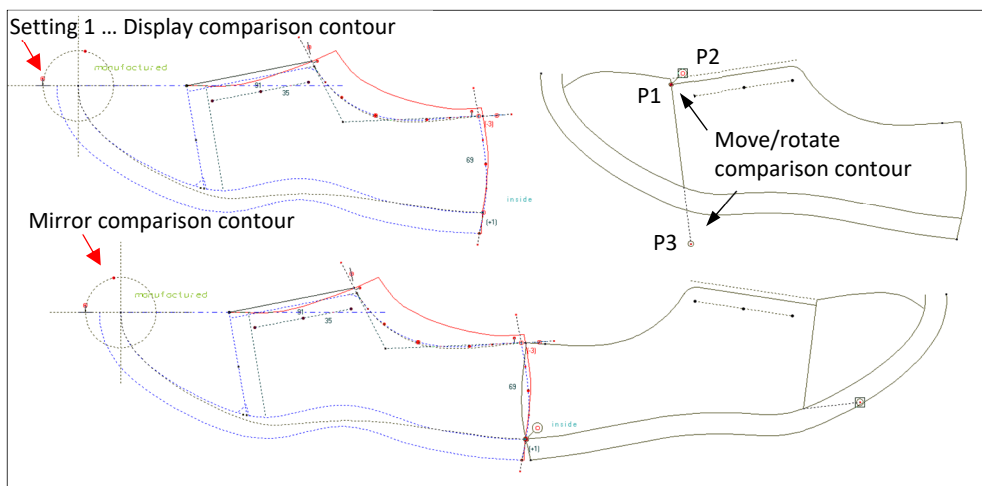


Picture 4-2

In the drag areas of the inner last, a third

setting, setting 1 is available, which displays a comparison contour of the outer last, see Picture 4-3. The comparison contour can be moved and rotated with the three drag cursors P1 to P3; the comparison contour can also be mirrored.

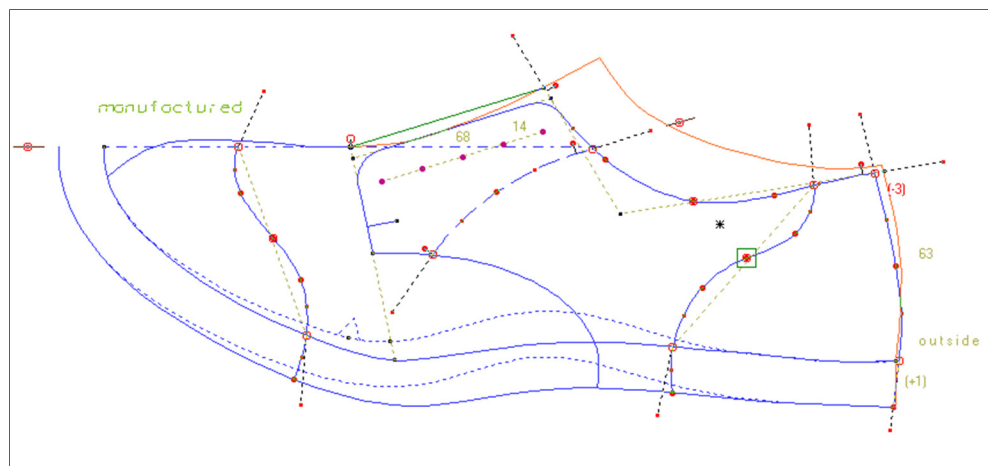
For targeted positioning of P1 to P3, *+Magnet* should be switched on. First, you drag P1 to the attachment point of the outer last/ comparison contour. Then, drag the outer last/ comparison contour to the desired position at the inner last with P2. The preferred points are highlighted with a small arrow. With P3, the outer last/ comparison contour can be rotated about P1.



Picture 4-3

## 4.2 Interactive Shoe type 11


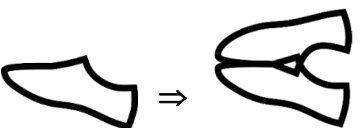
The module *Shoe type 11* (Picture 4-4) is intended for shoes with **open lacing**, i.e. **all forms of Derby styles**.



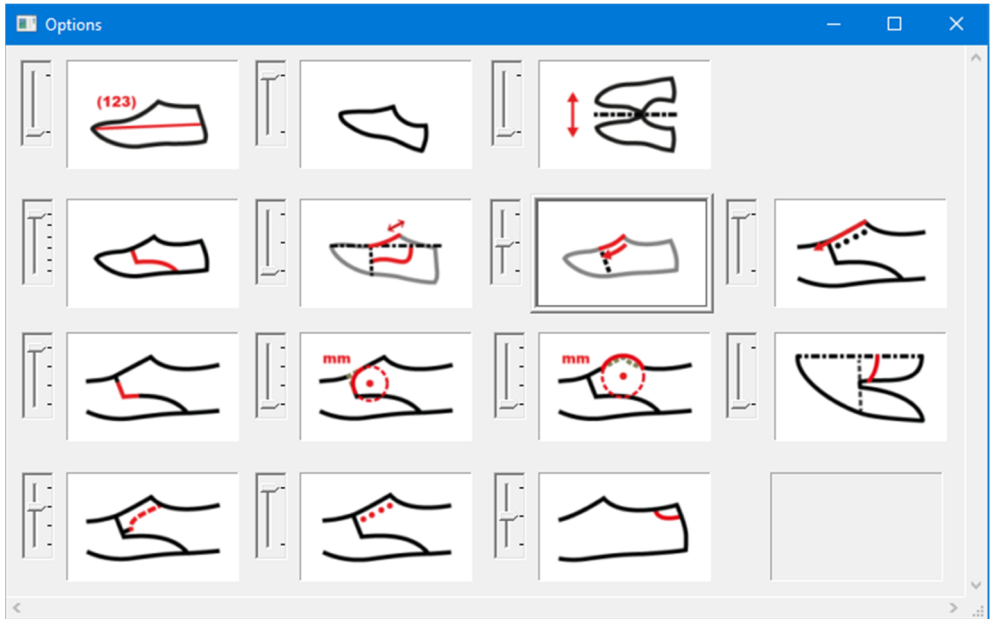
Picture 4-4

Calling shoe types and the step-by-step guide for adjusting shoe types is described in section 4.1.

### Options of Shoe type 11

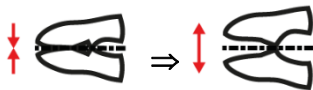
<p><b>Display measurements</b></p> 	<p>These options work in the same way as the options for <i>Last 10</i>, see Section 2.5.</p>
<p><b>Mirrored adjustment</b></p> 	

In addition to these options, further options are available...



Picture 4-5

### ***Distance between outer and inner last***



With this option the inner and outer last can be separated. This is particularly useful if a number of lines overlap and offers a better overview when inserting into another part.

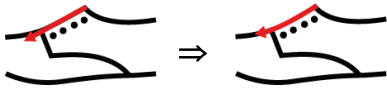
At the end of the styling process / detailing, this option should be de-activated. It is envisaged as a tool during composition of a style.

### ***Lacing types...***



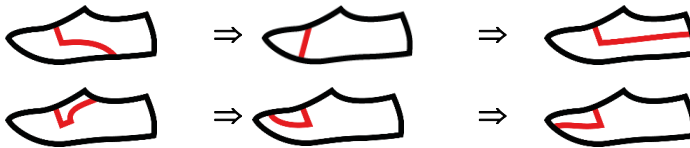
With this option the shaping of the instep line can be determined. This will influence the lacing and the extension of the lacing.

- In the first setting, the shape of the instep line is exactly as adjusted in the *Last 10* module.
- Setting 2 allows for a completely new shaping of the instep line and the dependent lacing shape.
- Setting 3 connects the upper opening and the break point with a straight line.

**Extension lacing straight/shaped**

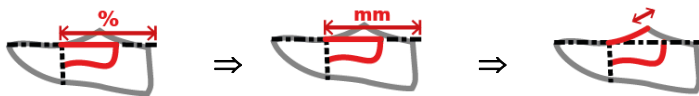
This option determines how the lacing runs beyond the break point.

- Setting 1 extends the lacing straight into the vamp.
- Setting 2 aligns the lacing with the shape of the last.

**Shoe types**

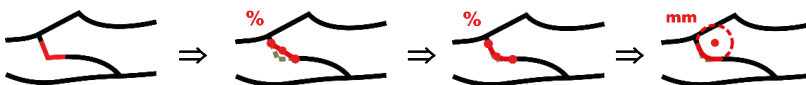
This is where the style line / vamp line is selected. It always starts directly at the lacing and divides the upper pattern into vamp and quarter, thus defining the shoe design.

If a derby is to be created, select setting 1, for a blucher, select setting 3.

**Tongue grading in %/mm**

This option defines the grading of the tongue. In this module, the tongue is constructed across the mirror line.

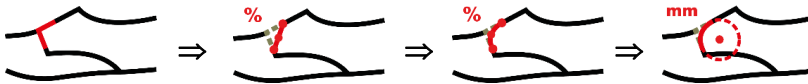
- With setting 1 the tongue is constructed via a percentage value relating to the length of the mirror line from the break point. As this line increases from size to size, the tongue is graded automatically.
- With setting 2, the tongue is not graded automatically. It has to be graded by the user via break sizes. Group size grading is equally possible.
- With setting 3, the tongue length is equivalent to the lacing length. Notwithstanding this, a distance can be set, guaranteeing that the tongue remains at the correct length throughout all sizes. This is particularly advisable for boot legs.

**Corner styling at ball line**

This option determines the shape of the corner ball line / style line.

- With setting 1 no change applies.
- With setting 2, an angled corner can be set.
- With setting 3, a rounded corner can be set.
- With setting 4, a rounded corner can be set via a circle arc. This is the only corner which is not graded automatically; the radius remains constant throughout all sizes.

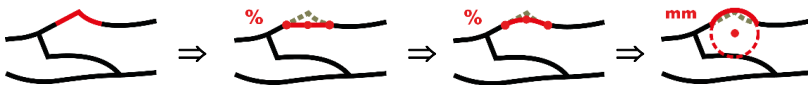
### **Corner styling lacing bottom**



This option determines the shape of the corner instep line / ball line.

The settings of the options are analogous to the settings of **Corner styling at ball line**. Here also, the radius of the rounded corner is not graded!

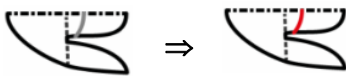
### **Corner styling lacing top**



This option determines the shape of the corner upper line / instep line.

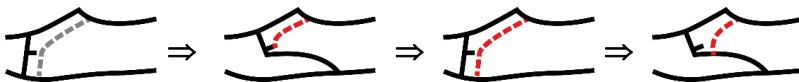
The settings of the options are analogous to the settings of **Corner styling at ball line**. Here also, the radius of the rounded corner is not graded!

### **Separate tongue**



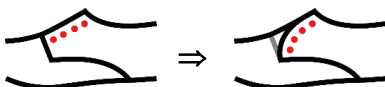
This option adjusts the separation of the tongue.

### **Stitch types for lacing ...**



This option can activate lacing stitching. It is shaped in the first two drag areas. Settings 2 to 4 determine at which line the stitching ends: at the bar tack, the insole edge or the style line.

### **Eyelet types...**



This option alters the orientation of the eyelets.

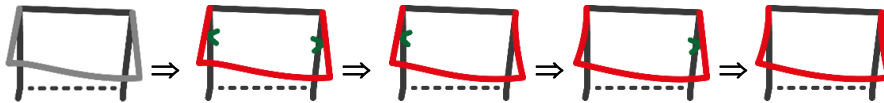
- With setting 1, the eyelets are aligned according to the instep line.
- With setting 2, the eyelets are aligned along the lacing.

### **Heel styles**



By activating this option, a fold line or a curve can be adjusted, defining the upper at the heel section.

### **Collar types**



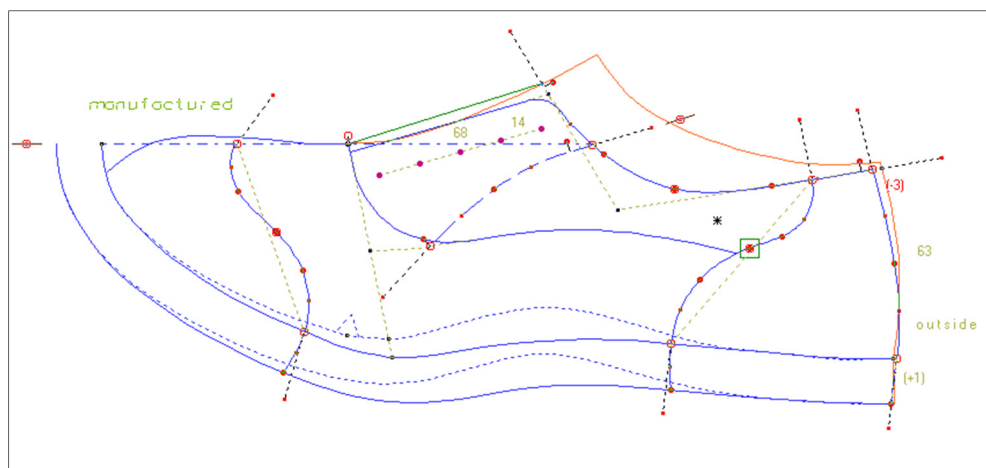
This option is only visible if a boot leg was selected in the basic shoe. In this case, a collar or cuff can be activated. The different options determine the line to be used as a fold line. The green tick mark in the option image indicates that the line is active as a fold line.

The fold lines are straight so that inner and outer collar can be butt-jointed accurately.

The shaped lines follow the same directions at the top as the boot leg lines to ensure a continuous transition. If the collar / cuff is to be cut onto the boot leg, they can simply be mirrored upwards.

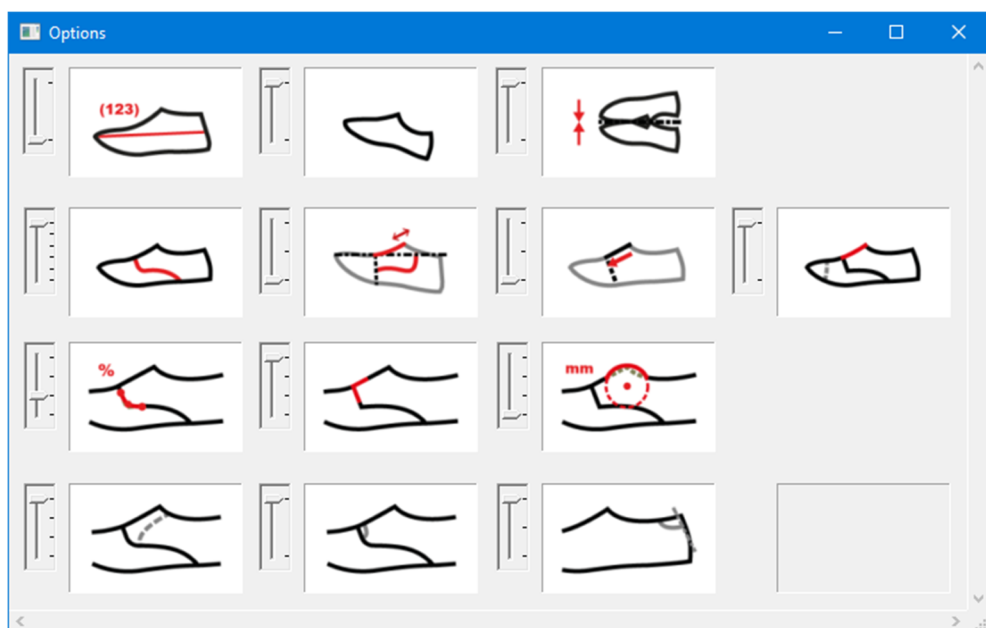
### 4.3 Interactive Shoe type 21

As in *Shoe type 11*, in *Shoe type 21* the upper is defined in more detail. This interactive shoe type construction is designed for **closed lacing**, in particular for **vamp styles**.



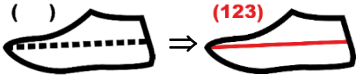
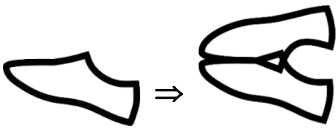
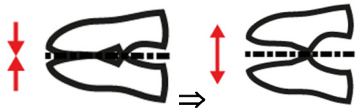


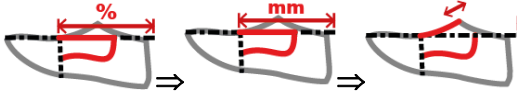
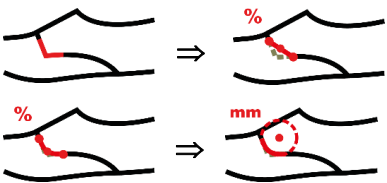
Picture 4-6

Calling shoe types and the step-by-step guide for adjusting shoe types is described in section 4.1.

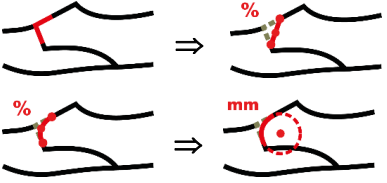
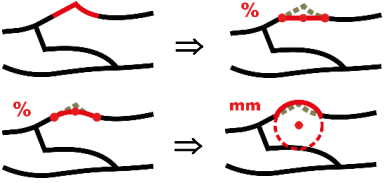

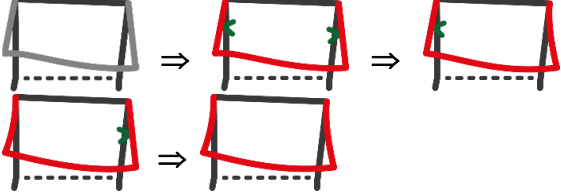


Picture 4-7

Options of Shoe type 21

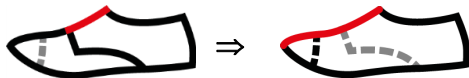
<p><b>Display measurements</b></p> 	<p>These options work in the same way as the options for <i>Last 10</i>, see section 2.5.</p>
<p><b>Mirrored adjustment</b></p> 	
<p><b>Distance between outer and inner last</b></p> 	<p>These options are analogous to <i>Shoe type 11</i>, see section 4.2.</p>
<p><b>Lacing types</b></p> 	
<p><b>Shoe types</b></p> 	
<p><b>Tongue grading %/mm</b></p> 	
<p><b>Corner styling at ball line</b></p> 	



<p><b>Corner styling lacing top</b></p> 	<p>These options are analogous to <i>Shoe type 11</i>, see section 4.2.</p>
<p><b>Corner styling lacing bottom</b></p> 	
<p><b>Heel styles</b></p> 	
<p><b>Collar types</b></p> 	

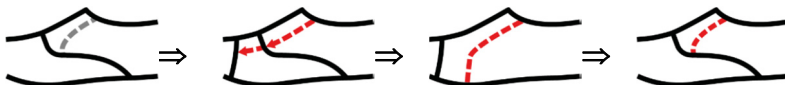
Additional to this options there are further options:

**Lacing up to ...**



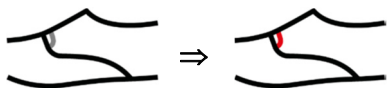
These options determine whether the lacing extends to the vamp line, the sole edge or the toe cap, if a toe cap exists. With setting 2, the vamp line is completely hidden and no further adjustments are available.

**Stitch types for lacing ...**



This option can activate lacing stitching which can be shaped in the first two drag areas. Settings 2 to 4 determine at which line the stitching ends: vamp line, style line or insole edge.

### Curve



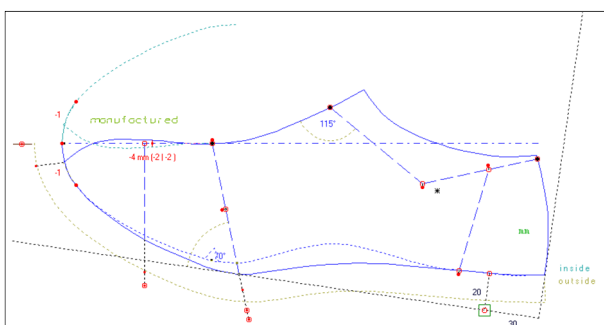
With this option a curve is activated.

### Exercise

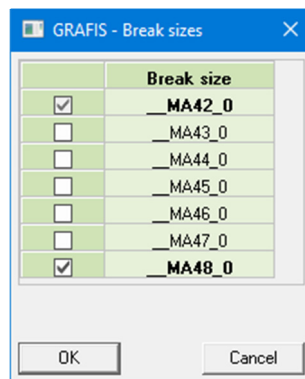
Load the scan of a last. Set the zero point. Open a further part in the part organisation and call *Last 10*. Trace the scan along the last. Enter the sizes `_MA_41` to `_MA_48` into the size table.

Call *Basic Shoe 10* into a further part of the part organisation. Adjust the following options (Picture 4-8):

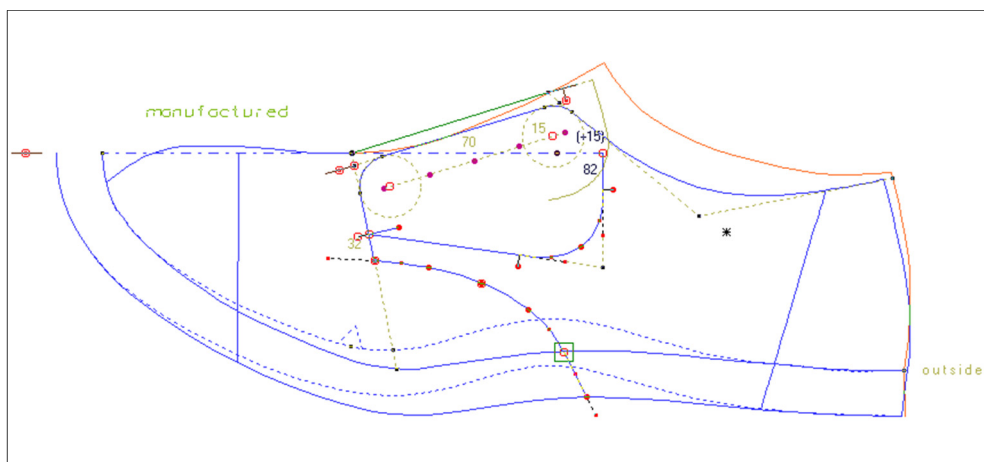
- Display measurements: yes
- Display last open: no
- Boot leg: no
- Adjust ease inner separately: no
- Toe cap in: percent
- Heel cap in: percent
- Construct on the fold: yes
- Alignment in: degrees
- Display ankle point: yes



Picture 4-8



Picture 4-9



Picture 4-10

Add size `_MA_48` to the drag area *Grading* (Picture 4-9).

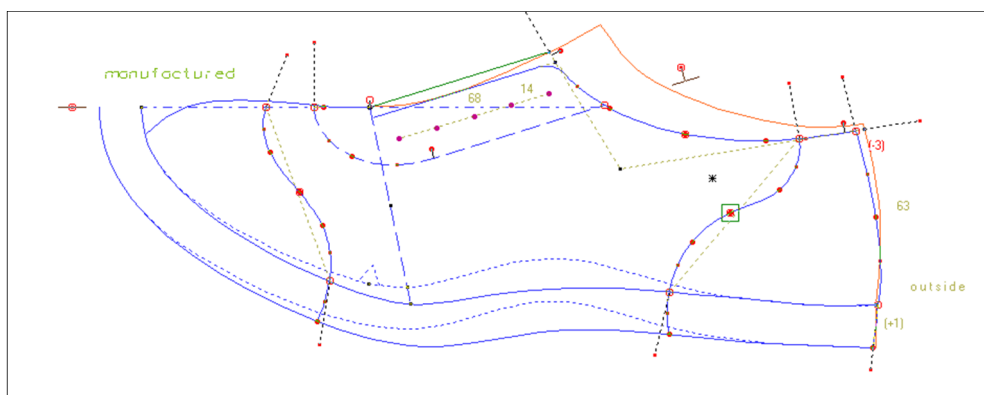
Adjust the following grading:

- Length grading: 6.6 mm
- Width grading: 3.3 mm

Call *Shoe type 11* into a further part of the part organisation (Picture 4-10).

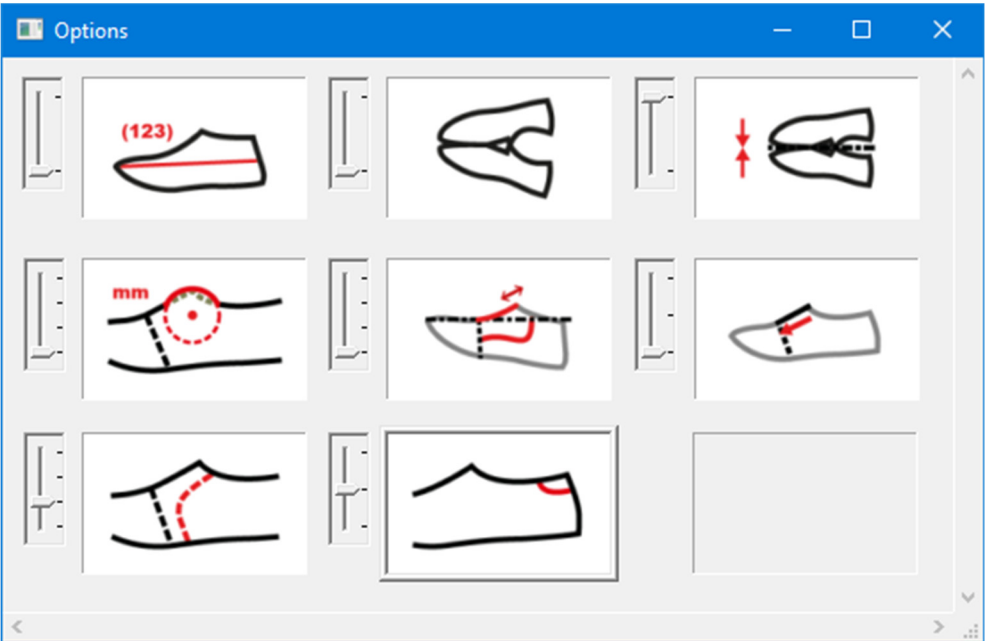
#### 4.4 Interactive Shoe type 01

As in *Shoe type 11*, in *Shoe type 01* the upper is defined in more detail. This interactive shoe type construction is a basic style with **closed lacing** for free style development with or without tongue, see Picture 4-11. It does not contain prepared shaped style lines and vamp lines, nor a prepared collar for a boot leg.



Picture 4-11

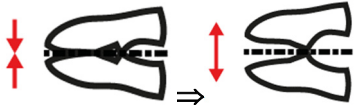

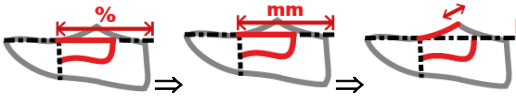
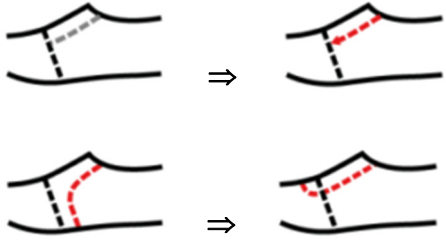
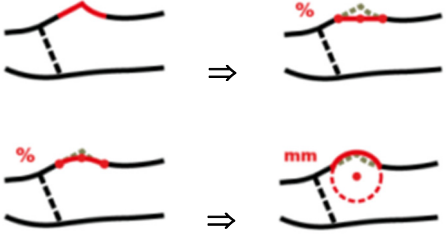

Calling shoe types and the step-by-step guide for adjusting shoe types is described in section 4.1.



Picture 4-12

Options of Shoe type 01

<p><b>Display measurements</b></p> <p>( ) ⇒ (123)</p>	<p>These options work in the same way as the options for Last 10, see section 2.5.</p>
<p><b>Mirrored adjustment</b></p>	

<p><b>Distance between outer and inner last</b></p> 	<p>These options are analogous to <i>Shoe type 11</i>, see section 4.2.</p>
<p><b>Lacing types</b></p> 	
<p><b>Tongue grading %/mm</b></p> 	
<p><b>Corner styling lacing bottom</b></p> 	
<p><b>Corner styling lacing top</b></p> 	
<p><b>Heel styles</b></p> 	



## Content

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### 5.1 Extracting pieces






Style development with Grafis ensues in several stages:


- call *Last 10* and adjust it
- possibly call *Insole 10* and adjust it
- possibly call *Orthopaedic modul 10* and adjust it
- call *Basic shoe 10* adjust it
- possibly call *Shoe type 11/21* and adjust it
- develop a draft with all required design elements
- derive the production patterns such as vamp, quarter, toe cap etc


The parts from these developmental stages are connected so that alterations to the basic block are applied to the draft pattern und thus, to the production patterns. This section initially deals with the extraction of pieces. More detailed explanation on part organisation and hereditary automatic can be found in sections 13.1 and 13.2.

#### Step-by-step guide

- ⇒ Open part organisation via: *part rack* → button  or *basic menu* → *part organisation* or *Extras* → *Part organisation...*; see Picture 2-6 in section 2.3
- ⇒ Create new parts with *open part*
- ⇒ Enter/edit the name of the selected part with *edit part name*  or after double-click on the part name.
- ⇒ Click to activate the part into which objects (points, lines) are to be inserted. The active part is highlighted in colour.

⇒ Show part(s)  from which lines and objects are to be inserted into the active part and hide all other parts.

⇒ Quit the *part organisation* with .


⇒ *Basic menu* → *insert* 

⇒ Select the type of object to be inserted by activating *points*, *lines* or *parts* below  
*Select object:*

⇒ Click objects in the inactive parts displayed in black on white screen or in white on black screen.

The inserted objects appear in a different colour (red) and, after having pressed <F5> removed from the donor part.

⇒ Click on *without transformation* inserts the objects into the active part. Only then, will the inserted objects appear in the blue colour of the active part and can be modified.

⇒ Press  to return to the basic menu.

### Insert menu

Select object:

[points](#) ▪ [lines](#) ▪ [part](#)

[reset single](#) ▪ [reset all objects](#)

Deposit objects:

[without transformation](#) ▪ [move](#) ▪ [turn and move](#)

[reset](#)

“Insert” tools:

[points](#) ▪ [lines](#) ▪ [part](#)




### Insert objects/ Extract objects from another part

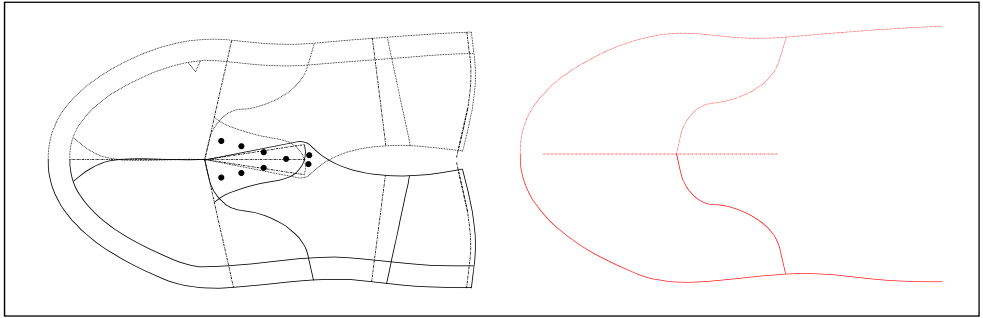
The following important rules apply when inserting objects:

1. To insert an object the part into which the objects are to be inserted must be active.
2. The part from which objects are to be extracted must be visible on screen but inactive.
3. Objects can only be inserted from parts with a lower part number into parts with a higher part number.





**Excercise**

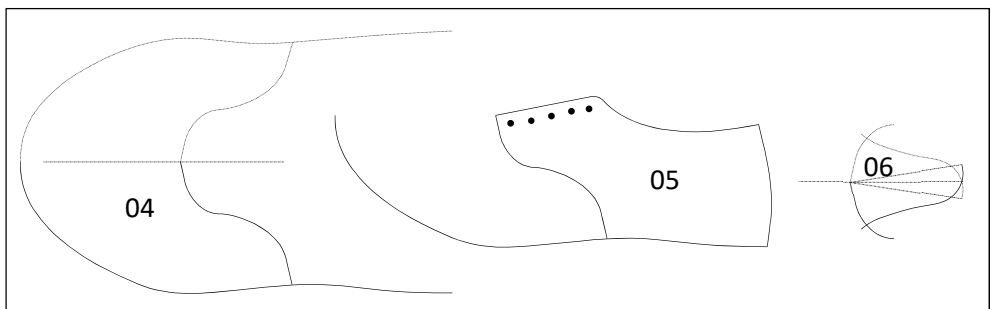
Call *Last 10*. Open three further parts in the part organisation. Call *Basic Shoe 10* into the second part, call *Shoe type 21* into the third part. Into the fourth part, insert the lines of the vamp. Activate the fourth part and switch to the basic Menu with . Open the *insert* menu by clicking onto *insert* in the menu on the right. Activate the object type *lines* by clicking. Now click the lines required for finishing the vamp (Picture 5-1). The clicked lines appear red or purple and are positioned to the side of the donor part after pressing <F5>.



Picture 5-1

***The <F5> key arranges all visible parts of a style in a rectangle.***

Then, swap to the object type *points* and insert also any other points required. The selected objects are inserted after clicking *without transformation*  in the *deposit objects* section. Quit the insert menu with . Open further parts in the part organisation and insert all other required objects in the same way (Picture 5-2).



Picture 5-2

***In the basic menu the following applies***

- ***clicking an inactive part → activates this part***
- ***dragging an inactive part → hides this part***

**Insert tools: lines, points and part**

The *Insert tools lines, points and part* can be used as an alternative to the described insert process. Using the tools allows for subsequent detaching of following constructions and saving building blocks in the call list. When using the *Insert tools lines, points and part*, the click situation is photographed automatically, marked by a photo frame. Ensure that the required objects are visible within the frame. Zoom out if required. Further explanation can be found in section 13.5.


**5.2 The construction record**

**Purpose of the construction record**

Grafis saves the construction and modification steps during pattern development in the base size by imperceptibly writing a record. The operator has the option of calling the construction record with other sizes and thus, creates a similar construction for these sizes. Incremental grading is omitted. The construction record is similar to the notepad of an attentive student who notes down each of the teacher’s steps and can then recreate the construction with different measurements.

**Indication of record steps, test run**

The number of recorded construction steps is constantly indicated in the basic menu in Grafis with two blocks of *record counters* containing three numbers respectively. The block on the right indicates the number of

The image shows a portion of the Grafis software interface. It features a grid of buttons. The top row has two circular arrows (refresh/reset). The second row has a button with a circular arrow and 'Nx', followed by a small input field containing the number '1'. The third row has a display showing '000 001'. The bottom row has a button with a single downward arrow and a button with two downward arrows. To the right of these buttons is a list of text labels: 'Basic menu (extract)', 'Construction record of the active part...', 'reset ▪ restore', 'reset N steps', 'record counter', and 'rest run ▪ grading'.

construction steps recorded so far. The left group of numbers indicates the record step at which test run was last activated. *Test run* starts the run through the construction record. It can also be run in a step-by-step mode. Immediately after having selected *test run* press the <S> key once. Pressing the space key shows the following construction steps one after the other. Press <S> again to quit the step-by-step mode.

### Reset the construction record

The *reset* function resets the construction record by one step. If a larger number of reset steps is required, click on *reset N steps* and enter the number of steps to be reset. The construction record is automatically reset

***As soon as you detect a mistake in your construction, reset the construction record back to the error and resume construction without the mistake. Please do not try to “patch up” your construction as following construction steps may be affected inadvertently. Correcting mistakes in time avoids errors during automatic construction (grading).***

If you have reset too many steps, you can go back to the state before deleting the record steps with the function *restore*.

### Exercise

Call the basic block *Last 10*, click on *reset* and then, click on *test run*. The screen is empty as calling a basic block counts as one construction step. Click on *restore*, the basic block is back on the screen.

## 5.3 Deleting objects

### The Delete menu

The *delete* menu is activated via *basic menu* → *delete*. Single objects, points, lines/curves, hatching, texts, can be deleted by clicking; several objects within a rectangle to be drawn up can be deleted in one operation.

Step-by-step guide

- ⇒ Activate the object type to be deleted under the required option *delete single* or *delete inside rectangle*
- ⇒ Click the objects or draw up rectangle

### Delete single

To delete individual objects the type of objects under *delete single* is to be activated and the object to be deleted is to be clicked. This is the object nearest to the cursor, marked by a fine thread and coloration.

### Delete menu

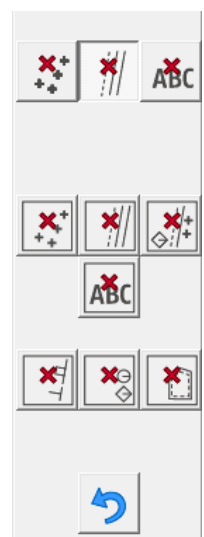
delete single ...  
points ▪ lines ▪ texts

delete inside rectangle ...  
points ▪ lines ▪ all



texts

delete inside rectangle ...  
notches ▪ inner symbols ▪  
seam lines

reset



### Delete inside rectangle


To delete several objects in one operation first, the type of object is to be selected under *delete inside rectangle*. All objects of this type **completely** lying within a rectangle to be drawn up will be deleted. The rectangle is drawn up by clicking  the corner of the area to be deleted, moving the mouse and clicking  the opposite corner.

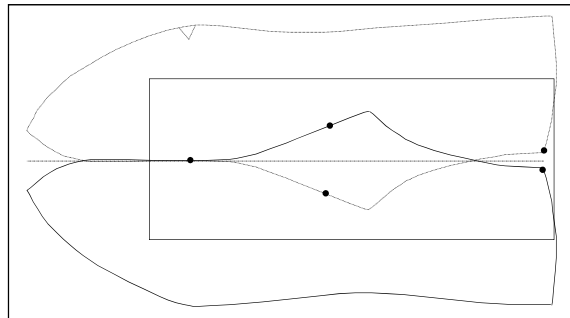
**When deleting several objects the objects lying completely within the rectangle are deleted only!**

With *reset* you can reset the last deletion step.

Please note that deleting is a construction step and will be performed automatically during *test run* or *grading*. Start both functions from the basic menu. One or more deletion steps can also be reset by resetting the construction record.

### Exercises

Call the basic block *Last 10* and delete all dashed lines and all points individually. Click  the point or the line to be deleted. A fine thread to the cursor indicates the nearest point. If a different point is deleted, the thread cursor did not indicate the point to be deleted. If a different object is deleted, a different type of object was active. To correct click *reset* and repeat deleting. Delete all points of the last with *delete inside rectangle: points*, see Picture 5-3. Reset the last record step and delete all lines inside the rectangle.

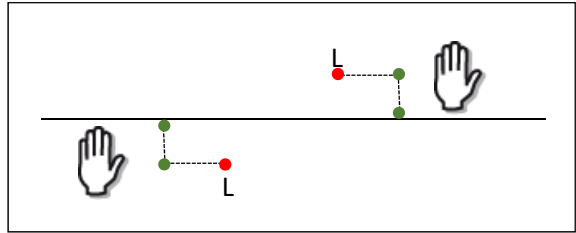


Picture 5-3

## 5.4 The right principle

For certain construction steps the beginning and end of a line have to be determined. The line receives a direction.

For this purpose the right principle was introduced. Grafis supports the operator with the so-called “right principle cursor” which also contains the direction indicator, see Picture 5-4.



Picture 5-4

To illustrate the right principle imagine the line/curve to be clicked as the central reservation of a road. The required direction of travel is communicated to the system by clicking the line. This relates to driving on the right side of the road, only. The right principle and its application is explained in detail in section 5.6.

## 5.5 Parallels

### Interactive tools and non-interactive functions

Up to Grafis Version 9, only **non-interactive menu functions**, in the following called ‘functions’, were available within the software. From Grafis Version 10, **new interactive tools** for the construction of parallels, raster, link and curves have been introduced.

The main differences are as follows:

- Point of entry of parameters

When using the functions, the required parameters, such as distance of a parallel or the number of raster points, must be entered first. Then, the relevant objects can be clicked. When working with interactive tools, the objects are clicked first and then, the parameters are adjusted interactively.

- Speed of processing

The functions are processed faster than the interactive tools during grading. This difference is markedly noticeable when grading curves using processors of less than 1GHz frequency. On faster computers, these differences are hardly obvious.

- Subsequent alterations

When working with functions, x values (see section 12.1) can be introduced as parameters. Only with the application of x values can functions be altered subsequently. Tools, however, can be altered interactively by double-clicking on the relevant objects or via the <F12> list at any time.

- Listing in the <F12> list of constructions

All tools are listed in the <F12> list of constructions in the order of use. The functions do not appear in this list.

***Recommendation: If you are certain that the use of a function for the respective construction operation will obtain the required result, you should apply this function. This way, you avoid too many unnecessary entries in the <F12> list and thus, reduce the processing time for grading.***

***All buttons with direct access to tools are indicated by a small green dot. Further tools can be accessed via the 'tools' button in the menu on the right at the very bottom if required.***

### The Parallel menu

The construction of parallels ensues with the *parallel* menu from the basic menu. This menu contains the *parallel* function as well as the *Parallel 10* tool and the *Parallel 20* tool.

As a rule, the ***parallel*** function is used, possibly with the application of x values. The ***Parallel 10*** tool is useful if the distance of a parallel is to be different at starting point and final point.

### The parallel function

Step-by-step guide

- ⇒ Select distance or enter special distance value in the menu
- ⇒ Select *+/-chain*
- ⇒ Select *+/-copy*
- ⇒ Click the line/curve to which a parallel is to be generated.

## Determine distance value

If the required distance (in millimetres) is listed in the menu, click the respective button. Otherwise, a specific value has to be entered in the *distance value* field followed by <ENTER>. The point is the decimal sign.

A distance value already entered can be reactivated by clicking the *distance value* button.

## Significance of +/-chain and +/-copy

If *+chain* is set the parallel is generated not only for the clicked line/curve but for all lines and curves connected with the clicked line. Clicking *chain* activates or deactivates this option.

The switch *+/-copy* determines whether the original line remains existent (*+copy*) or not existent (*-copy*). Toggle by clicking on this button.

## Un-parallel

The function *un-parallel* constructs a new line with the distance to the original line changing evenly along the course of the line. The distances at the beginning and end of the line are set. The un-parallel applies only to individual lines, not line sequences.

## Parallel menu

fixed distance values for parallel function

distance value

Un-parallel

distance value 1

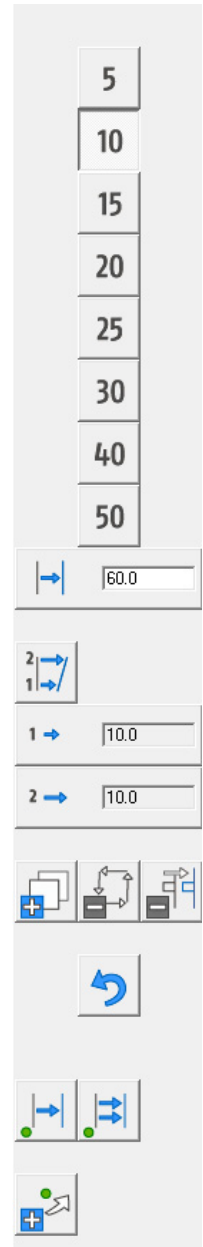
distance value 2

+/- copy ▪ +/- chain ▪  
+/- move symbol

reset

Tool Parallel 10 ▪ Tool Parallel 20

start the tool automatically



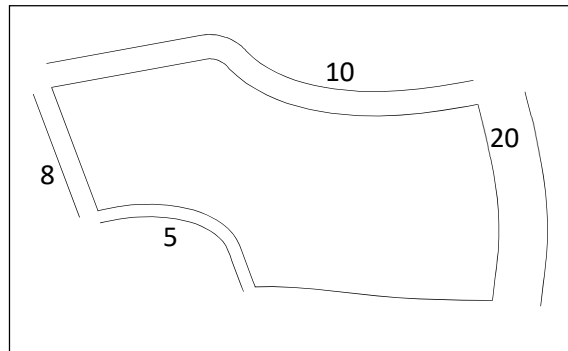
### Direction for parallel generation

Clicking decides on which side of a line/curve the parallel is generated. The parallel is generated in the direction from which the line/curve is clicked. Therefore, click next to the line and not on the line!

Attention! If identical objects are lying on top of each other 2, 4 or 6,... times they cannot be seen on screen as they delete their respective image. If they lie on top of each other 3, 5,... times they are visible. When practising the *parallel* function for the first time this is a common mistake. After <F4> even objects deleting each other's image are displayed. If you cannot see a new parallel straight away, press <F4>. Make sure that points or lines are never placed on top of one another by using *reset* or *delete*.

### Exercise on creating parallels to single lines

Call *Last 10*, open two more parts in the part organisation and call the basic block *Basic Shoe 10* into the second part. Call the *Shoe Type 11* in the third part and save the style as "BasicShoeStyle.mdl" for use in subsequent exercises. Now insert the lines of the quarter into the fourth part in the part organisation. Create parallels in different widths to the heel line, upper opening and Derby line, see Picture 5-5.



Picture 5-5

### The Parallel 10 tool

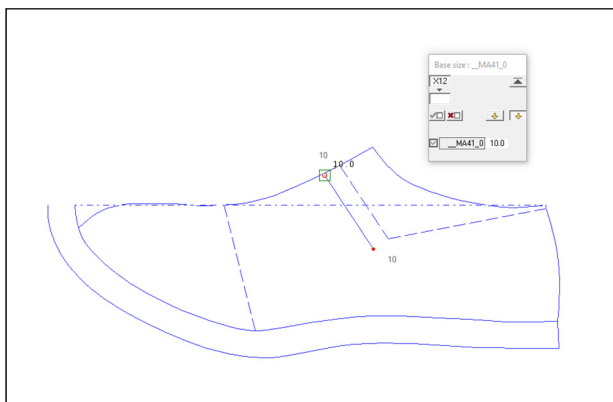
Step-by-step guide

- ⇒ Call *Parallele 10*
- ⇒ Click on the line/curve to which the parallel is to be constructed.
- ⇒ Double-click on the new parallel and adjust starting distance and end distance interactively.



### Exercise “Sandal”

Generate a new style, call *Last 10* and then call *Basic Shoe 10* into a further part. Insert the lines as shown in Picture 5-6 into a further part and construct a parallel to the upper opening with the tool *Parallel 10*. Adjust the width of the parallel to your own requirements. Save the exercise as “Exercise Sandal”.



Picture 5-6

### The Parallel 20 tool

Step-by-step guide

- ⇒ Call *Parallel 20*
- ⇒ Click several lines/curves, to which the parallels are to be constructed.
- ⇒ Double click on once of the new parallels and adjust the distance interactively.

You can adjust all parallels to one distance and then assign an additional distance to single lines/curves. You optionally adjust every parallel separately.

## 5.6 Corners

### The Corners menu

The construction of corners ensues with the *corners* menu from the basic menu. This menu contains the functions *corner* as well as various interactive corner tools.



### Corners menu

corner

reset

corner with curve ▪ corner with circle  
▪ corner with line

co-ordinated corner with curve ▪  
co-ordinated corner with circle

U corner ▪ co-ordinated U corner

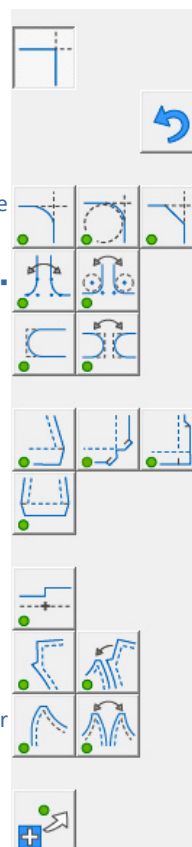
mirror corner ▪ mitred corner ▪  
vent corner

hem corner

stepped corner

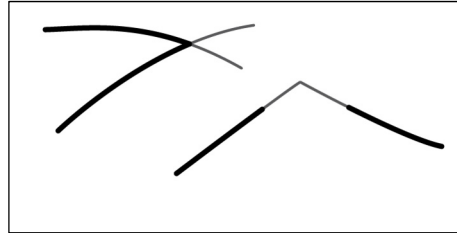
angle corner ▪ co-o. angle corner  
tapered corner ▪ co-o. tapered corner

start the tool automatically



### Initial options for the corner function and the interactive Corner tools

A corner is built of two lines/curves which do not need to intersect but may have more than one intersection (see Picture 5-7). Before each corner construction, the relevant objects are extended (internally) by 500mm at the beginning and end. Thus, corners outside the objects can be constructed. If Grafis detects more than one corner on curves they are indicated and the one required has to be clicked.

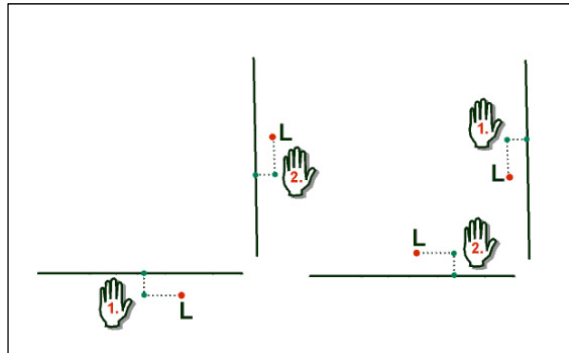


Picture 5-7

For the construction of corners the right principle must be followed when clicking

the objects, see section 5.4 With this principle not only the objects are determined when clicking the line/curve but a direction in which the object is to be used for the instructed construction.

The first object is to be clicked so that you are driving towards the requested corner, the second click must be driving away from the corner, see Picture 5-8.



Picture 5-8

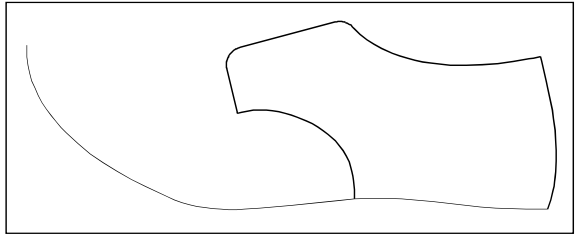
### The *corner* function

Step-by-step guide

- ⇒ Activate *corner*
- ⇒ Click two lines, following the right principle

The *corner* function creates a corner directly from the intersection of the two objects.

Open the basic style from section 5.5, consisting of *Last 10*, *Basic Shoe 10* and *Shoe type 11*. Insert the lines for the quarter into a further part in the part organisation. Cut the protruding line with the *corner* function, see Picture 5-9.

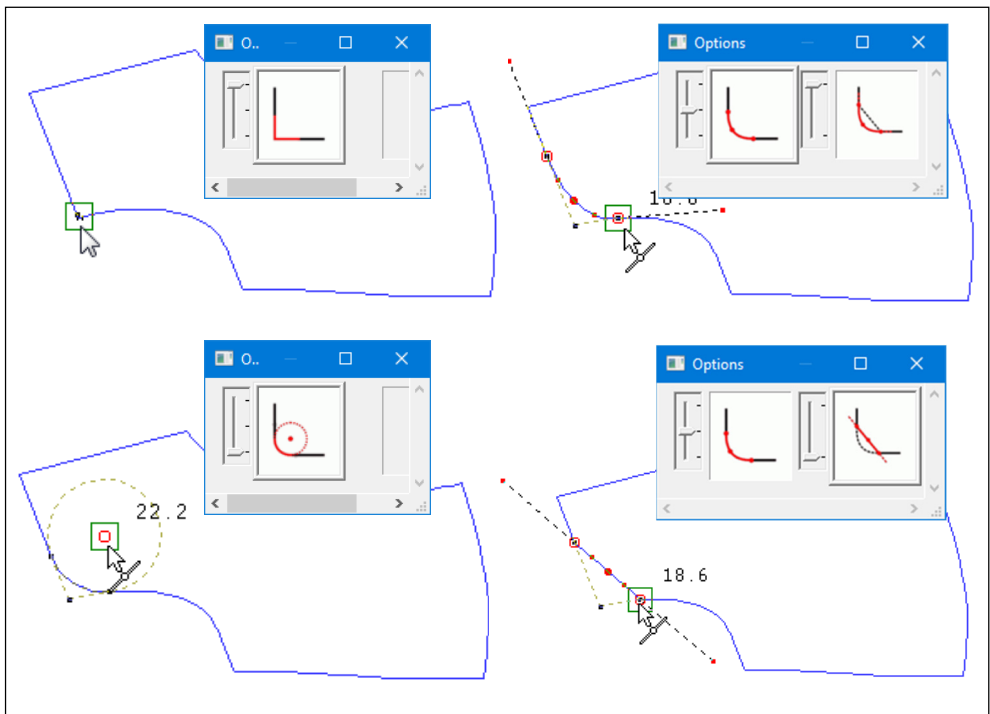


Picture 5-9

**The interactive tool *Corner 40* with the options *curve*, *circle*, *straight line* and *corner***

Step-by-step guide

- ⇒ Call *Corner 40 with curve*
- ⇒ Click on two lines, following the right principle
- ⇒ Double-click on the new corner
- ⇒ Adjust the options of the corner
- ⇒ Interactively design the corner.

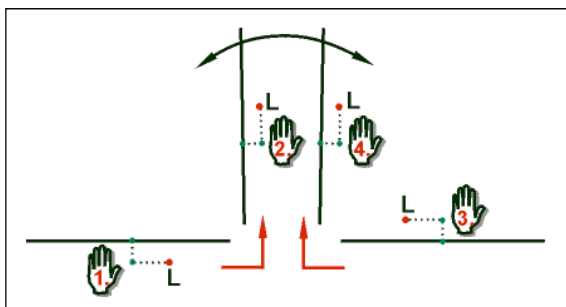


Picture 5-10

Create a corner with the *Corner 40* tool similar to Picture 5-10. One after the other, adjust the corner interactively to a corner with curve, straight line and circle.

### The interactive co-ordinated *Corner 50 curve/circle*

With the co-ordinated corners *corner curve* or *corner circle* two corner constructions of the same part are adjusted towards one another. The step-by-step guide is identical to *Corner 40*. The order of clicking depends on the position of the corners to one another. Detailed information can be found on the

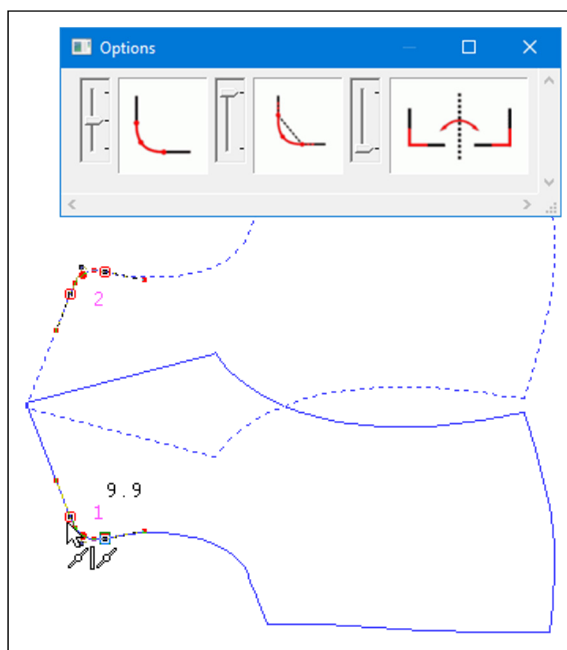


Picture 5-11

*Attach* file card in the *call* function under *Grafis-Corners*. Of the total of three click variations available, we will introduce only the most commonly used click variation here, see Picture 5-11.

***The first clicked corner has a higher priority than the corner clicked second. Alterations to the first corner apply to both corners. Alterations to the second corner apply to the second corner, only. Therefore, adjust the first corner and then, adjust any asymmetry at the second corner.***

Into the quarter part, insert the lines for the quarter of the inner last as well. Construct the *Corner 50* as depicted in Picture 5-12.



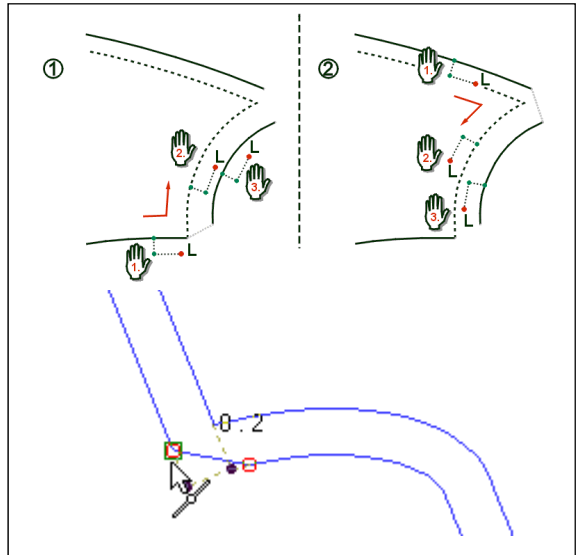
Picture 5-12

### The interactive *Slant Corner 90*

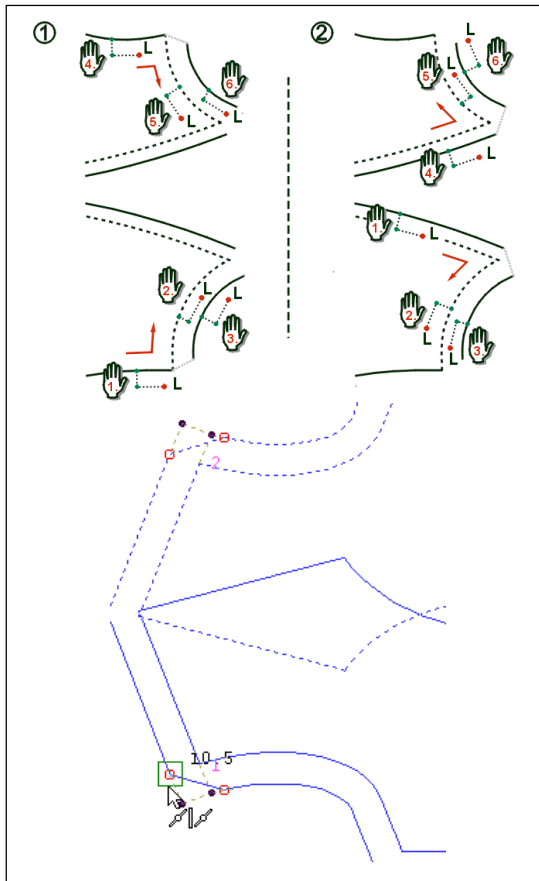
As opposed to the previous corners, this corner requires three lines: one stitch line and the two seam allowance lines.

Step-by-step guide

- ⇒ Call *Slant Corner 90*
- ⇒ Click on the three lines, following the right principle in the clicking order:  
**allowance – seam – allowance**, see Picture 5-13.



Picture 5-13



Picture 5-14

- ⇒ Double-click on the new corner
- ⇒ Interactively design the corner.

Create a parallel of 10mm distance to two lines of the quarter, see Picture 5-13. Create the corner with the tool *Corner 90*.

### The interactive *Co-ordinated slant Corner 100*

Step-by-step guide

- ⇒ Call *Co-ordinated slant Corner 100*
- ⇒ Click on the six lines, following the right principle in the clicking order shown in Picture 5-14:  
Corner 1:  
**allowance – seam – allowance**,  
Corner 2:  
**allowance – seam – allowance**,  
⇒ Double-click on the new corner
- ⇒ Interactively design the corner.

**As Corner 50 the first clicked corner has a higher priority than the corner clicked second. Alterations to the first corner apply to both corners. Alterations to the second corner apply to the second corner, only. Therefore, adjust the first corner and then, adjust any asymmetry at the second corner.**

Into the quarter part, insert the lines for the quarter of the inner last as well. Construct the corner with the tool *Co-ordinated slant Corner 100* as shown in Picture 5-14.

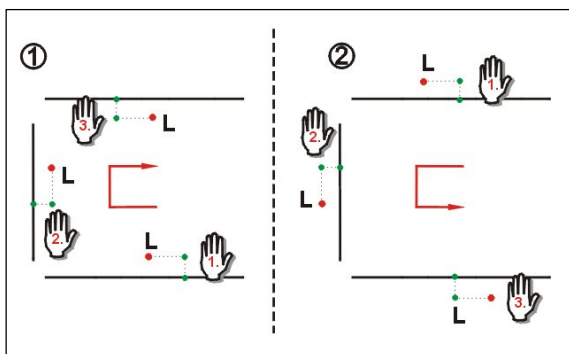
### The interactive U-shaped Corner 110

This corner requires three clicks: **seam – seam – seam**. Clicking inside or outside is of no consequence.

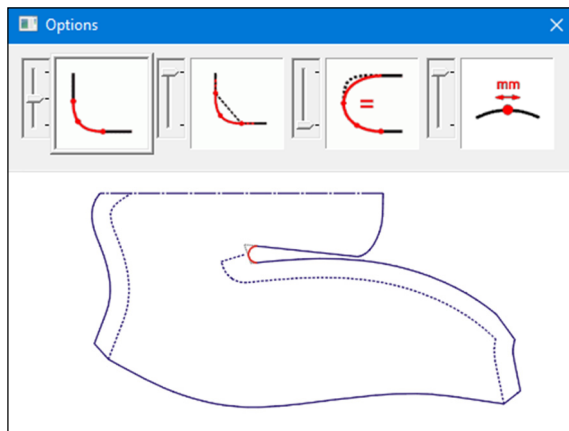
Step-by-step guide

- ⇒ Call *U-shaped Corner 110*
- ⇒ Click on three lines, following the right principle in the click sequence: **seam – seam – seam**, see Picture 5-15.
- ⇒ Double-click on the new corner
- ⇒ Interactively shape the corner

The *U-shaped Corner 110* is used for example for treating edges of belts and bartacks, see Picture 5-16.



Picture 5-15



Picture 5-16

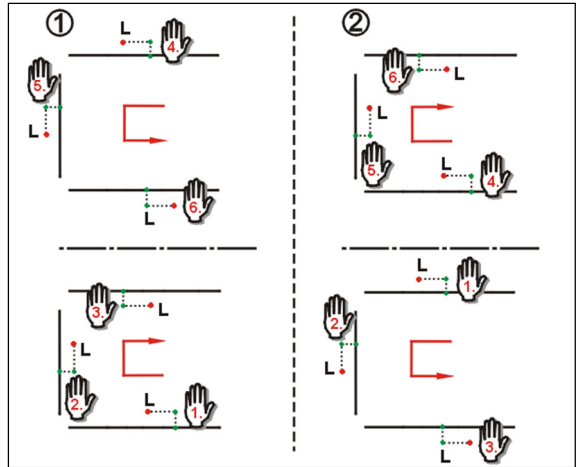
### The interactive *Co-ordinated U-shaped Corner 120*

The two click variations are displayed in Picture 5-17.

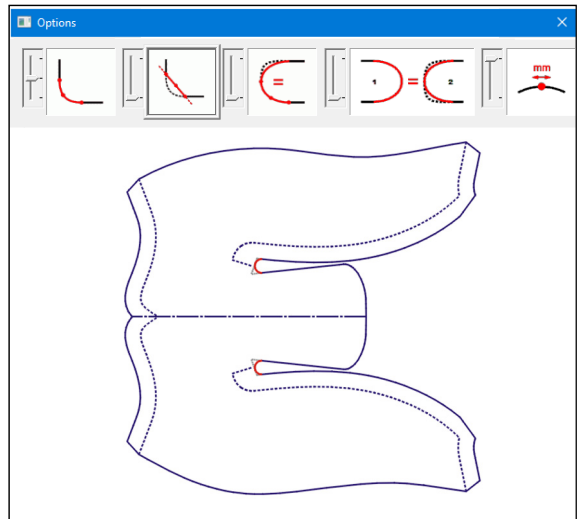
Step-by-step guide

- ⇒ Call *Co-ordinated U-shaped Corner 120*
- ⇒ Click on six lines following the right principle in the click sequence according to Picture 5-17.
- Corner 1: *seam–seam–seam*
- Corner 2: *seam–seam–seam*
- ⇒ Double-click on the new corner and interactively shape the corner

***With this corner also, the first clicked corner has a higher priority over the second clicked corner. Modifications made to the first corner apply to both corners. Modifications made to the second corner apply to the second corner only. Therefore, adjust the first corner first and then, adjust any desired asymmetry to the second corner.***



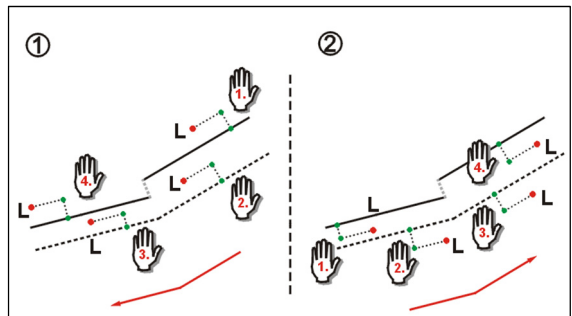
Picture 5-17



Picture 5-18

### The interactive *Stepped Corner 130*

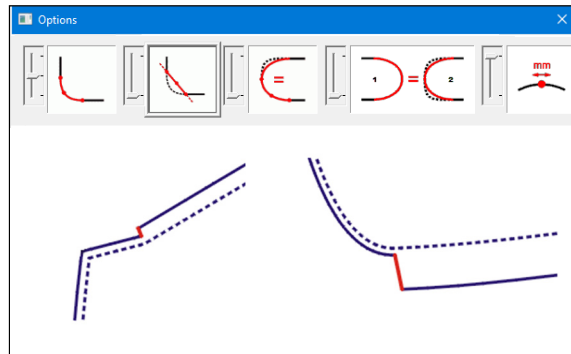
The click sequence is ***allowance – seam – seam – allowance***. It is imperative to click on the seam allowance line first. The two click variations are displayed in Picture 5-19.



Picture 5-19

**Step-by-step guide**

- ⇒ Call *Stepped Corner 130*
- ⇒ Click the four lines following the right principle in the click sequence according to Picture 5-19: **allowance – seam – seam – allowance**,
- ⇒ Double-click on the new corner and interactive adjustment of the corner



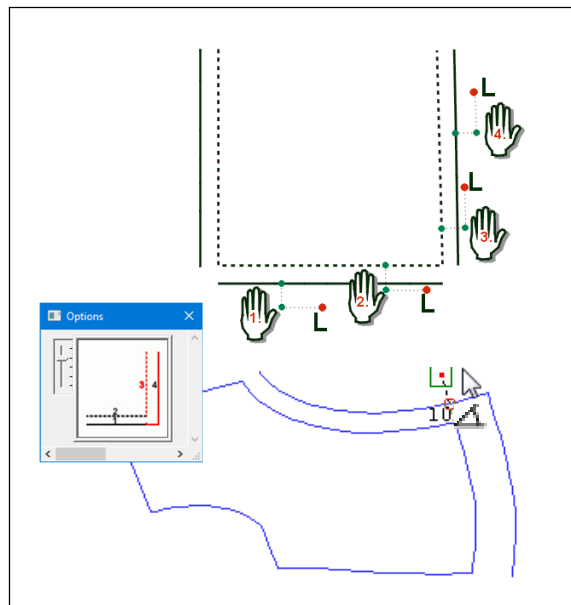
Picture 5-20

**The interactive corners *Mirror Corner 10*, *Mitred Corner 20*, *Vent Corner 30* and *Angle Corner 60***

For this corners four lines are required: the two stitch lines and the two seam allowance lines. The step-by-step guides of this corners are identical. The clicking order is explained exemplarily by the *Mirror Corner 10*.

**Step-by-step guide**

- ⇒ Call *Mirror Corner 10*
- ⇒ Click on the four lines, following the right principle in the clicking order shown in Picture 5-21: towards the corner **allowance – seam** and away from the corner **seam – allowance**.
- ⇒ Double-click on the new corner
- ⇒ Adjust the options of the corner
- ⇒ Interactively design the corner.



Picture 5-21

At the quarter, generate a parallel of 20mm distance to the heel line and a parallel of 10mm distance to the upper opening. Create a mirror corner with the tool *Mirror Corner 10* at the corner of heel seam/upper opening, see Picture 5-21. Try also the other corners, in particular the different settings in the options.



## Content

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### 6.1 Cut, “cut on” and separate lines

#### The *separate* menu

Cutting and separating lines can be called from the basic menu via *separate*.

***Separate*** divides a line into two lines which touch at the separation position and can be processed individually. If the cut mark switch is set to *+cut mark* the separation position is marked by a large point.

*Cut* shortens or lengthens a line up to the intersection. Lengthening is called “cut on”.

*Reset* resets the last separation or cutting operation respectively.

***separate*** ⇒ **2 lines**

***cut/cut on*** ⇒ **1 line**

The separate/cut position can be determined in three different ways.

#### Step-by-step guide

Separate or cut at a cutting line

- ⇒ Define/construct a cutting line with *click cutting line* or *cutting line from point*
- ⇒ Activate *separate* or *cut*
- ⇒ Adjust *+/-cut mark*
- ⇒ Click lines to be separated or cut.



#### Separate menu

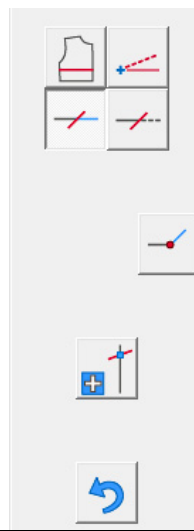
*click cutting line* ▪  
*cutting line from point*

*separate* ▪ *cut*

*separate in corner*

*+/-cut mark*

*reset*



Separate in a corner

⇒ Activate *separate in corner*

⇒ Adjust *+/-cut mark*

⇒ Click the corner in which the lines are to be separated outside.

### Separate/cut at a cutting line

*Separating or cutting with a cutting line* is the accurate option. First, a cutting line is to be determined. One or several lines can be separated or cut with it. The top four buttons of the *separate* menu relate to *separate with cutting line*.

First, the cutting line is to be defined. Grafis offers two options:

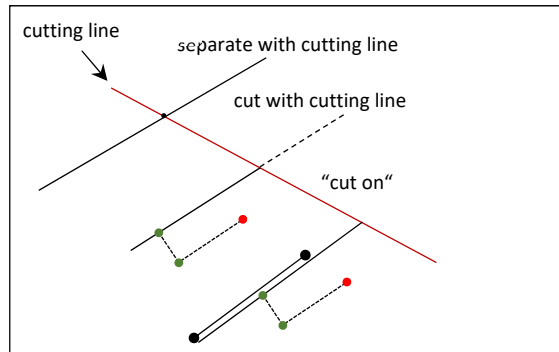
1. With *click cutting line* an existing line is determined as cutting line.
2. With *cutting line from point* the first point of the cutting line is constructed and the other point is defined freehand by moving the mouse.

The current cutting line is displayed in a different colour. Whether to cut or separate with this cutting line is determined by activating the appropriate function *cut* or *separate*.

2. With *separate with cutting line* the clicked line is divided at the intersection with the cutting line provided the two lines intersect. Practise this option with *+cut mark*. The separation position is marked by a point and thus easier to recognise.
3. With *cut with cutting line* the part of the line beyond the cutting line in respect to the click position disappears. The click point defines the part of the line to remain existent. Result of this operation is one line, only.

It is not absolutely necessary for the cutting line and the line to be cut to intersect. A line ending before the cutting line is lengthened up to it when cutting with cutting line. This is known as "cutting on" amongst Grafis operators. "Cutting on" is possible to a maximum of 500mm.

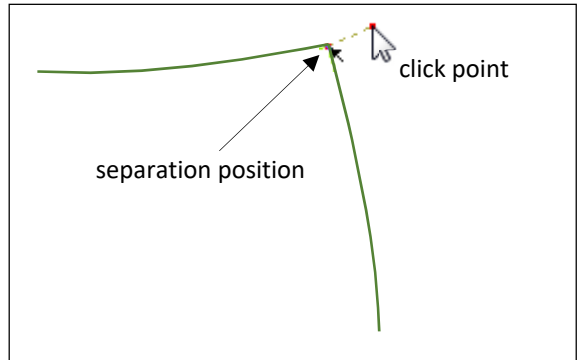
The different options are depicted in Picture 6-1.



Picture 6-1

### Separate in a corner

This function separates a continuous line in a corner. The respective curve is to be clicked on the outside as Grafis separates at a point where an imaginary lightning would strike (lightning principle). As a result a small arrow is shown at the separation position for a short while, Picture 6-2.



Picture 6-2

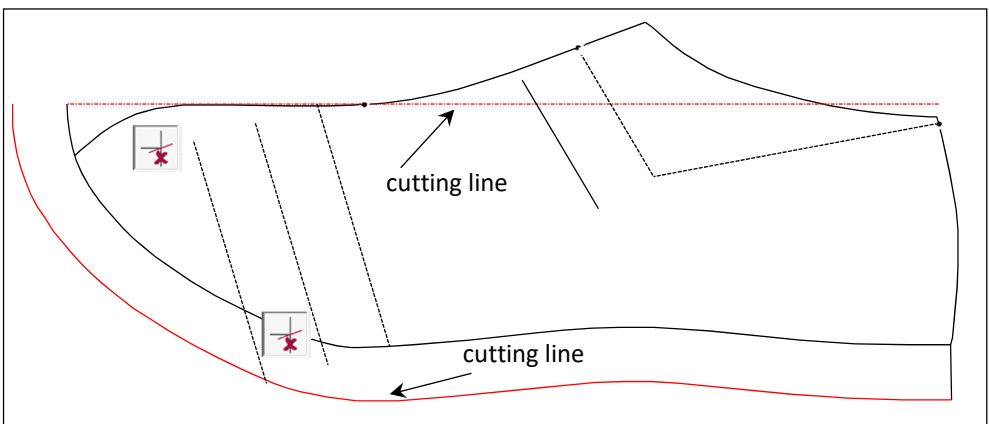
### Further functions

The *cut mark* switch decides whether or not a marker is to be set when separating lines. As a rule, use *+cut mark*, as it is easier to recognise the separation position. A cut mark is a point with the attribute *big point* (see section 8.8). The cut markers can be deleted as points.

*Reset* can undo the last construction step.

### Exercise

Open the style "Exercise Sandal" from section 5.5. Construct a parallel of 18mm to the ball line and a further parallel of 18mm to the new line for the laces. Cut the lines for the laces at the break line and at the allowance on/off, see Picture 6-3. Save the exercise.



Picture 6-3

## 6.2 Linking lines

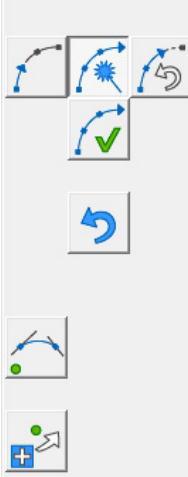
### The *link* menu

The *link* menu is opened from the basic menu. It allows for the linking of lines or the joining of lines by a curve.

### Linking lines (connect with each other)

#### Step-by-step guide

- ⇒ Activate the option *single* or *chain*
- ⇒ Click the lines to be linked following the right principle
- ⇒ Correction (several possible) by clicking *reset link step*
- ⇒ Terminate linking with *deposit*



**Menü Koppeln**

koppeln einzeln ▪ mit Kette ▪ rücksetzen

ablegen

rücksetzen

Tool Koppeln 20 ▪ Tool Koppeln 30

Tools automatisch starten

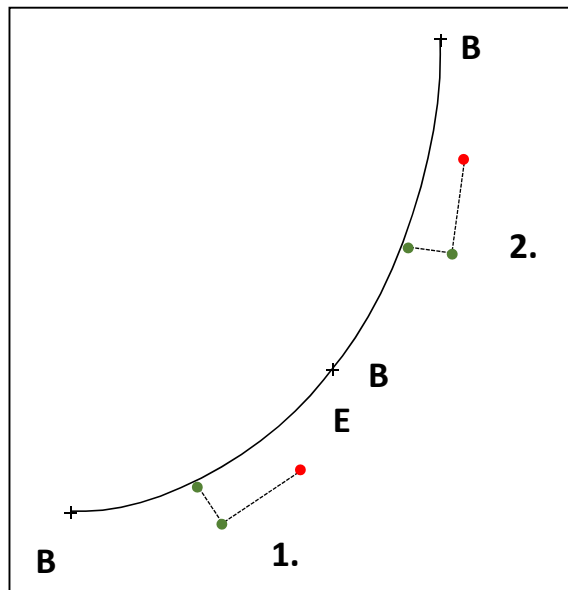
The top four buttons are used for linking lines by bridging the gaps between the lines with a straight line.

Linking lines is required when two or more lines are supposed to be treated as one during further construction steps.

First you have to choose between the options *single* or *chain*. With *chain* all tangential lines (without kink) will be linked automatically in one operation.

At the beginning, the simpler option *single* is recommended.

Reset link step resets the individual linking operations step-by-step. The link operation is terminated only with *deposit* and treated as one construction step in the record.

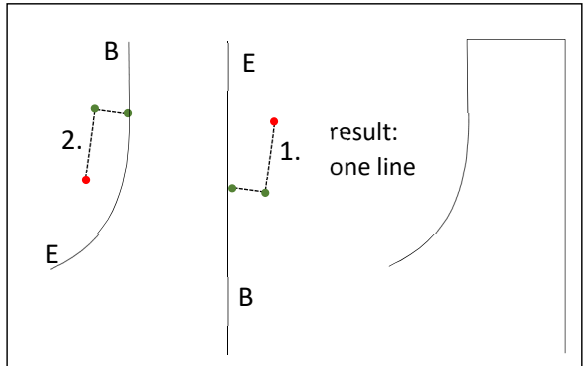


Picture 6-4

**The end of the already linked lines (= basic line) is linked to the beginning of the clicked line. For the determination of direction the right principle applies.**

Picture 6-4 shows the linking of two lines with *single* or *chain*. Beginning and end of the lines are determined by the right principle. For further information read the explanations in sections 5.4.

Picture 6-5 shows linking of two lines which are not touching with a straight line. Here, also, the right principle is to be followed.



Picture 6-5

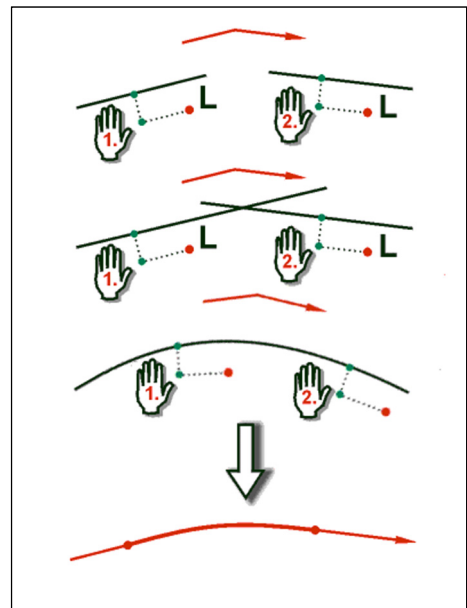
With *reset* the last link step can be undone.

### The interactive link tool *Link 20*

With the interactive link tool two lines can be linked by a curve. The new joining curve begins and ends at the respective click positions. The starting and/or final point of the connecting piece is to be moved interactively along the original line. The shape of the connecting piece can also be designed interactively with the link tool.

#### Schrittfolge

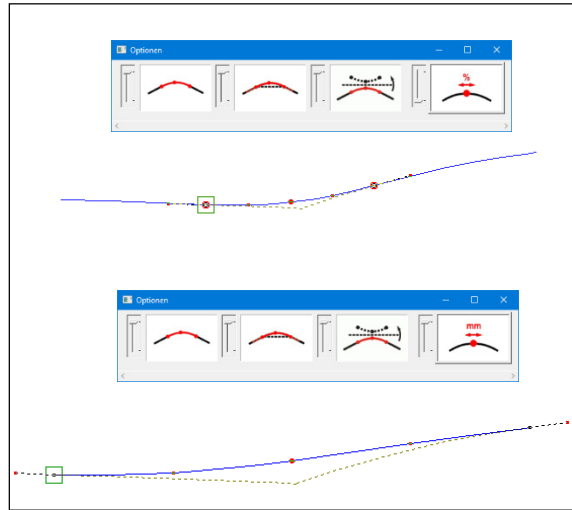
- ⇒ Call *Link 20* tool
- ⇒ Click on the two lines to be linked or click on two positions of a line to be shaped, following the right principle (Picture 6-6)
- ⇒ Possibly, construct the start and end point
- ⇒ Double-click on the new continuous line
- ⇒ Adjust the options
- ⇒ Interactively design the curve.



Picture 6-6

The options define

- whether start/end of the connecting piece is to be moved along the original lines or whether one/both of the original lines are to be replaced completely (Picture 6-7),
- whether the basic direction of the connecting piece at beginning/end is identical to the original lines or free and
- whether the base points can be moved in mm or in %.



Picture 6-7

The shape of the connecting piece and the additional directions at its beginning/end can be interactively adjusted, see explanations in the following section.

### The interactive co-ordinated link tool *Link 30*

With *Link 30* two lines are connected and synchronized twice simultaneously.

***The connecting piece of the first two lines has a higher priority than the second connecting piece. Alterations to the first connecting piece apply to both connections. However, alteration to the second connecting piece apply to the second connection only. Therefore, adjust the first connecting piece first and then adjust the required asymmetry for the second connection.***

### Adjusting an interactive curve using the example of the tool *Link 20*

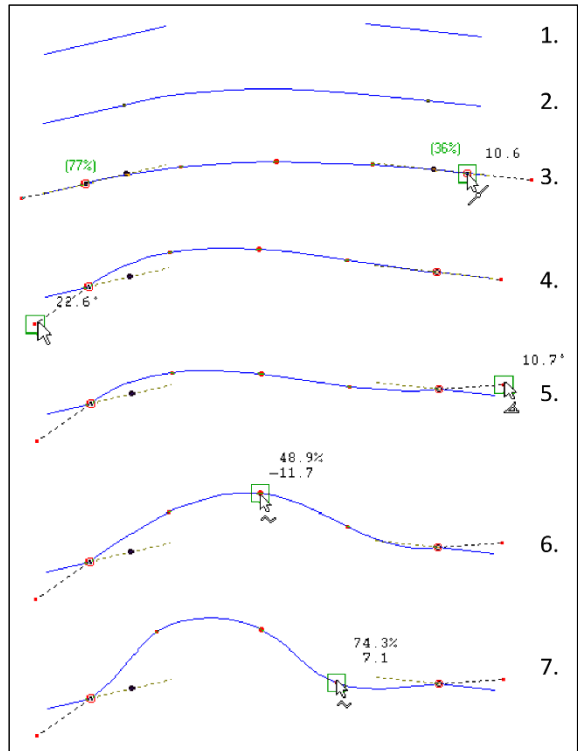
The same principles apply to the adjustment of curves in all interactive constructions. These principles already have been explained in section 2.5.

Applying these principles to the *Link 20* tool results in the following step-by-step guide for adjustment of the connecting piece (Picture 6-8):

1. Initial state: It is possible to link two lines or to design a single line in a particular area.
2. The *Link 20* tool is called. The two small black points indicate beginning and end of the new linking piece. These are exactly the positions, which were clicked.

3. The two base points at beginning and end of the section can be moved along the original line.
4. and 5. The required curve direction is adjusted at both base points.
5. The shape of the curve is roughly adjusted with the shape point 1st priority.
6. The shape of the curve can be finely adjusted with the shape points 2nd priority.

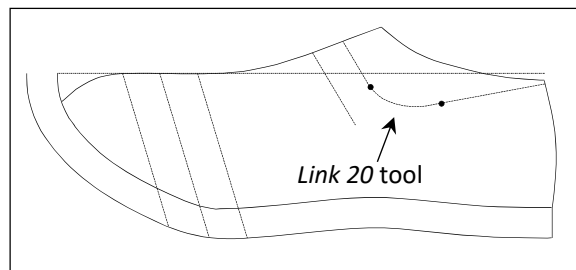
If you want to adjust an interactive curve subsequently, first set the shape points back to the zero position by selecting raster 10 for example and dragging the points to 50%/0. Then, set the raster value back to 0 or 1 and adjust the curve to your requirements. Always start with the objects of the highest priority.



Picture 6-8

### Exercise

Open the style “Exercise Sandal” from section 5.5. Link the upper opening with the *Link 20* tool, see Picture 6-9. Alter the tool in the interactive interface. Save.



Picture 6-9

### 6.3 Raster

#### The *raster* menu

The *raster* menu offers functions for the construction of point sequences. The point sequences are generated along a line.

#### The function *raster 0*

In Grafis each line is a polygon. With *raster 0* the fulcrums of a line are displayed. On a straight line this would be the starting and final point. An example for a curve is shown in Picture 6-10.

Step-by-step guide

- ⇒ Activate *raster 0*
- ⇒ Set *+/-copy*
- ⇒ Click on the line

#### *Convert to line*

The *convert to line* function is the reverse function to the *raster 0* function. Activating *convert to line* and clicking a point sequence creates a line from the point sequence. Note that the *+/-copy* switch applies.

#### *+/-copy, reset*

With the *+/-copy* switch you decide whether or not the original object remains existent. When changing a line into a point sequence with

- +copy* both line and point sequence are existent,
- copy* only the point sequence is existent.

With *reset* the last construction step is undone.



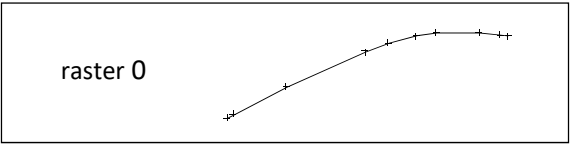
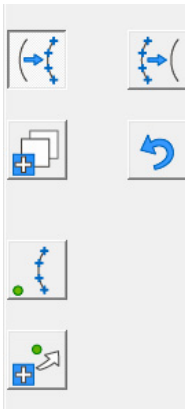
#### Raster menu

*raster 0* ▀ convert to line

*+/-copy* ▀ reset

*Raster 20 tool*

start the tool automatically



Picture 6-10

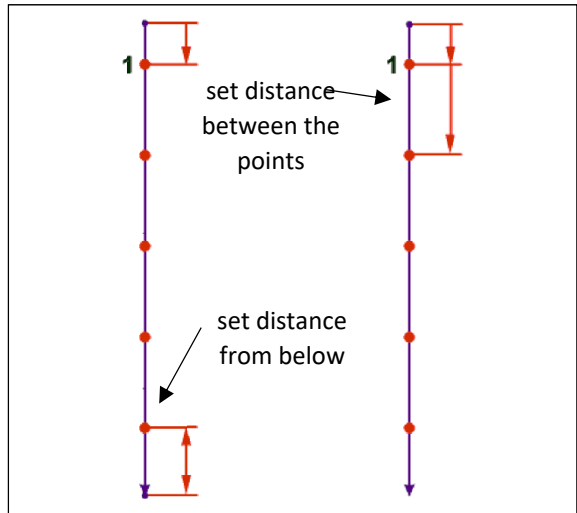


### The interactive *Raster 20* tool

#### Step-by-step guide

- ⇒ Call *Raster 20* tool
- ⇒ Click on a line
- ⇒ construct the start and end point
- ⇒ Double-click on the new point sequence
- ⇒ Adjust the options
- ⇒ Interactively design the point sequence

With the *Raster 20* tool point sequences are constructed, which can be adjusted subsequently regarding position and number of points (Picture 6-11).

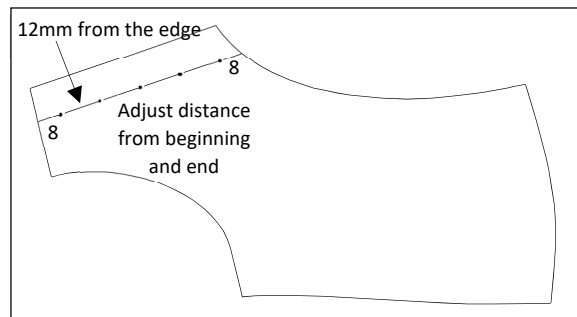


Picture 6-11

The only option of this tool (Picture 6-11) decides whether the point distance is determined by the position of the last point or vice versa.

#### Exercise

Open the 'Basic Style' from section 5.5. Insert the lines of the quarter into the fourth part of the part organisation. Raster the upper edge with the tool *Raster 20*. Adjust the raster interactively according to Picture 6-12.



Picture 6-12

## 6.4 Lengthening and shortening lines

### The *lengthen* menu

The *lengthen* menu contains functions for lengthening and shortening lines at the ends.

These functions are especially significant for the adjustment of line lengths.

Step-by-step guide

- ⇒ Enter the length value for the alteration under *lengthen by* or *lengthen to*
- ⇒ Activate *lengthen by* or *lengthen to*
- ⇒ Click the line to be altered, following the right principle

The line is lengthened straight at its end or shortened along the line, Picture 6-13. The end of the line is determined according to the right principle when clicking.

#### Lengthen to and lengthen by

With ***lengthen to*** a line is lengthened to the pre-set length. The required length is pre-set accurately.

With ***lengthen by*** a line is lengthened (positive value) or shortened (negative value) by a given amount, see Picture 6-13.



#### Lengthen Menu

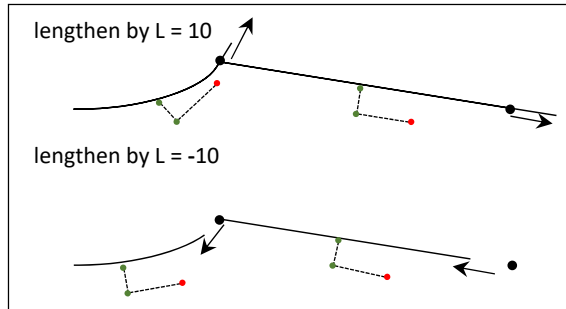
lengthen to...

length

lengthen by...

length

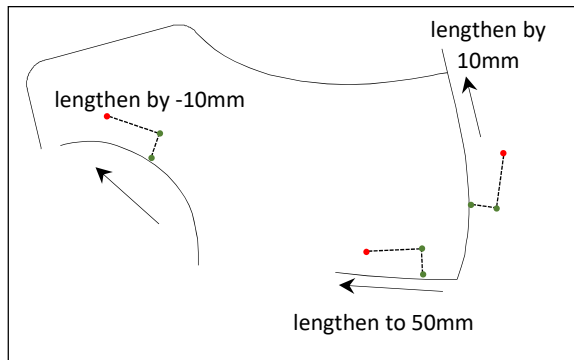
reset



Picture 6-13

**Exercise**

Open the Basic Style and insert the lines of the quarter into the fourth part of the part organisation. Cut the protruding line of the ease with *corners*. Lengthen the heel centre by 10mm and shorten the ease to 50mm. Lengthen or rather shorten the line of the quarter by -10mm, see Picture 6-14.



Picture 6-14



## Chapter 7      Points, lines, curves and direction construction

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### 7.1 Line construction in conjunction with the sub-menu point construction

Grafis works with the construction objects point and line. For the construction of these objects, the sub-menus point and direction construction are of particular significance. The sub-menu point construction is explained in the following using the example of line construction with *line from point to point*.

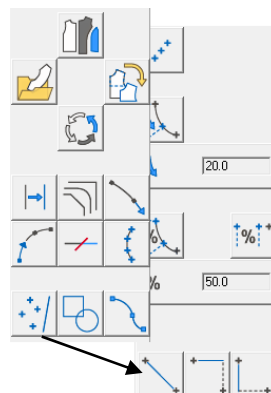
#### Line from point to point

Step-by-step guide

- ⇒ *points and lines*
- ⇒ Activate *line from point to point*
- ⇒ Construct the first point
- ⇒ Construct the second point

This function constructs a line between two points. Having called the function, the sub-menu point construction opens for the construction of starting and final point.

***It is not necessary to attach the line to existing point objects! The position of starting and final point of the line is determined with the point construction sub-menu.***



## Significance of point construction

***Point construction determines the position of the point in the base size and all other sizes.***

Therefore, it is important to reflect for each construction step which option of the point construction is the most appropriate for the specific step. On a line of 100mm length, points constructed at 20% and 20mm are placed at exactly the same position. When the length of the line changes, the two points are positioned at different locations.

### 7.1.1 Point construction with click point, click line, freehand and the free mode

#### Construct line on existing points with click point


Step-by-step guide




⇒ *points and lines* → *line from point to point*

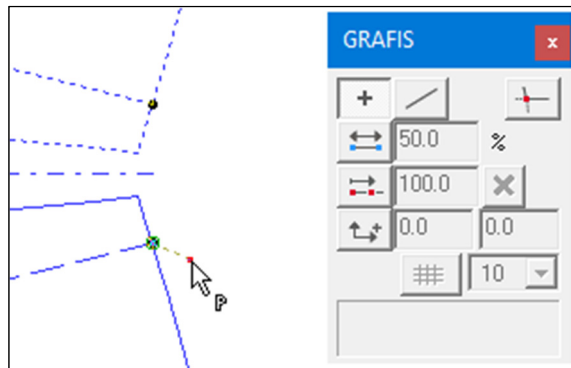
⇒ Activate *click point* 

⇒ Click on the first point

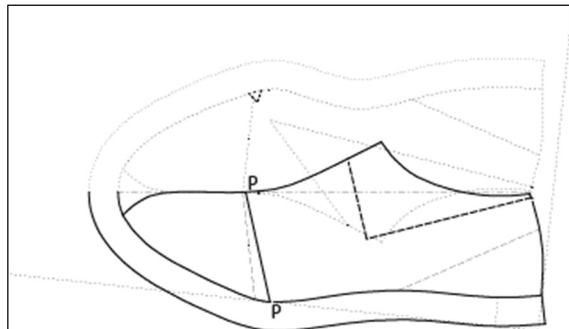
⇒ Click on the second point

During grading, a point set with  is always attached to the clicked point.

Activate *click point*  and move the cursor over the pattern. A fine thread originating from the cursor (thread cursor) and a green circle mark the position for the new starting or final point of the line after . In this case, the thread cursor points at existing points, only, see Picture 7-1. Call *Basic Shoe 10* and construct with  a line from ball point to the insole edge (Picture 7-2).



Picture 7-1




Picture 7-2

### Construct a line on existing lines with *click line*


#### Step-by-step guide

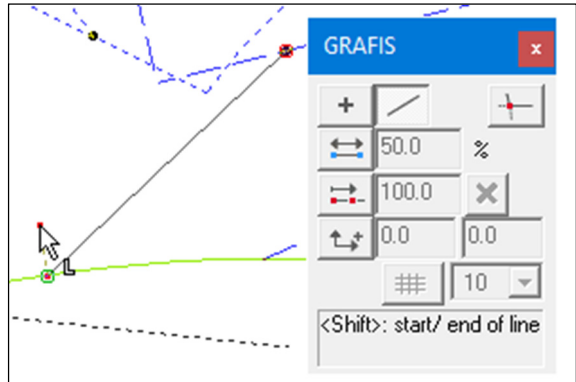
⇒ *points and lines* → *line from point to point*

⇒ Activate *click line* 


⇒ Click on the first point

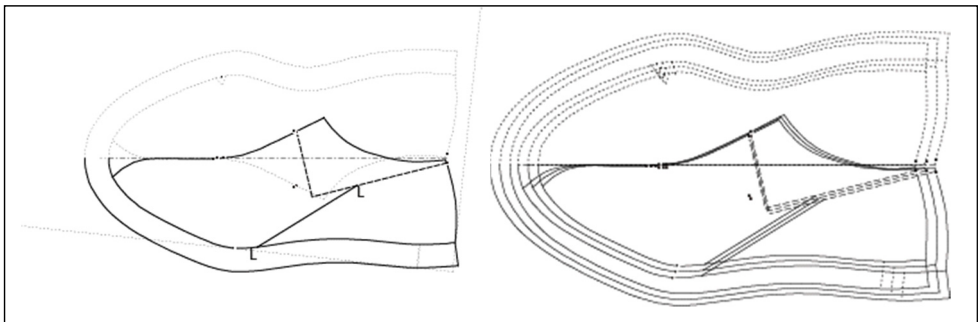
⇒ Click on the second point

With *click line*  a point is constructed on a line, at the position on the line closest to the cursor. During grading, this point is moved relative to the length of the line. With this type of construction, it is important to check the base line: it should not be linked unnecessarily across corners.




Picture 7-3

Activate  and move the cursor over the pattern. The thread cursor will point to the nearest line, respectively. The colour of the line also changes, see Picture 7-3. **Pressing <Shift> selects the starting point or final point of the line.**



Picture 7-4

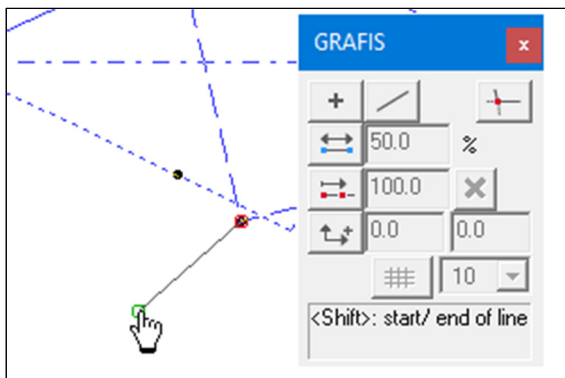
Construct a line from the rim auxiliary line to the insole edge. Set the starting point using  and grade in sizes 37, 39 and 41 (Picture 7-4).

### Construct a line in the *free mode* and with *freehand point*


#### Step-by-step guide

- ⇒ *points and lines* → *line from point to point*
- ⇒ Deactivate an active button if applicable, see Picture 7-5
- ⇒ Click on the first point
- ⇒ Click on the second point

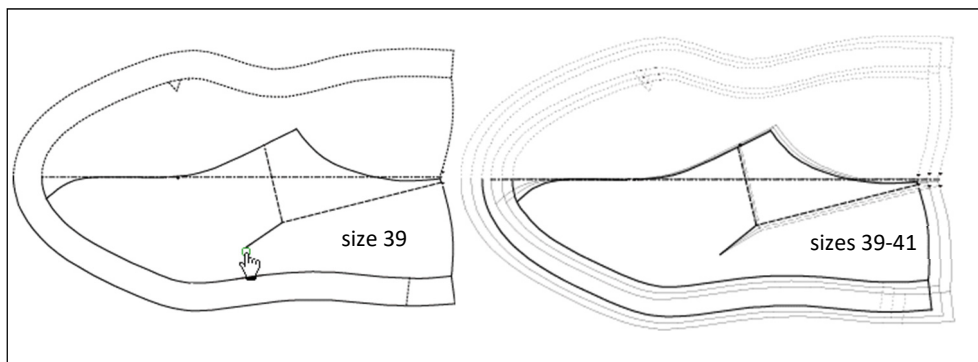
The free mode is active if no button is pressed in the dialogue. In the free mode, the point constructions *click point*, *click line* and *freehand point* are active, simultaneously. The point constructions *click point* and *click line* have already been explained. A *freehand point* can be set as soon as the cursor has



Picture 7-5

taken on the shape .

*Freehand points* are placed in the same position for all sizes. *Freehand points* should be avoided and used under special circumstances, only as they contain no grading information.




Picture 7-6

Set the free mode (see Picture 7-5) and construct a line according to Picture 7-6. The starting point is set in the free mode with <Shift> onto the corner of the rim auxiliary line and the end point is set with *freehand point*. Grade in sizes 39, 40 and 41 (Picture 7-6).



### 7.1.2 Point construction with relative length and partial length

#### Construct a line onto an existing line with *relative length*

The variation **relative length**  generates a point at the relative length of a line. The relative length in % relates to the total length of the line. The right principle must be followed when clicking the line, as the relative length is measured from the beginning of the line.

Step-by-step guide

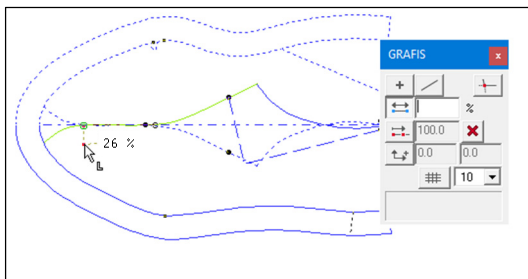
⇒ *points and lines* → *line from point to point*

⇒ Activate *relative length* 

⇒ Click on the first point

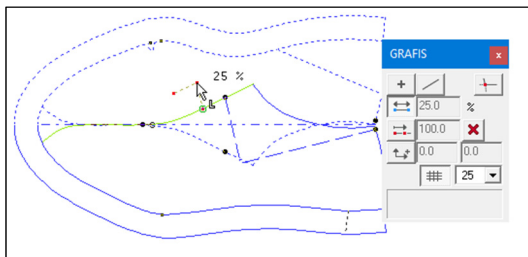
⇒ Click on the second point

Setting a point at a relative position can ensue in three different variations:



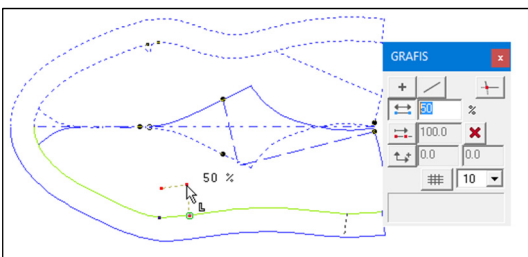
Picture 7-7

Free value, no raster




Picture 7-8

Free value, with raster



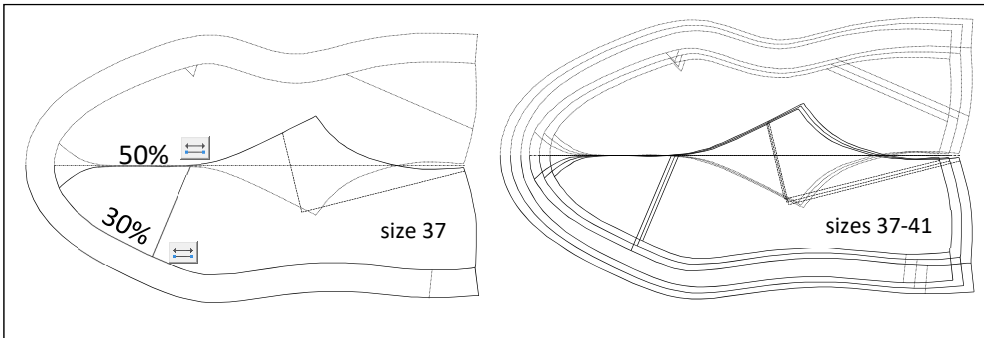
Picture 7-9

Fixed entered value

X and z values can be entered as relative length, see Chapter 12. A fixed entered value can be deleted with .


Construct a panel seam with *line from point to point* (Picture 7-10). The panel seam starts at the front last centre at 50% from the tip and ends at 30% of the insole edge measured from the front. Grade in sizes 37, 39 and 41.

Construct further panel seams using the three variations introduced above.




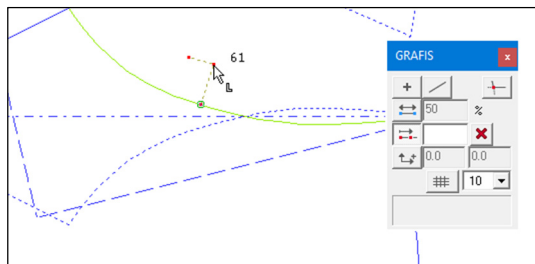
Picture 7-10

### Construct a line onto an existing line with partial length

As opposed to *relative length*, **partial length**  generates a starting/ final point at the partial length of a line. Here also, the right principle must be followed as the partial length is measured from the beginning of the line. The length is displayed at the cursor.

#### Step-by-step guide

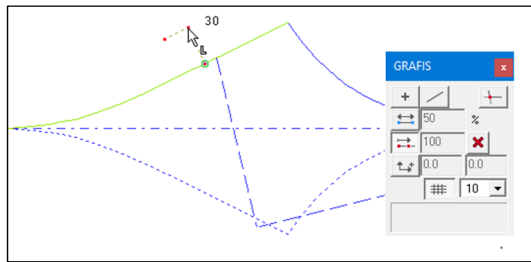
- ⇒ *points and lines* → *line from point to point*
- ⇒ Activate **partial length** 
- ⇒ Click on the first point
- ⇒ Click on the second point



Picture 7-11

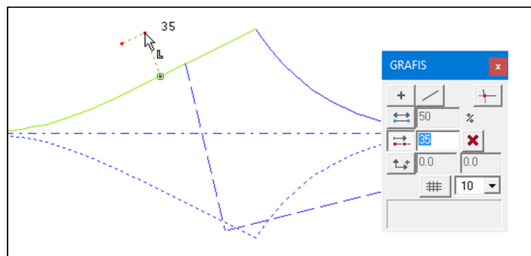
Setting a point at a partial length ensues in three different variations, as with *relative length*:

Free value, no raster




Free value, with raster

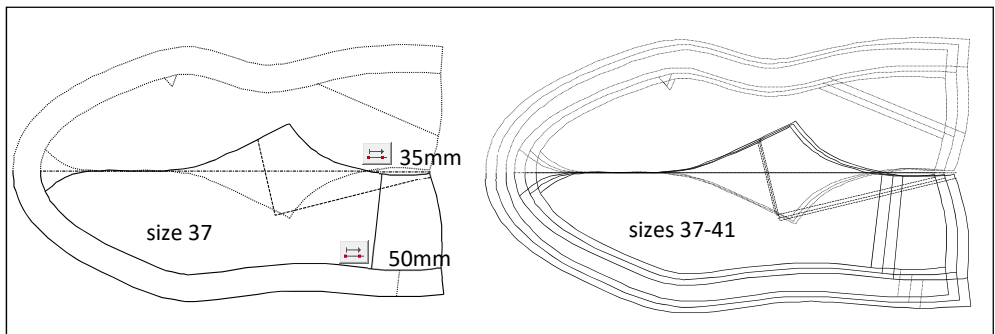
Picture 7-12



Fixed entered value

Picture 7-13

X and z values can be entered as partial length, see Chapter 12. A fixed entered value can be deleted with .



Picture 7-14

Construct a counter with *line from point to point*. The line starts at the upper opening at 35mm measured from the back last centre and ends at the insole edge at 50mm from the back last centre. Grade in sizes 37, 39 and 41 (Picture 7-14).

### 7.1.3 Point construction with intersection

#### Construct a line with the intersection of two lines


Step-by-step guide

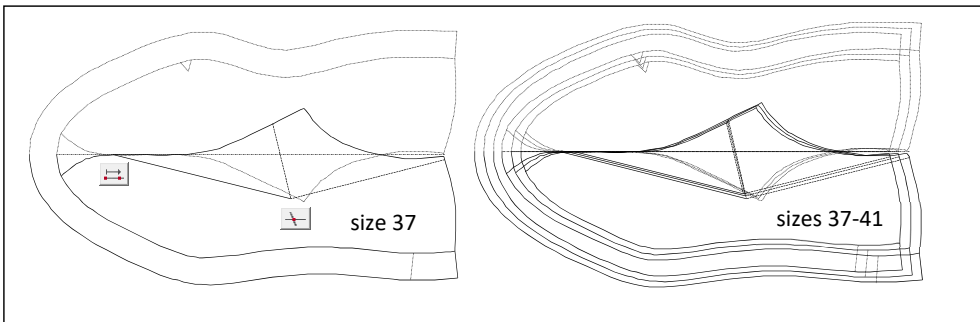
⇒ *points and lines* → *line from point to point*

⇒ Activate *intersection* 

⇒ Construct the first point

⇒ Construct the second point

Using *intersection* generates a starting/final point at the intersection of two lines or curves. The lines and/or curves are to be clicked one after the other. The cursor displays  $X_1$ , when the first line is to be clicked and  $X_2$ , when the second line is to be clicked. The first clicked line is highlighted in colour. During stage  $X_2$  a green circle appears when touching the second line at the point of intersection created after . An intersection is also constructed if both lines intersect only in their extension of 500mm maximum. Ensure that the lines will actually intersect after grading. If the 500mm limit is exceeded, a warning appears.



Picture 7-15

Construct a line with *line from point to point* from intersection instep auxiliary line/ rim auxiliary line to the front last centre. Construct the starting point with *intersection* and the end point with a *partial length* of 30mm from the shoe tip. Grade in sizes 37, 39 and 41 (Picture 7-15). Construct more panel seams with *intersection*.


### 7.1.4 Point construction with xy co-ordinates

#### Construct a line with xy co-ordinates

The position of xy points relates solely to the co-ordinate origin. The points are not linked to any objects of the construction. They remain in the same position during grading. xy points should be used for 'zero run constructions' in conjunction with construction parameters, only (Chapter 12).

Step-by-step guide

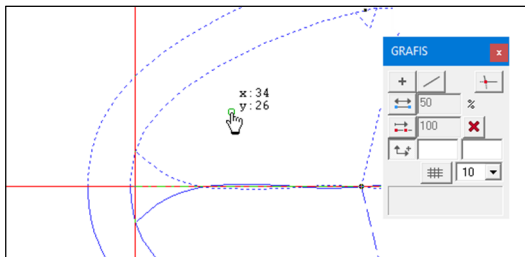
⇒ *points and lines* → line from point to point

⇒ Activate xy point 

⇒ Construct the first point

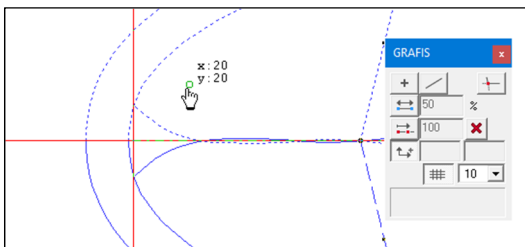
⇒ Construct the second point

Setting a point at absolute co-ordinates can ensue in three different variations as for *relative length* and *partial length*:



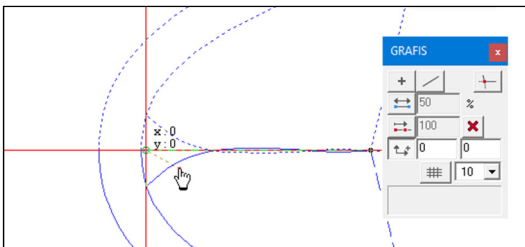
Free value, no raster

Picture 7-16




Free value, with raster

Picture 7-17

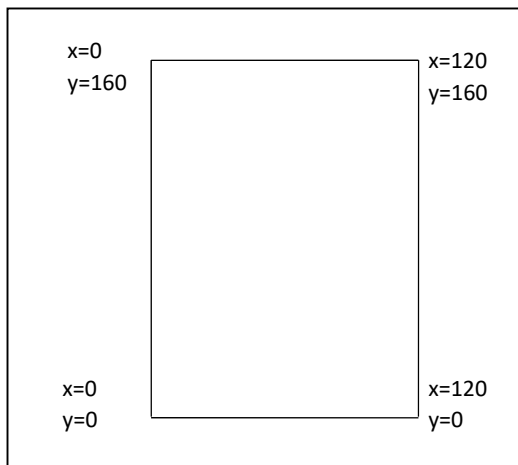


Fixed entered value

Picture 7-18

X and z values can be entered as x and y co-ordinate, see Chapter 12. Entered values can be deleted with .

Construct a rectangle of 120mm width and 160mm height with *line from point to point*. The lower left corner point is to be the co-ordinate origin. Use the raster. Grade in sizes MA39 - MA44 (Picture 7-19). The rectangle will have the same position and same measurements in all sizes. Grading information can be related with the use of construction parameters, see Chapter 12.



Picture 7-19

## 7.2 Point constructions

### The *points and lines* menu

The *points and lines* menu can be called from the basic menu, directly. The *points and lines* menu contains four options for the construction of a single new point. Indirectly, new points can also be created from existing points via move, turn or mirror transformations, see section 10.2.

#### Points and lines menu (extract)

single point

point at a distance to a base point  
on a line

distance value

point between two points on a line

▪ point between two points

relative value

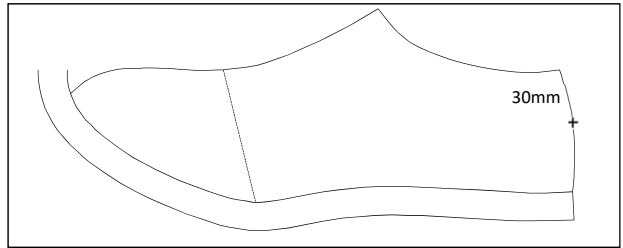


### 7.2.1 Single point

Step-by-step guide

- ⇒ *points and lines*
- ⇒ *single point*
- ⇒ Construction of the point with the *point construction* sub-menu

Call *Last 10* and *Basic shoe 10* and construct a point onto the heel line with a partial length of 30mm from the top edge of the last, see Picture 7-20.



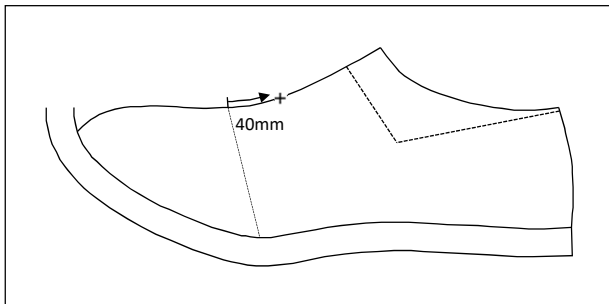
Picture 7-20

### 7.2.2 Point at a distance to a base point on a line

Step-by-step guide

- ⇒ *points and lines*
- ⇒ Enter the *distance value*
- ⇒ Activate the function *Point at a distance to a base point on a line*
- ⇒ Construct the base point with the *point construction* sub-menu

This function constructs a new point on an existing line with a fixed distance to an existing point. The entered distance is measured along the line and considered also during grading. The right principle must be followed when clicking the line.



Picture 7-21

In Picture 7-21 in the basic block *Basic shoe 10*, a new point has been constructed as a marker using at a partial distance of 40mm from the intersection ball line/ last centre line.

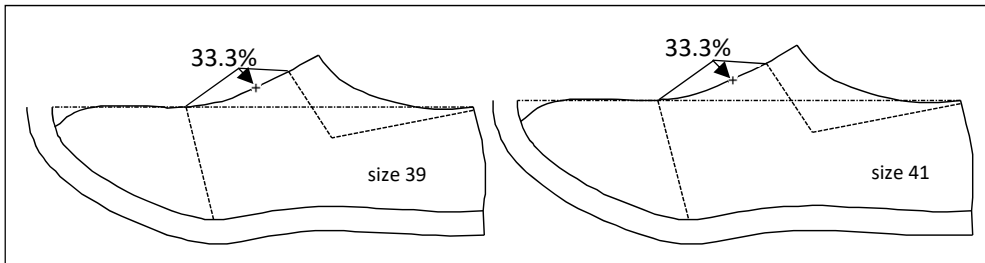
Activate *single point* in the *points and lines* menu and construct the base point with *intersection* at ball line/ last centre line. For the second point first enter the distance value 40. Clicking on *Point at a distance to a base point on a line* opens the point construction sub-menu for selection of the base point. Use the free mode or *click point*. Then, the base line is to be clicked, following the right principle. The right principle defines the direction in which the distance is to be measured.

### 7.2.3 Point between two points on a line

#### Step-by-step guide

- ⇒ *points and lines*
- ⇒ Enter the *relative value*
- ⇒ Activate the function *point between two points on a line*
- ⇒ Construct the first base point
- ⇒ Construct the second base point
- ⇒ Click the base line

The new point is constructed on the base line at a relative position between two base points. The distance between the base points is measured along the line.



Picture 7-22

Construct a point with point between two points on a line on the intersection of upper opening auxiliary line/ front last centre and the ball line with a relative value of (Picture 7-22).

### 7.2.4 Point between two points

#### Step-by-step guide

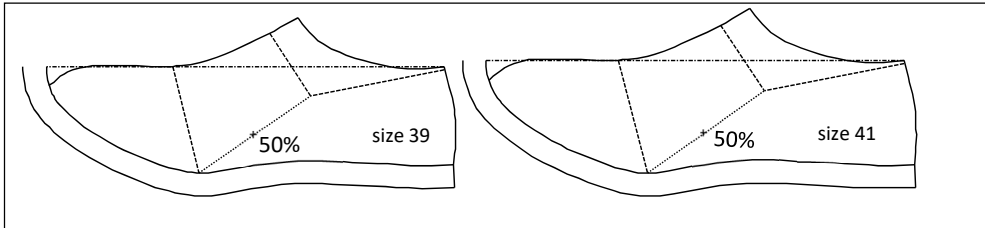
- ⇒ *points and lines*
- ⇒ Enter the *relative value*
- ⇒ Activate the function *point between two points*
- ⇒ Construct the first base point
- ⇒ Construct the second base point

The new point is constructed at a relative position between two base points. No base line is required. The position is determined relative to the first base point.





Construct a point on the Basic Shoe with *point between two points* between the end of the ball line and the intersection of the upper opening auxiliary lines with a relative value of 50% (Picture 7-23).



Picture 7-23

## 7.3 Line constructions

### The points and lines menu

The different construction principles for the creation of line objects with the functions of the *points and lines* menu form the subject of this section. A further line construction in conjunction with direction construction is the subject of the following section.

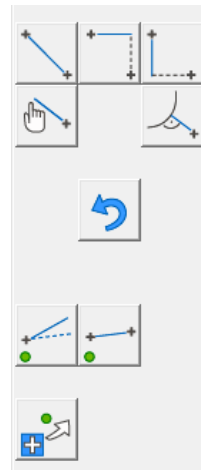
### Points and lines menu (extract)

line from point to point ▪  
horizontal line ▪ vertical line  
freehand line from point ▪  
perpendicular onto a line

reset

Line 10 tool ▪ Line 20 tool

start the tool automatically



### 7.3.1 Line from point to point

This principle has already been used to explain the sub-menu point construction in section 7.1.

Step-by-step guide

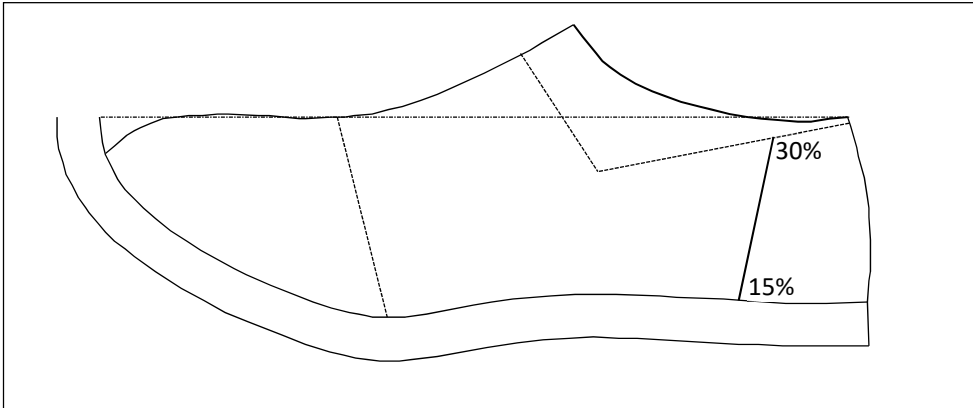
- ⇒ *Punkte und Linien*
- ⇒ Activate *line from point to point*
- ⇒ Construct first point
- ⇒ Construct second point

With *line from point to point* a line is constructed between two points. After having called this line construction the sub-menu point construction is opened for construction of the starting and final point of the line.



### 7.3.2 Linie 20 tool

The *Line 20* tool also constructs a line from point to point. However, as opposed to the function *line from point to point* this line can subsequently be moved interactively and if required it can even be released from its base line.



Picture 7-24

Construct a heel cap in *Basic Shoe 10*. Use the tool *Line 20*. Construct a line starting at the heel centre on the upper opening auxiliary line with a relative length of 30% ending at the insole edge with a relative length of 15% (Picture 7-24). Grade. The heel cap constructed in this fashion is graded proportionally.

Reset *Line 20* in the record and construct a new heel cap. This time, start at a partial length of 30mm on the upper opening auxiliary line and end at 50mm on the insole edge. Grade. The heel cap constructed in this way remains constant throughout all sizes.

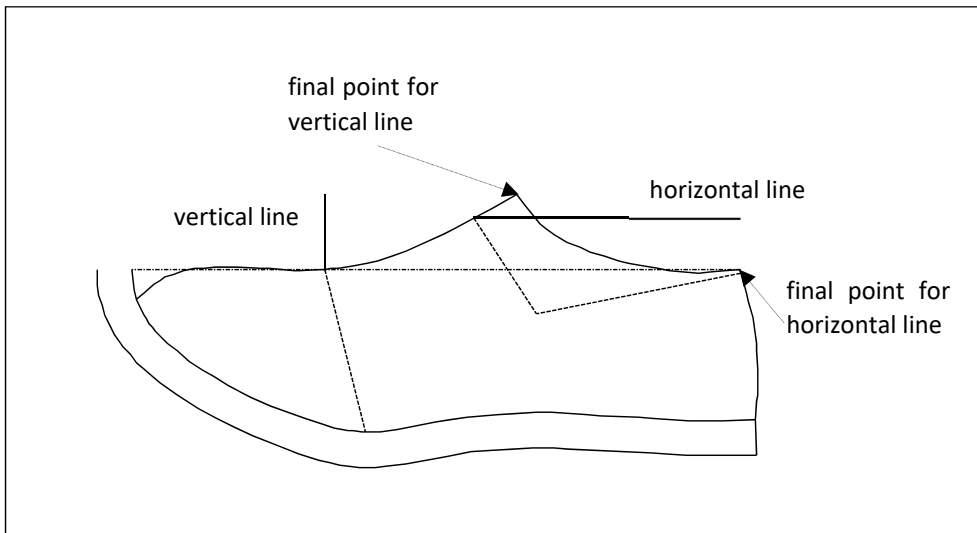
### 7.3.3 Horizontal and vertical lines

Step-by-step guide

- ⇒ Activate the function *horizontal line* or *vertical line*
- ⇒ Construct the starting point of the line
- ⇒ Determine auxiliary point for calculation of the final point



The functions *horizontal line* and *vertical line* construct horizontal or vertical auxiliary lines. After having activated the respective function the starting point of the line is to be defined and then a second point is to be determined for calculation of the final point. For calculation of the final point with *horizontal line* the x co-ordinate of the second point is applied, with *vertical line* the y co-ordinate is used.



Picture 7-25

Construct a horizontal auxiliary line in *Basic Shoe 10* from the upper opening auxiliary line/ front last centre to the upper opening auxiliary line/back heel centre and a vertical auxiliary line from the ball point to the last top edge (Picture 7-25).

### 7.3.4 Freehand line from point



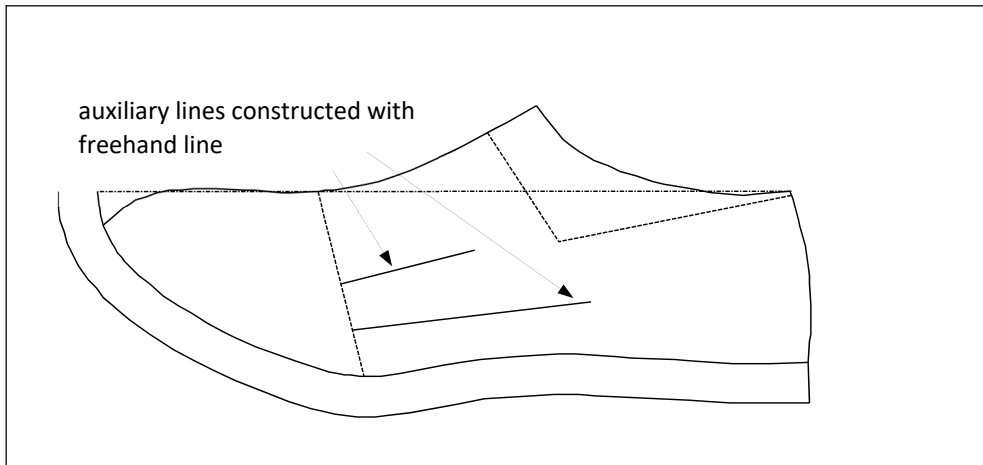
#### Step-by-step guide

- ⇒ Activate the function *freehand line from point*
- ⇒ Construct the starting point
- ⇒ Determine the final point freehand

This function creates a line with a fixed length in any direction. Length and direction are constant throughout all sizes. *Freehand line* is particularly suitable for horizontal, vertical or oblique auxiliary lines.

In Picture 7-26 two lines were constructed with *freehand line*. After having activated *freehand line* the starting point of the line is to be defined with the point construction sub-menu. Length and direction of the line can then be determined by moving the cursor freehand. The preferred directions horizontal and vertical act like a magnet, the line 'jumps' to these directions.

Construct the lines depicted in basic block *Basic shoe 10*, see Picture 7-26. The lines can be extended to the external line or respectively cut off with *separate*. Grade sizes 39 and 44.



Picture 7-26

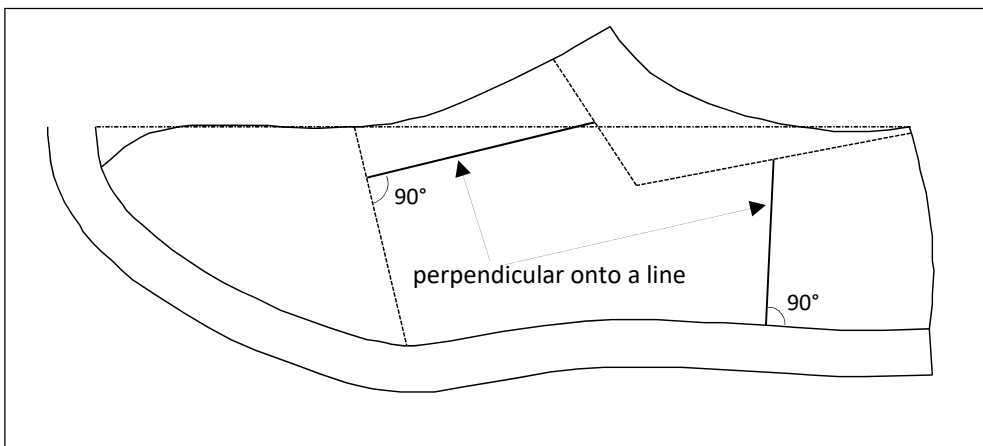
### 7.3.5 Perpendicular onto a line

Step-by-step guide

- ⇒ Activate the function *perpendicular onto a line*
- ⇒ Construct the starting point
- ⇒ Click the line onto which the perpendicular is to be dropped



With *perpendicular onto a line* a perpendicular is dropped from a point onto a line. After having activated the function *perpendicular onto a line* the starting point is to be determined, first. Then the line onto which the perpendicular is to be dropped must be clicked. The perpendicular takes on a right angle to the clicked line.



Picture 7-27

Construct the perpendiculars in basic block *Basic shoe 10* shown in Picture 7-27.

## 7.4 Lines with direction construction



### The interactive tool *Line 10* and the sub-menu direction construction

With the interactive tool *Line 10*, the user can create a line object with specific direction. The direction construction ensues via its own sub-menu, which automatically appears for other construction purposes, also, similar to the point construction sub-menu. The direction construction sub-menu is required for the following operations for example:

- construction of a line, to be adjusted parallel to another line,
- construction of curves and
- adjustment of symbols.

Step-by-step guide for *Line 10* tool

⇒ Call *Line 10* from the *points and lines* menu

⇒ Construct the base point

⇒ Adjust the line with the direction construction sub-menu (set base direction, adjust difference direction)

⇒ End the direction

construction with the right mouse button

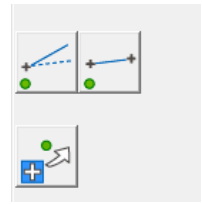
⇒ Interactively adjust the line (line length, possibly moving of base point, possibly altering the line direction)

⇒ End the interactive adjustment with *End* in the right menu

#### Points and lines menu (extract)

*Line 10* tool ▪ *Line 20* tool

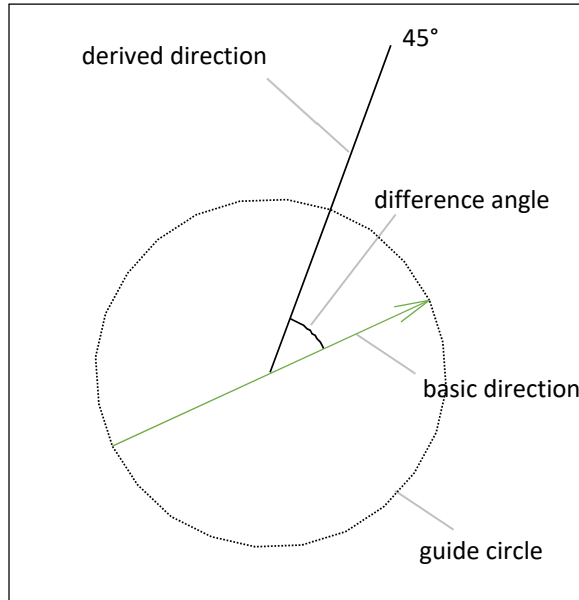
start the tool automatically



#### Explanantion of the direction construction sub-menu

In Grafis, the direction construction is called automatically if required by the operation. The guide circle is an important element of the direction construction. It works like a protractor.

The arrow inside the guide circle indicates the basic direction and corresponds with the base line of the protractor. The elements of the guide circle are shown in Picture 7-28.



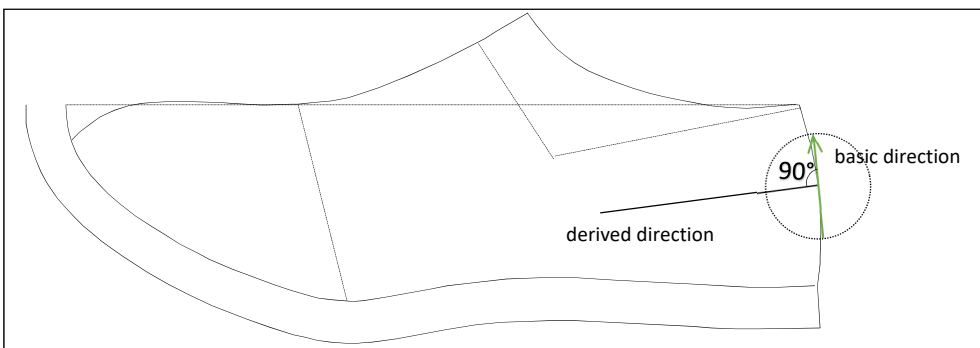
Picture 7-28

The direction construction ensues in two steps:

1. Set the basic direction
2. Set the difference angle

Exactly these steps are repeated during automatic grading. As a result the derived direction is constructed:





$$\text{derived direction} = \text{basic direction} + \text{difference angle}$$

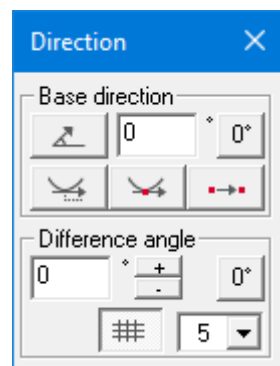


Picture 7-29

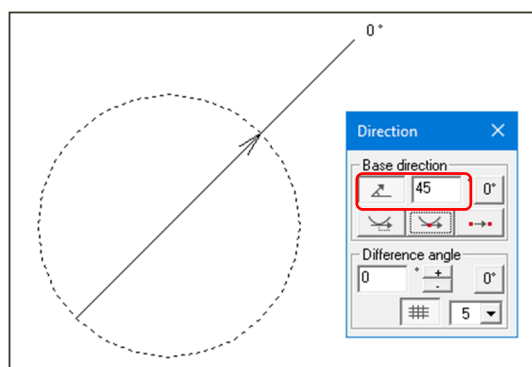
## Setting the basic direction

### Step-by-step guide

- Set a fixed direction in the entry field next to **fixed base direction**  or
- activate **base direction with click line**  and click on a line or
- activate **base direction with direction in base point**  and possibly selection of a base line or
- activate **base direction point to point**  and construct two points.



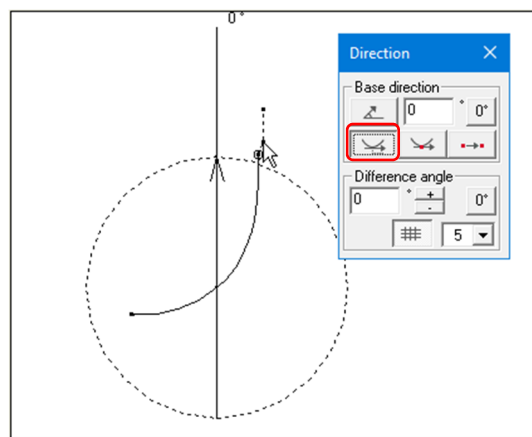
The basic direction is set with the upper group of functions in the direction dialogue. There are four construction principles available:



Picture 7-30

#### **Fixed base direction**

A fixed direction value in degrees can be entered into the field to the right of the button Fixed direction. Entry of x and z values is not permitted for the basic direction. Clicking on the button '0°' resets the basic direction to 0°.



Picture 7-31

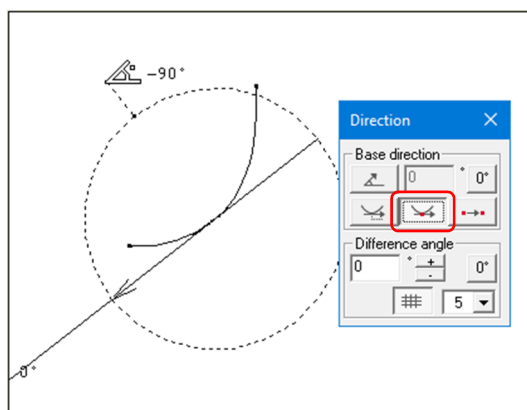
#### **Base direction with click line**

The basic direction is set parallel to a line/ curve to be clicked. The direction of the line/ curve at its click position according to the right principle applies. Use the <Shift> key if the starting/ final direction of the line is required. This function is active when opening the direction construction.



### **Base direction with direction in base point**

The basic direction is taken exactly at the base point of the guide circle from the nearest line. If more than one line are positioned in the vicinity, a prompt appears. In this case, the cursor is displayed as a question mark and the base line is to be clicked:



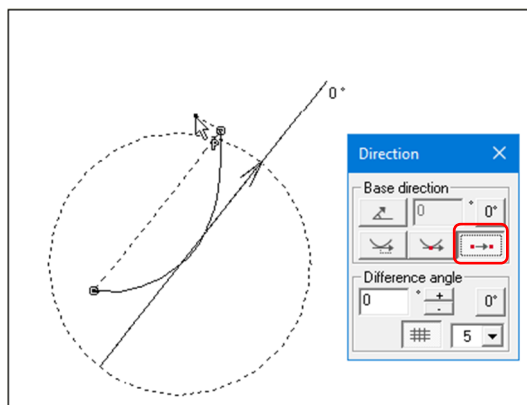
Picture 7-32

This function should be used for setting symbols and construction of curves to ensure that the basic direction is taken exactly where the curve or the symbol is attached.



### **Base direction point to point**

The basic direction is determined by the construction of two points. It is set parallel to the direction from the first point to the second point.



Picture 7-33

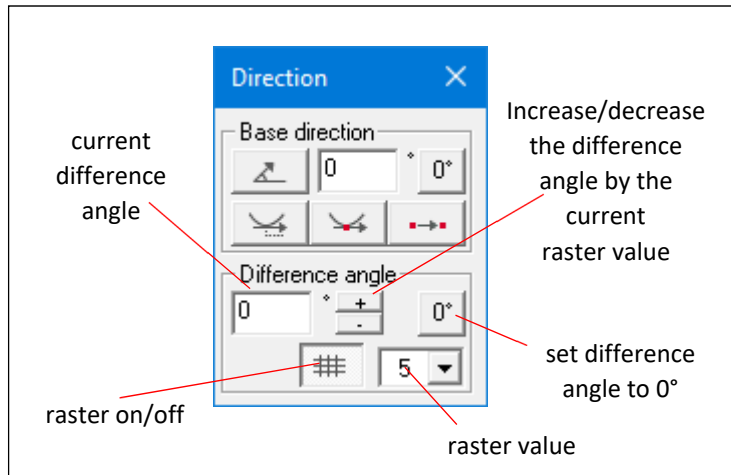
## **Setting the difference angle**

After having set the basic direction, the derived direction is to be set. The derived direction, in the shape of a long line, first points in the direction of the basic direction (see Picture 7-28). It is changed by altering the difference angle to the basic direction. This process corresponds with measuring an angle on an adjusted protractor.





The difference angle is set with the functions in the lower section of the direction dialogue with the following options, see Picture 7-34:

- Entry of difference angle or
- click on + and – next to the entry field or
- click on the guide circle with or without the use of raster.



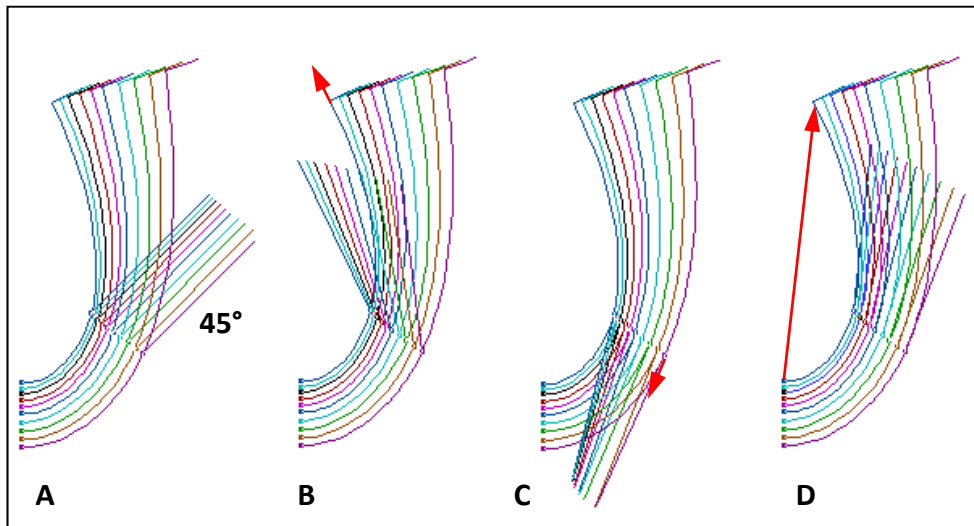
Picture 7-34

The difference angle is adjusted interactively by dragging the derived direction or by clicking the guide circle. If *raster* is active, the difference angle changes according to the set raster value. Entry of x and z values for the difference angle is permitted, see Chapter 12. Clicking on  sets the derived direction back along the basic direction. To quit the direction construction menu press .

### Demonstration of the basic direction

Call the basic block *Basic shoe 10* and construct lines one after the other with the tool *Line 10*. Use a different construction principle for the basic direction for each line. Grade in sizes M39 to M44 respectively.

- Using the interactive tool *Line 10*, construct a line with fixed basic direction  $45^\circ$  and difference angle  $0^\circ$  (Picture 7-35 A). Grade.
- Using the interactive tool *Line 10*, construct a line. Determine the basic direction with *Base direction with click line* onto the upper end of the front last centre using the <Shift> key. The difference angle remains  $0^\circ$ . Grade (Picture 7-35 B).



Picture 7-35

- C) Using the interactive tool *Line 10*, construct a line. Activate the *Base direction with direction in base point* button. The difference angle remains  $0^\circ$ . Drag the base point interactively along the the upper last centre. Grade (Picture 7-35 C). **Use 'line direction at base point' for setting notches with a difference angle of  $90^\circ$ . The notch always points at a right angle to the line independent of its position.**
- D) Using the interactive tool *Line 10* construct a line. The basic direction should correspond to the direction from start to end of the front last centre to the ball point in all sizes (Picture 7-35 D). Activate *Base direction point to point*. The first point is the point at the top last edge. It can be clicked in the free mode. The second point is the ball point, selected using the free mode with *click point*. The difference angle remains  $0^\circ$ . Drag the base point along the last centre interactively. Grade.

## 7.5 Curve construction and manipulation

### 7.5.1 Construction of curves

#### The curves menu

A new curve is created with the record function *curves* from the basic menu. In the *curves* menu, three functions are available:

- **new curve**  
... is the new curve function from version 10.
- **replace curve**  
... as new curve, but an existing line/ curve to be selected is replaced by a new curve. The curve to be replaced must be clicked in the direction of the green arrow!
- **manipulate curve**  
... opens a menu with functions for relocating starting and final point of curves and for refining curve runs.

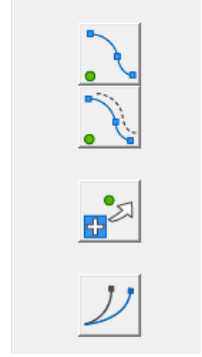
#### Curves menu

create new curve

replace curve

start the tool automatically

manipulate curve



#### Base points and auxiliary points

A curve is shaped with so-called base points and auxiliary points.

**Base points** are points, which are bound to objects (points or lines) of the construction. Each curve has a minimum of two base points: starting point and final point. Base points constructed with *click line*, *click partial length* or *click relative length* can be moved along their base lines. For all other variations, an additional **displacement line** can be determined by clicking. The following applies to base points:

- Base points are constructed, i.e. bound onto the construction.
- Base points can be moved along an existing displacement line.
- In a base point, a direction can be assigned to the curve.
- Base points are indicated by small crosses.

**Auxiliary points** are points, which are not bound to the construction. The position of auxiliary points is calculated relative to the zero curve. The zero curve is displayed as a dashed line and generated exclusively on the basis of the assignments of the base points. Auxiliary points are determined by their relative position to the zero curve between two adjacent base points.

The following applies to auxiliary points:

- They serve to fine-tune the shape of the curve between base points.
- Auxiliary points can be dragged freely.
- Auxiliary points are displayed as small round points.

***The fewer the auxiliary points, the smoother the curve. After construction of base points and assignment of directions, usually no or few auxiliary points are necessary.***

Step-by-step guide

⇒ *basic menu* → *curves* → *new curve*

⇒ Construction of starting and final point of the new curve

⇒ Set the base points along the curve. This way, the curve is moved with the base points during grading:

- *Insert points*
- *Bind points*: The point becomes a base point.

⇒ The basic points are given by default with the *Direction start/final*. If necessary, this can be changed with the *Set direction* or *Direction start/final*. The direction can be fine-tuned subsequently at any stage.

⇒ Insert further auxiliary points for fine-tuning of the curve with *Insert points*.

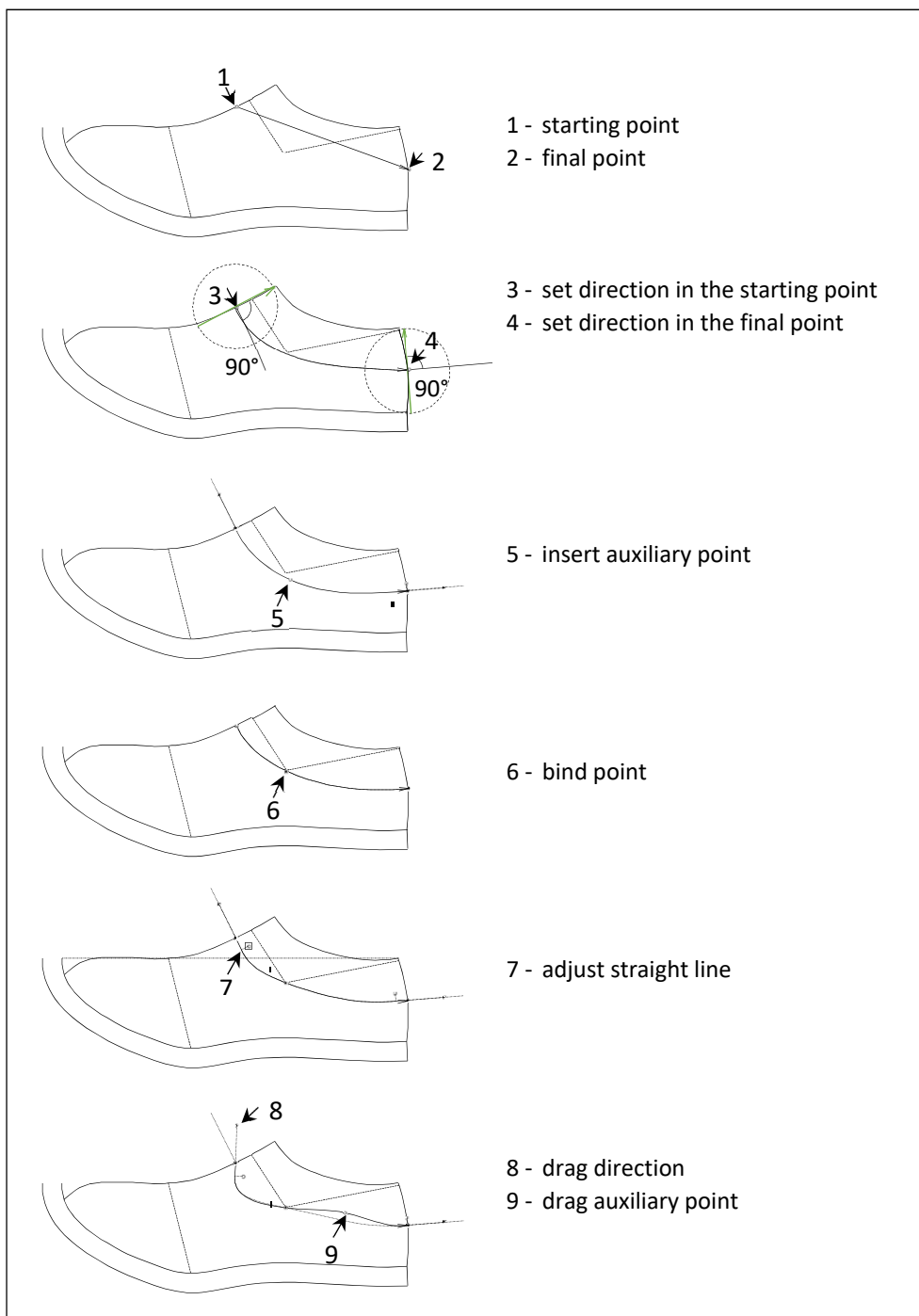
⇒ If necessary, base points, auxiliary points and directions can be deleted.

⇒ Support during curve construction via the functions of the right menu strip:

- raster,
- various display options and
- redo and undo the steps within the curve construction.

⇒ *End* or *Abort* to quit the curve construction

***Important: Points must have a minimum distance of 5mm between each other!***



Picture 7-36

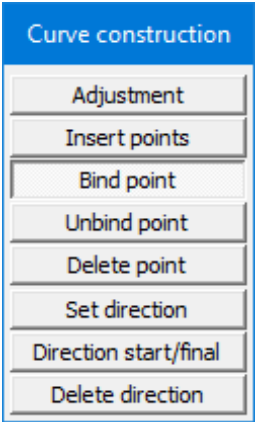
Construct new curve

Construction of a curve starts with *basic menu* → *curves* → *new curve* and determination of starting point and final point of the curve. As the same construction step must be repeated in other sizes, the starting and final point of the curve must be bound to the construction.

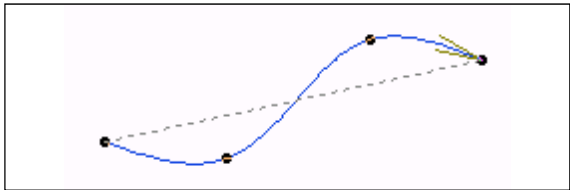
In the case of *replace curve*, in addition to determining the starting point and final point, the curve to be replaced must be clicked.

The individual steps are explained using the example of a panel seam in a shoe construction (Picture 7-36). Call *Basic shoe 10*. Determine the starting point and final point of the new panel seam with *click line* respectively see Picture 7-36 No.1 and 2.

Having constructed starting point and final point of the curve, the interactive interface with the *Curve construction* menu (Picture 7-37) opens and the curve can be shaped. The Curve construction menu can be positioned anywhere on the screen.



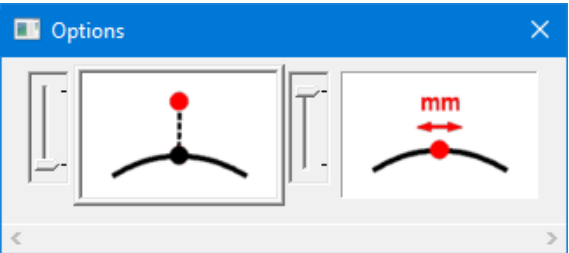
Picture 7-37



Picture 7-38

During direction construction, the direction of the curve itself must be considered. It is indicated by an arrow at the end of the curve (Picture 7-38).

You can use the options to unbind the starting and final point from the line and to specify the shift variant mm or % (Picture 7-39).



Picture 7-39

### **Construct a direction in the base point**

In a base point, the curve can be assigned a direction with *Set direction* or *Direction start/final*.

The panel seam is to start horizontally and end at a right angle with the back last centre in all sizes, according to Picture 7-36. These pre-requisites are respected if you activate *Set direction* and then, click the base point. Start with the starting point of the curve on the front last center set a fixed direction of 90° to the base line, see Picture 7-36 No.3. Then, construct the direction in the final point at the the back last center and set the direction at a right angle to the base line, see Picture 7-36 No.4.

The direction must be determined along the direction of the curve, i.e. from the starting point to the final point. Direction assignments should be relative to lines of the construction, such as the front last centre and the back last centre in Picture 7-36.

The assigned direction is reset with *Delete direction*.

### **Insert and drag auxiliary points**

If the curve is to be bound onto the construction along its length, further base points are required. Base points are generated by inserting an auxiliary point and then, turning it into a base point.

Insert an auxiliary point by activating *Insert points* and click on the curve, see Picture 7-36 No.5. The point is set. Now, activate *Adjustment* and drag the point with pressed down left mouse button.

### **Construct base point**

An auxiliary point becomes a base point by binding it onto the construction with *Bind point*.

The panel seam according to Picture 7-36 Picture 7 36 is to run through the corner point of the upper opening lines in all sizes. Therefore, bind the auxiliary point to the corner point, see Picture 7-36 No.6. It becomes a base point. Activate *Bind point*, click on the auxiliary point and construct its new position with the point construction sub-menu, here with <Shift> in the free mode. Now, the curve runs through this point in all sizes.

The position of a base point can be re-assigned by repeating the *Bind point* operation. This also applies to the starting point and final point of the curve. With *Unbind point* the binding of an auxiliary point onto the construction is reset. The base point reverts to an auxiliary point.

### Delete points

With the exception of starting point and final point, all base and auxiliary points of a curve can be deleted with *Delete point*. To delete a point, activate *Delete point* and click on the point to be deleted.

### Fine-tuning in the drag area Adjustment

In the curve construction menu, which can be positioned anywhere on the screen, dragging of handles is only possible with *Adjustment*. In all other menu functions, targeted action is expected. Under *Adjustment* the following handles are available:

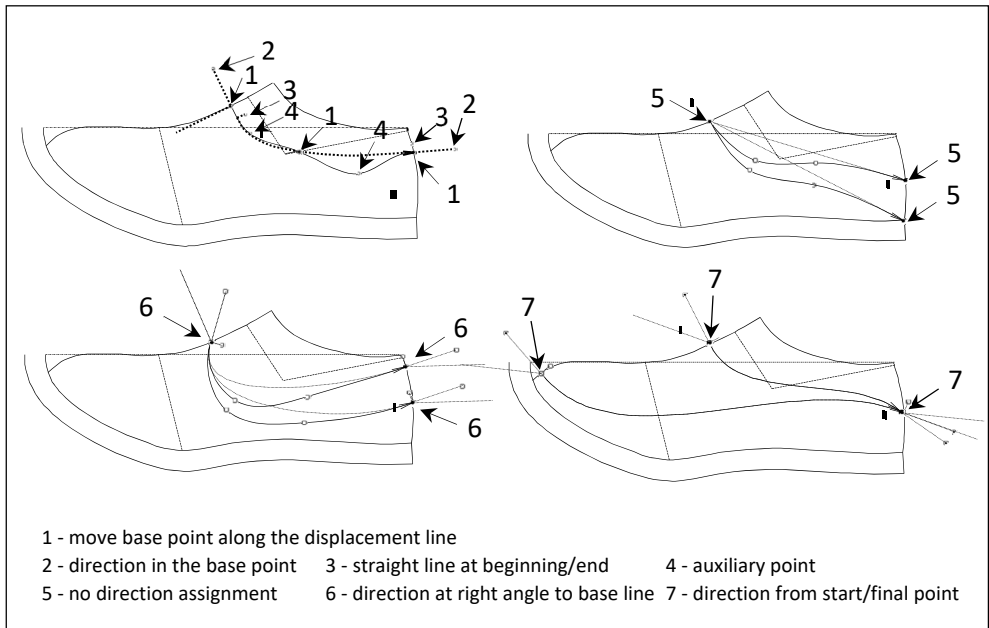
- Move base points along a base line or a displacement line, see Picture 7-40 No.1,
- Drag auxiliary points, see Picture 7-40 No.4,
- Adjust the straight line at the beginning and/or end of the curve, see Picture 7-40 No.3,
- Fine-tuning of directions in base points, see Picture 7-40 No.2, as long as a direction has been assigned to the base point

### Difference between Set direction and Direction start/ final

In a base point

- the direction can be free, i.e. no direction assignment, see Picture 7-40 No.5, or
- a constructed direction can be assigned, see Picture 7-40 No.6, or
- the direction of starting point to final point can be assigned, see Picture 7-40 No.7.
- These three variations are displayed for a curve with two auxiliary points in Picture 7-40. The differences become obvious when the final point of the curve is moved significantly as in this example. Note particularly the directions of the curves in the starting point and final point.





Picture 7-40

### End curve construction

With *end* in the menu on the right, the curve is deposited in your construction. *Abort* in the menu on the right rejects the current changes to the curve. The curve becomes a straight line from starting point to final point.

### Subsequent curve correction

The curve can be re-opened for processing via double-click or the <F12> key at any point in the part in which the curve had been created originally. The construction record runs through to the respective record step and opens the curve for processing. All functions for shaping the curve previously described are available. However, the curve may only be altered in so far as the logic of the following construction steps in the active part and in the daughter parts remains untouched. These limits are at the discretion of the user.

## 7.5.2 Manipulate curve

### The manipulate curve menu



#### Manipulate curve menu

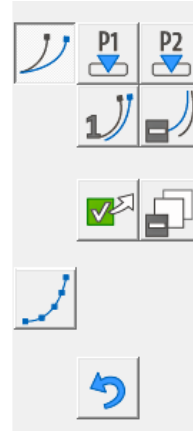
manipulate curve ▀ re-set P1 ▀ re-set P2

transition types ▀ +/-formed

deposit curve ▀ +/-copy

refine curve

reset



The *manipulate curve* menu is opened from the *curve* menu. It offers two different functions:

- the manipulate curve function to relocate starting and final point of curves and
- the refine curve function for a more refined curve run.

***With both functions the character of the curve remains unchanged.***

#### Step-by-step guide

- ⇒ *basic menu* → *curves* → *manipulate curve*
- ⇒ Activate *manipulate curve*
- ⇒ If required relocate the starting point of the curve with *re-set P1*
- ⇒ If required relocate the final point of the curve with *re-set P2*
- ⇒ Switch between the different transition types
- ⇒ Adjust *+/-formed*
- ⇒ Adjust *+/-copy*
- ⇒ End with clicking on *deposit curve*

After activating the *manipulate curve* menu, a curve has to be clicked. This curve will then display the designation P1 for the starting point and P2 for the final point of the curve. With *re-set P1* or *re-set P2* these points can now be relocated.

The manipulated curve appears in black. It can still be adjusted. Clicking on transition types alternates between six different *transition types*. The switch *formed* effects a change in the curve run for very specific curve shapes only.

The switch *+/-copy* decides whether or not the original curve remains existent. *Deposit curves* stores the manipulated curve.

Clicking on *reset* aborts the current curve manipulation or resets the last construction step.

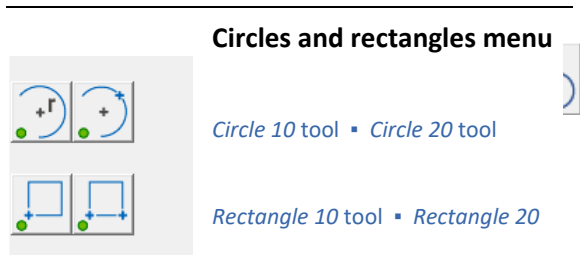
### Refine curve

Having activated *refine curve*, the start and end of a curve section must be defined by clicking. This section is then refined through reducing the number of curve points and subsequent interpolation. The shape of the curve remains unchanged.

## 7.6 Circle arcs

### The Circles and rectangles menu

The circles and rectangles menu is called from the basic menu. It allows for construction of circles and rectangles.



Both options for the construction of circle arcs generate half circles only. If a complete circle is required a second circle arc is to be constructed or the circle arc is to be mirrored with the functions in the *transform* menu.

### Circle 10 tool



When calling *Circle 10*, the centre point and a basic direction for the circle are to be constructed. Radius and size of the circle segment can be adjusted interactively.

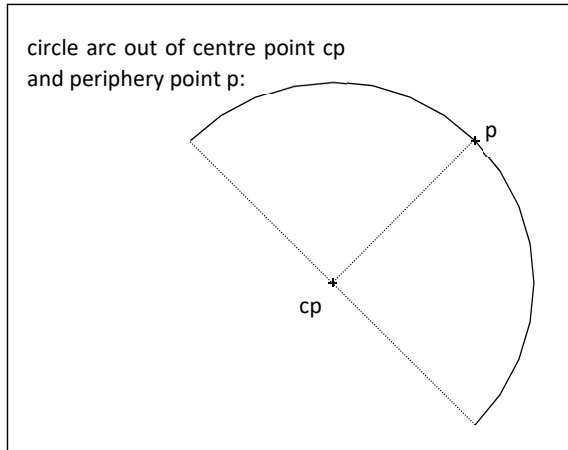
#### Step-by-step guide

- ⇒ Call *Circle 10*
- ⇒ Construct the centre point for the circle
- ⇒ Construct the base direction, in which the circle should be constructed
- ⇒ Adjust radius interactively

Clicking *Circle 10* tool opens the sub-menu point construction with which the centre point for the circle can be determined. The basic direction for the circle is to be constructed with the direction construction sub-menu. The radius of the circle can be adjusted interactively.

**Circle 20 tool****Step-by-step guide**

- ⇒ Call *Circle 20*
  - ⇒ Construct the centre point for the circle
  - ⇒ Construct the periphery point
- Clicking *Circle 20* tool opens the sub-menu point construction with which the centre point for the circle can be determined and the periphery point can be constructed. The clicked periphery point is exactly in the middle of the new circle arc (Picture 7-41).



Picture 7-41

**7.7 Rectangles****The Circles and rectangles menu**

Construction of rectangles also ensues with the *circles and rectangles* menu, see section 7.6.

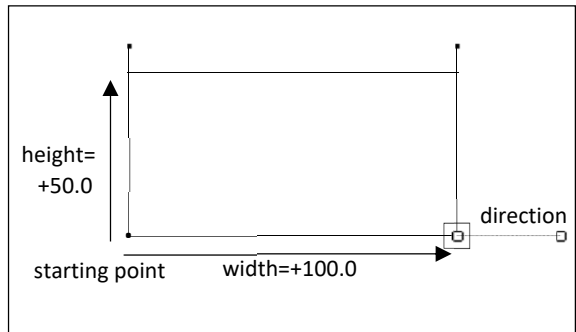
**The tools *Rectangle 10* and *Rectangle 20*****Step-by-step guide**

- ⇒ Call *Rectangle 10*
- ⇒ Construct the starting point
- ⇒ Construct the base direction or the right lower corner of the rectangle
- ⇒ Enter the width and height or adjust interactively

When calling *Rectangle 10* the lower left corner and the direction of the base line are constructed. Height and width of the rectangle can be adjusted interactively (Picture 7-42).

When calling *Rectangle 20* the left and right corner of the rectangle are constructed. The width of the rectangle results from these points. The height of the rectangle is interactively adjustable (Picture 7-42).

Both interactive rectangles can be reshaped to a trapezium.



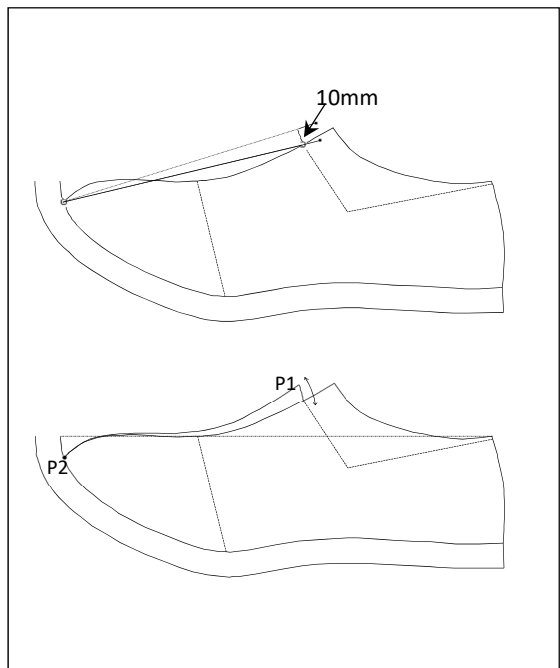
Picture 7-42

## 7.8 Exercises

### 1st Exercise

Call *Basic Shoe 10* and construct a circle with *Circle 20* for an extension of the outer upper. Central point for the circle is the toe tip, the periphery point is the intersection of front last centre/upper opening line.

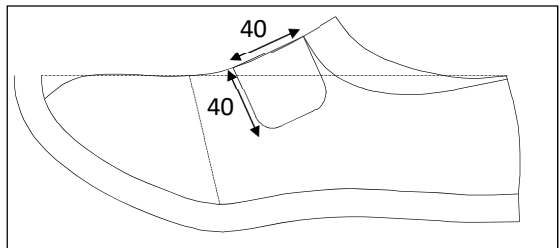
Shorten the upper circle arc to 10mm. Cut the front last centre at the upper opening. Move the front last centre to the final point of the circle arc with the function *manipulate curve* (Picture 7-43).



Picture 7-43

### 2nd Exercise

Call *Basic Shoe 10* and construct a strap to the front last centre with *Rectangle 20*. Adjust the length and width to your requirements. The corners of the strap can be edited with *Coordinated corner 50* (Picture 7-44).



Picture 7-44



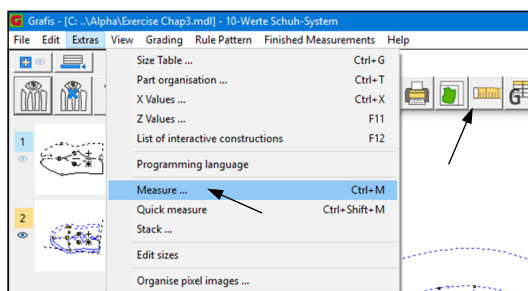
## Content

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The functions of this chapter are not functions for alteration of the construction but important aides for control and annotation of patterns.

### 8.1 The temporary measure

Temporary measure is opened via the pull-down menu *Extras*, with the shortcut <Ctrl>+M or via the toolbox (Picture 8-1). It is used for temporary measuring during pattern development. Grafis also offers a recorded measurement function, which is discussed in the next section.



Picture 8-1

#### Step-by-step guide






- ⇒ start *measure* from the *Extras* pull-down menu or from the toolbox
- ⇒ select a measurement type from the central block of functions
- ⇒ click on the objects of the construction
- ⇒ set the display options for the active measurement

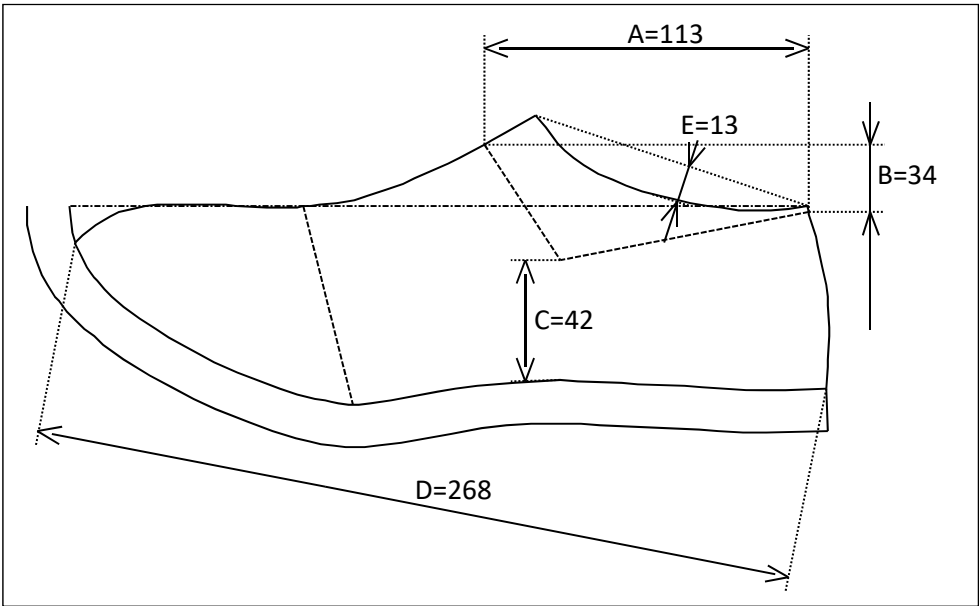
**Distance measurements**

There are five distance measurements. The different measurement type modes are well illustrated by the button symbols. The numbers indicate the order of clicking. When clicking, the sub-menu point construction opens automatically.

Measure the distance measurements indicated in Picture 8-2 on *Shoe Basic 10*:

- A - horizontal distance
- B - vertical distance
- C - distance from a point to a line
- D - direct distance
- E - perpendicular onto an imaginary line between two points

	direct distance
	horizontal distance
	vertical distance
	perpendicular onto an imaginary line between two points
	distance from a point to a line







Picture 8-2

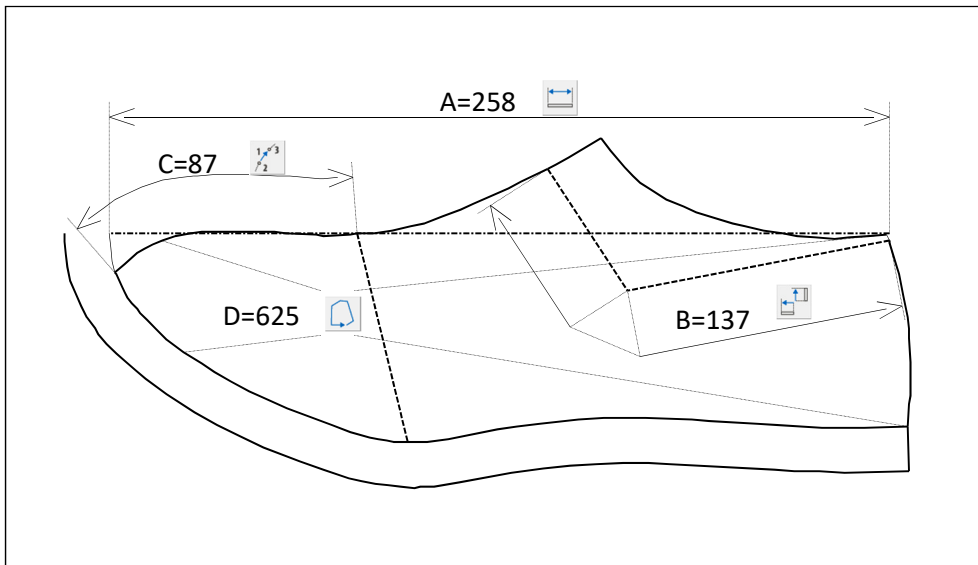
The position of each measurement can be altered by clicking and dragging. Close measure.



### Length measurements


There are four length measurements:

	length of a single line
	length of several lines
	partial length of a line
	perimeter length



Picture 8-3

- A - length of the last
- B - total length of upper opening auxiliary lines
- C - partial length of front last centre
- D - length of circumference lines of the last

When setting measurement B, start with the segment at the front last centre and then, click the two segment lines below, see Picture 8-3. Alternatively, you can start at the back last centre and click the individual lines above. As the number of lines is variable, the measurement is only shown after a right mouse button click . Position the measurements suitably. Then, close measure.

## Area measurements

An area measurement can be set in two different ways:

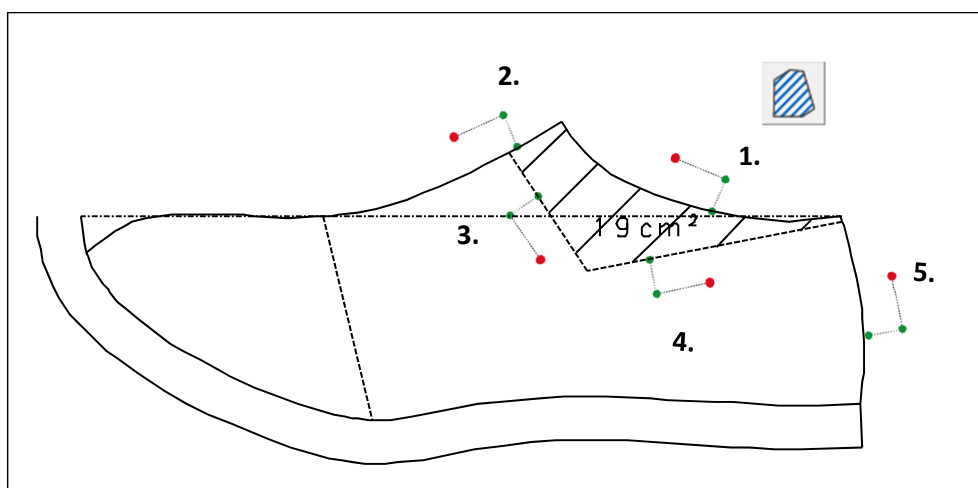


select single lines for perimeter of area





search lines for area perimeter automatically

Measure the area of *Shoe Basic 10* depicted in Picture 8-4 by clicking **the single lines for the perimeter**.



Picture 8-4

Click the five lines from the outside in order. After having clicked the last line, press , to set the measurement. A closed perimeter is created automatically from the clicked lines. Protruding lines are cut off. **The click point of the first line must be within the future perimeter contour!** Until the measurement has been set with  individual lines can be reset with



reset single lines

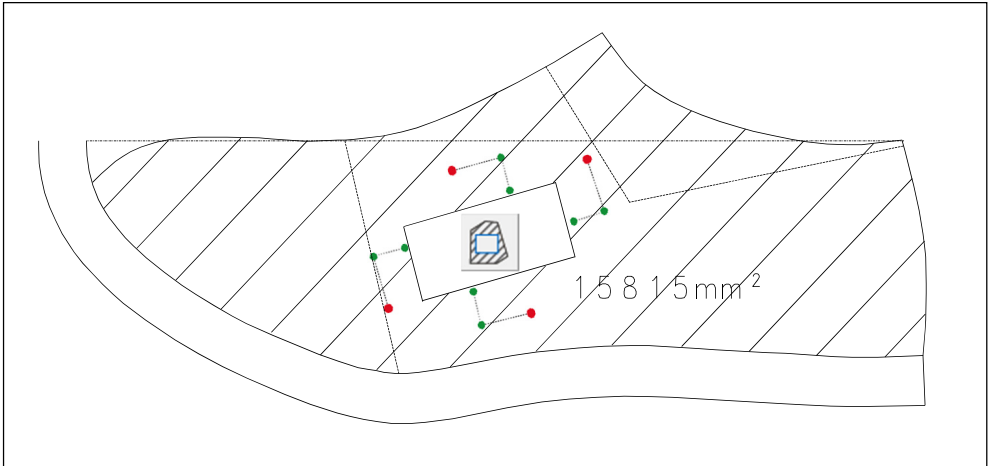
**Internal partial areas** can be deducted from an area measurement. The partial areas must be marked before the measurement is set.

Measure the area of *Shoe Basic 10* without the area of the internal rectangle. First, define the outer contour of *Shoe Basic 10*. A new partial area to be deducted from the original area begins with



start new partial area

Then, click the four lines of the internal rectangle, see Picture 8-5. Please note the order. Set the measurement with or define a new area to be deducted with *start new partial area*.



Picture 8-5

### Angle measurements

There are four angle measurements:



angle between two lines at click point



angle at intersection point



angle about a turning point from a basic direction to a point

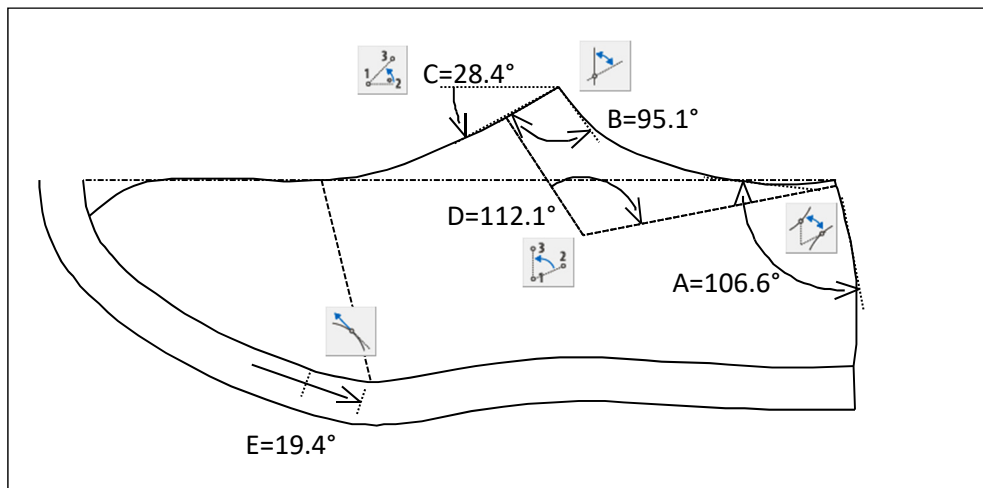


angle out of three points



line direction in click point

Measure the angles in *Shoe Basic 10* shown in Picture 8-6:



Picture 8-6

- A - angle between last top edge and centre back 20mm from corner respectively
- B - angle between last top edge and last centre
- C - inclination angle at the front last centre
- D - angle between the auxiliary lines of the upper opening
- E - direction of the insole edge at click point.

The measuring mode *line direction in click point* is useful if the construction direction/ orientation of a curve or a line is needed.

### Co-ordinate/Vector measurements

A co-ordinate/ vector measurement can be set in two ways:

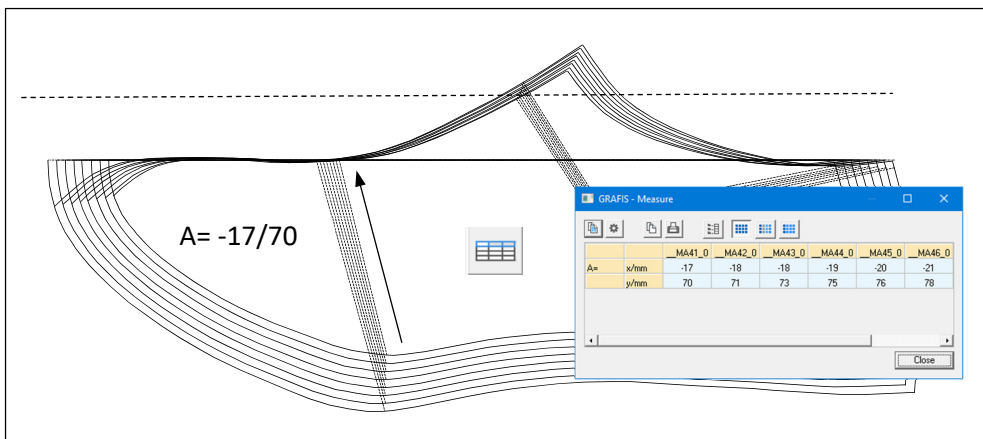


co-ordinate / vector from zero (origin)



co-ordinate / vector from constructed zero point

Grade the *Shoe Basic 10* in different sizes (Picture 8-7). Set a measurement *coordinates from constructed zero point*. First, the zero point is constructed at the corner point ball width/sole. The second point is the corner point ball width/front last centre.



Picture 8-7

### Display measurements in a table



display measurements in a table

All set measurements can be displayed in a table. Measurements of a graded stack are shown in all sizes. The table can be printed or copied to the clipboard.

There are three **display options**:



normal view



difference to first size



relative difference / difference to the previous size



sort measurements

If a co-ordinate/vector measurement is set in a graded stack, the third display option shows the **grade rules** between the sizes.

**Options for measurements**

Clicking selects a single measurement. With <Ctrl>+A and <Ctrl> a number of measurements can be selected. <Del> deletes all selected measurements. The following display options can be chosen for selected measurements:

Dimension  
☒ 0    ☐ 0.0

normal or more number of decimals

☐ 2x    ☐ 4x

display of normal, doubled **2x** or quadrupled **4x** value

In the pull-down menu *Settings* units for length/ distance and area can be selected amongst others.

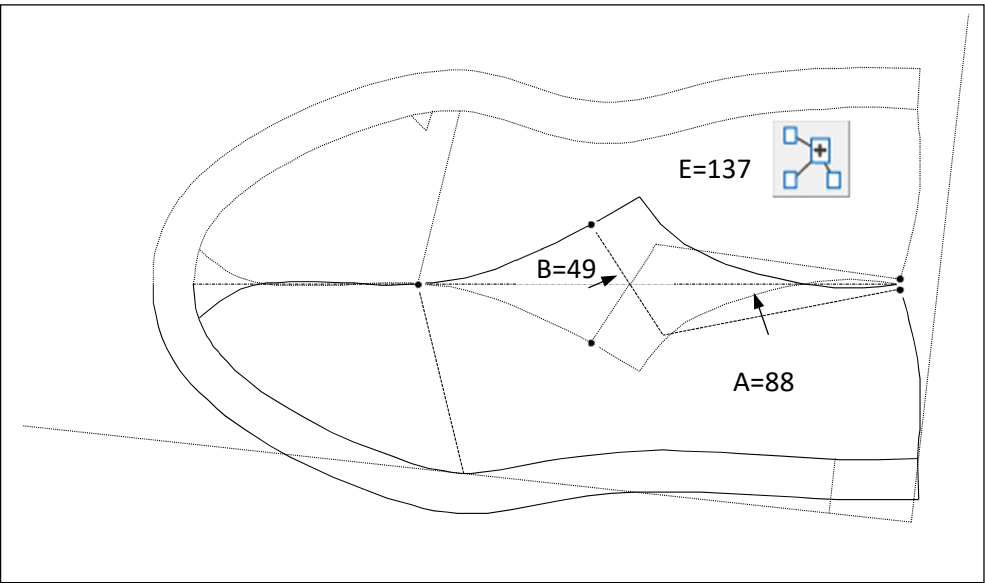
**Set chain measurement**

If a number of measurements are selected they can create a chain measurement:



create chain measurement from a number of selected measurements

Set two measurements for the length of the auxiliary lines of the upper opening of *Shoe Basic 10*. Select the two measurements with pressed <Ctrl> key and use the button *chain*. The measurement E is created as a sum of the two individual measurements, see Picture 8-8.



Picture 8-8

## 8.2 Finished measurements



The record function *dimension* sets measurements which are saved with the style as opposed to measure (section 8.1). Finished measurements are automatically calculated for all sizes and the results are stored in finished measurement tables. These are significant for creating style descriptions, finished measurement tables and other documentation. They can be plotted together with the pattern.

First, the record function *dimension* is discussed. The display of Finished Measurement Tables follows.

### Set and alter measurements

The record function *dimension* can be found in the menu on the right. Finished measurements can be set in the active part. Manipulation of setting and alteration of the measurements is identical with manipulation of temporary measuring in section 8.1.

The following differences to temporary measuring apply:

- The display of the measurement text in the pattern has been optimised for plot output.
- Additional display options are available.
- The measurement can be assigned a measurement designation or measurement code at point of setting already. This designation will appear in the finished measurement table.
- All measurements are given consecutive measurement numbers at entry M1, M2, M3,...



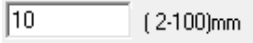

### Display options

Alteration of the display options are applied to all selected measurements. The displayed state shows the setting of the first selected measurement.


#### Show/hide...

	measurement number, e.g. M01 or M07
	measurement value in the respective size
	measuring lines
	measurement code or individual description
	measurement description

**Settings**

	flip measurement text about the measuring line
<div>Dimension</div> <div> <input checked="" type="checkbox"/> 0           <input type="checkbox"/> 0.0  <input type="checkbox"/> 2x           <input type="checkbox"/> 4x         </div>	accuracy and multiples of the value
	enter individual designation or select standard designation
	measurement text height between 2 and 100mm
	retake single selected measurement

**Measurement code and measurement text**

Each measurement can be assigned a standard measurement designation, consisting of code and measurement text or an individual measurement designation with . Both code and measurement text appear in the finished measurement table.

When assigning a standard measurement description the measure group is to be selected, first. Then, select the measurement description. If *Show graphic* is checked a graphic - if available - with explanations about the measurement is opened. With double-click or *OK* the measurement description is accepted.

**Show and hide finished measurements**

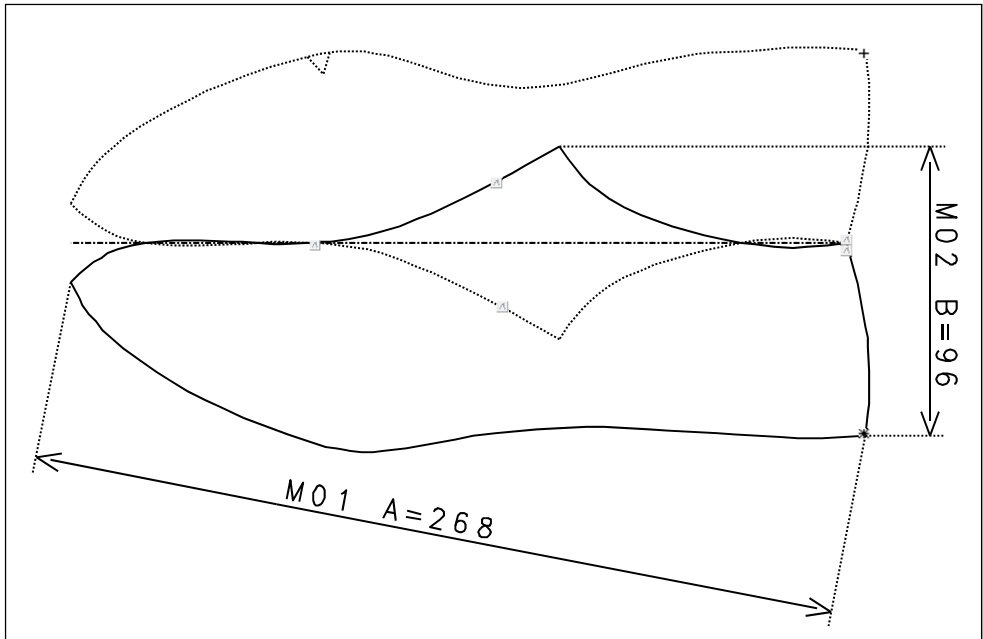
As long as the *dimension* menu is not open, set measurements can be shown or hidden with <F7>. Quit the *dimension* menu, grade and press <F7> a few times.

**Pattern development after set measurement**

After having set measurements, the pattern can be developed further without restrictions. Hide the measurements with <F7>. They are updated after each *test run* or *grading*.

Set some measurements in *Last 10* according to Picture 8-9. Then, alter the last length and last height interactively.





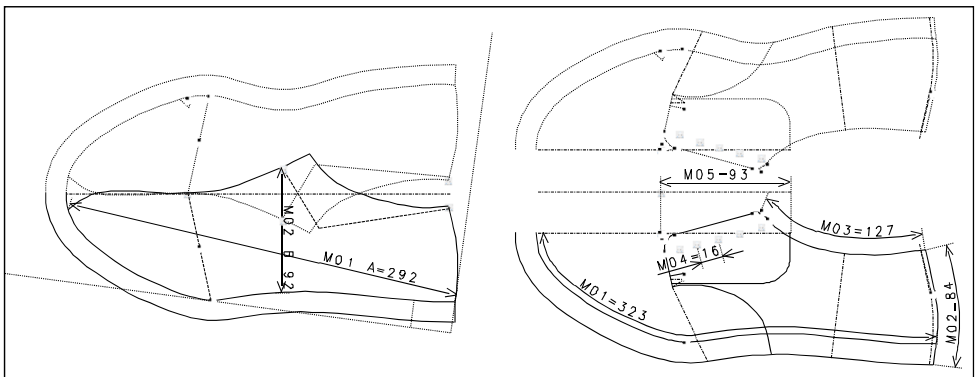
Picture 8-9

The set measurements are bound to points (*click point*) or lines (*click line*, *click partial length*, *click relative length*, *intersection*). If points or lines of a measurement are deleted during pattern development, Grafis gives an undefined measurement after the next test run. You then have the option to set the measurement again or delete it.

### Exercise

Call *Last 10*. Call *Basic Shoe 10* into the next part in the part organisation. Into the third part of the part organisation, call *Shoe type 11*.

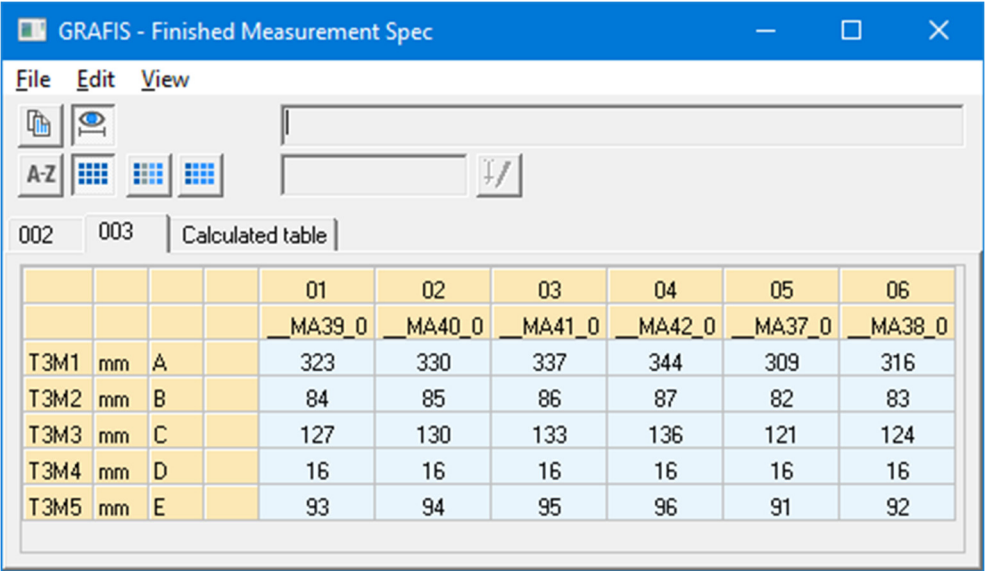
Set the measurements according to Picture 8-10.



Picture 8-10

Display finished measurement table

The finished measurements are recorded and can be repeated for other sizes. Grade the construction measured according to Picture 8-10 in the sizes \_MA37, \_MA38, \_MA39 and \_MA40, quit the *dimension* menu and open the *Finished Measurement Table* from the *Finished Measurements* pull-down menu. The Grafis *Finished Measurement Spec* window is opened as shown in Picture 8-11. Each part has its own finished measurement table. You can switch to the finished measurement table of another part with the **file card tabs**. The style from Picture 8-10 has finished measurements in parts 002 and 003. The part name appears as a tooltip on the file card tabs.



			01	02	03	04	05	06
			_MA39_0	_MA40_0	_MA41_0	_MA42_0	_MA37_0	_MA38_0
T3M1	mm	A	323	330	337	344	309	316
T3M2	mm	B	84	85	86	87	82	83
T3M3	mm	C	127	130	133	136	121	124
T3M4	mm	D	16	16	16	16	16	16
T3M5	mm	E	93	94	95	96	91	92

Picture 8-11

The measurements are arranged in lines and the graded sizes in columns. The first column contains part and measurement number. T3M4 stands for fourth measurement in part 003. The arrangement of rows/columns can be swapped with



The second column contains the measurement unit. The third and fourth columns show the measurement designation (code and text). The following columns contain the measurement values in the available sizes. The position number in the size table is stated in the first row and the size designation in the second row. Change the display of the finished measurement table via the pull-down menu *View* → *Display options*. Change the measurement units as well.

There are three **display options**:



normal view



difference to first size



relative difference/ difference to the previous size

The order of sizes in the finished measurement table originally corresponds with the order in the size table. To list the sizes of the size run use button



sort sizes

For a single measurement selected in the table you can adjust the following:



The measurement is centred on the screen. Thus, it is easier to find in the pattern.



Alter the measurement code or the individual measurement designation

Copy the displayed table to the clipboard via **Edit → Copy**. Now, start a different Windows application such as Word for Windows or Excel and insert the table from the clipboard. If you have already created templates or forms in these applications, seam length calculations or other calculations can be solved quickly.

With **Edit → Copy measurement into the calculated finished measurement table** or <Ctrl>-B a selected measurement is transferred into the *Calculated table*.

In the style from the exercise shown in Picture 8-10 transfer the measurements M01 to M02 from part 002 and the measurements M01 to M05 from part 003 into the calculated finished measurement table<Ctrl>+B.

**Deleting finished measurements** can only be done via the function *dimension*.

### Calculated finished measurement table

Finished measurements from different parts of a style are combined in one table in the calculated finished measurement table, see Picture 8-12. Finished measurements from different parts can be calculated together to establish a circumference measurement across different parts for example. The following additional functions are available for creation and editing of calculated measurements:



create a new calculated measurement at the end of the table



delete selected measurement




## 8.3 Set and edit text

### The text menu

This menu can be called from the basic menu, directly by clicking on *texts*. It allows for entry, editing, positioning and adjustment of texts. The functions offered are sufficient for pattern annotation or entry of making-up instructions. They cannot be compared to a word-processing package.

Step-by-step guide for entry of new text

- ⇒ *basic menu* → *texts*
- ⇒ Click on *via keyboard*
- ⇒ Enter text and/or specific information
- ⇒ Quit text entry with clicking on *OK* or *Cancel*
- ⇒ Position the text
- ⇒ Manipulate the active text according to the 'Step-by-step guide for alteration of text'
- ⇒ Quit with 

Step-by-step guide for alteration of text

- ⇒ *basic menu* → *texts*
- ⇒ Click the text
- ⇒ Alteration of text content:
  - double-click on the text
  - alter the text
  - quit with *OK* or *Cancel*



### Text menu

[via keyboard](#) ▪ [via file](#)

[activate text](#) ▪ [copy text](#)

[delete active text](#) ▪ [delete all text](#)

[align left](#) ▪ [align centred](#) ▪ [align right](#)

[+/- grading](#) ▪ [+/- autom. direction](#)


[+/- frame](#) ▪ [+/- autom. size](#)

[user-defined text formats](#)


[set text formats](#)




⇒ Alteration of text position:

- drag as soon as the cursor  appears
- possibly: bind the **text position** onto the construction with the upper left corner of the text frame

⇒ Alter text alignment:

- drag the upper text frame as soon as the cursor  appears.
- possibly: bind the **direction** onto the construction with the upper right corner of the text frame

⇒ Alter text size

- drag the text frame as soon as the cursor  appears.

⇒ Alter text format:

- click *aligned left*, *align centred* or *aligned right* in the menu

⇒ Set the switch *+/-grading*

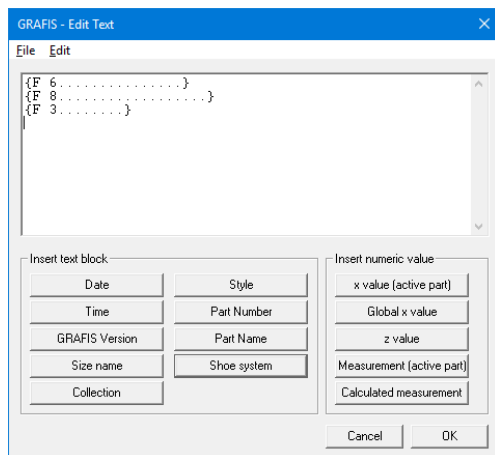
⇒ Set the switch *+/-frame*

### Enter or activate text

The active text is surrounded by a solid frame with active points. Existing text is activated by clicking. This works within the *text* menu, only. Double-click on a text opens the window for text entry. All functions in the middle of the function strip relate to the active text, only. A new text is set with:

#### *via file*

After having clicked via file the position for the text is to be set, first. Then, a window for selection of prepared text masks opens. Prepared texts should be saved on the current drive in the directory \GRAFIS\TEXTE as \_\_\_.TXT files. ASCII text files are permitted, only. The application of this function is especially interesting for pattern annotation with standard text.



Picture 8-13

### via keyboard

After having pre-positioned the text the window for entry of new text opens (Picture 8-13).

Additionally, the following text blocks with specific information can be inserted by clicking the buttons:


	Display in text editor:
<b>date</b>	{F 1...}
<b>time</b>	{F 2}
<b>Grafis version</b>	{F 3.....}
<b>size name</b>	{F 4...}
<b>collection</b>	{F 5...}
<b>style</b>	{F 6...}
<b>part number</b>	{F 7}
<b>part name</b>	{F 8.....}
<b>shoe system</b>	{F 9.....}

In Chapter 12 you will learn about x and z values. These numerical values as well as the previously discussed finished measurements can be inserted into text:

	Display and significance in text editor:
<b>X value (active part)</b>	{X00.2} second x value of the active part
<b>global x value</b>	{XG01} first global x value
<b>Z value</b>	{Z05 } fifth z value of the active part
<b>measurement (active part)</b>	{M04 } fourth measurement of the active part
<b>calculated measurement</b>	{B1.3} third calculated measurement in the finished measurement table

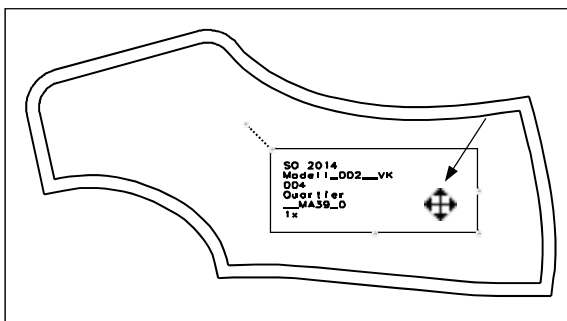
After *OK* the text is accepted and can be positioned, aligned and altered in size.

### Position and align text


To **position the text** drag the text as soon as the cursor  appears (Picture 8-14).

The text is positioned and remains in this position in all sizes.

Only after **binding the text** onto a line of the construction will its position change during grading. For binding the text the active point at the upper left corner of the text frame can be used. As




Picture 8-14


soon as the cursor  in the shape of a pin appears the text can be bound onto a line (Picture 8-15).

To **align the text freehand** the text is to be dragged at the upper right frame.


As soon as the cursor takes on

the shape  the text can be rotated freehand with pressed left mouse button (Picture 8-16).

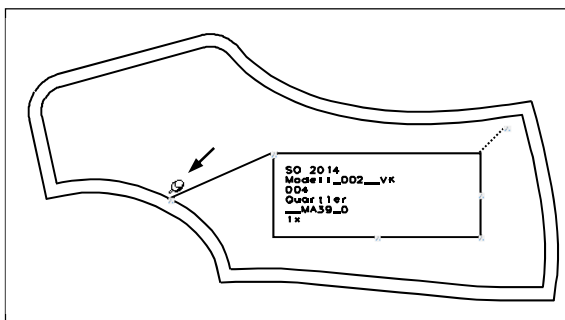
With bound direction point the text is also aligned along an existing line. The direction tag is located at the upper right corner of the text frame. It appears only after the text has been bound according to Picture 8-16. As

soon as the cursor takes on the shape of the pin  near the upper right corner the text direction can be bound (no picture). In the different sizes the text is rotated about the angle the connection between the binding points is rotated.

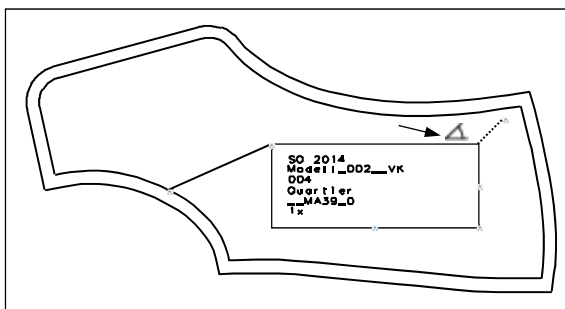
### Text size and format

Adjust the text size with the active points according to Picture 8-17. Near these active points the cursor takes on the shape of a double arrow .

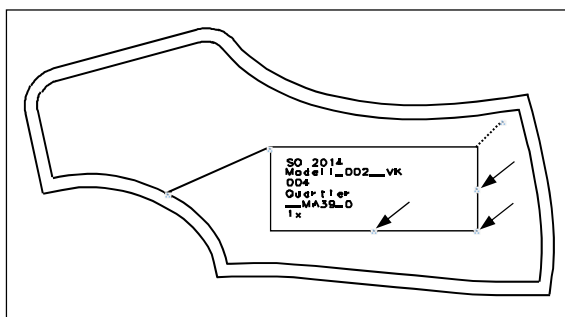
Text of more than one line can be aligned *left*, *right* or *centred*. This format relates to the alignment of lines, only. The format for the active text is to be selected from the menu.



Picture 8-15



Picture 8-16



Picture 8-17



### **+grading or -grading**

With this switch you decide whether or not the active text is graded.

*-grading*                text appears in base size, only.

*+grading*               text appears in all graded sizes.

Text with *+grading* is displayed slightly lighter than text with *-grading*.

### **+frame or -frame**

With this switch you decide whether the active text is displayed with or without frame.

### **Copy and delete text**

After having selected *copy text* from the menu the text to be copied is to be clicked. The copy is to be positioned according to Picture 8-14. **NB: Text can also be copied from an inactive piece into an active piece.** The menu functions *delete active text* and *delete all text* are used to delete text.

### **Prepared text format and automatic direction and size adjustment**

Clicking on of the ten prepared text formats (004 to 121 with delivery) assigns the active text with the respective settings. The text formats can be edited via *set text format*.

With the switch *+autom. direction* you decide whether the direction of the text is changed according to the direction point during grading. When binding the direction point, the switch is automatically activated.

With *+autom. size* the direction point is also responsible for enlarging/reducing the text during grading. This ensures that the text is not positioned outside the perimeter in small sizes.

### **Prepare and switch texts in different languages**

A text module can be stored in different languages. The text module must be saved as a \*.txt file in German in the directory GRAFIS\TEXTE\049\ and in English in the directory GRAFIS\TEXTE\044\. The file name must be identical in both directories. A prepared text module is called via the menu function *from file*. Switching languages ensues via the pull-down menu *Finished measurements → Language for measurements*. If the desired language is not available, it can be entered in the file \GRAFIS\Masscode.dat. The designated number is the international access code, e.g. 049 for German and 044 for English. **When switching the language, the text content is automatically recreated according to the contents of the text module file. Possible individual alterations to already set texts are reset. Alterations to the text module can be incorporated into styles in this way.**

## 8.4 Set symbols

### The symbols menu

With the functions from this menu symbols can be set onto points or lines in any direction. If the symbol is not to lie on the construction line it can be moved to the seam allowance with *move on allowance*, later. The available symbols are listed in the lower part of the menu. The active symbol is highlighted.

### Setting a new symbol

#### Step-by-step guide

- ⇒ *basic menu* → *symbols*
- ⇒ Activate the symbol required
- ⇒ Enter length of the new symbol
- ⇒ Activate *place on*
- ⇒ Construct position for the new symbol

#### Note

**The function 'on allowance' is always active. For each new symbol the function 'place on' has to be clicked.**

Set a new symbol select the symbol from the lower part of the menu. If the symbol is required in a length different from the default length (Picture 8-18) the *symbol length* must be altered. With *place on* the symbol can be attached to a point or a line. Then, the direction construction sub-menu is opened for orientation of the symbol.



### Symbols menu

place on

symbol length

move on allowance...

at right angle

in symbol direction

change symbol

slit notch (N1)

notch

buttonhole

circle

.CB

repeat point weft

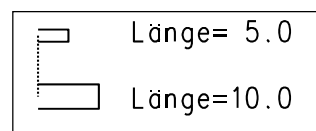
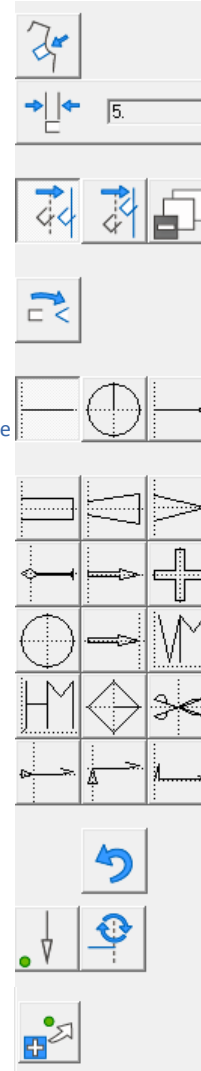
repeat point warp

reset

Grain line 10 tool

Convert into notch tool

start the tool automatically



Picture 8-18

Symbols are treated as line sequences during further work. A placed symbol can be changed into another symbol with *change symbol*. There are no functions available for the alteration of size or direction of symbol, later. In this case the current symbol is to be deleted and a new symbol is to be set.

### **Moving a symbol**

Step-by-step guide

Prerequisite is a line onto which the symbol is to be moved.

- ⇒ *basic menu* → *symbols*
- ⇒ Adjust *+copy* or *-copy*
- ⇒ Activate *on allowance*
- ⇒ Activate *at right angle* or *in symbol direction*
- ⇒ Click the symbol


Frequently, a symbol, e.g. a notch, is to lie on the seam allowance rather than the construction line. The function *on allowance* is always active and the symbol to be moved can be clicked, directly.

Grafis then asks for the seam allowance onto which the symbol is to be moved. With the switch *+/-copy* you decide whether a copy of the symbol is created or whether the symbol is simply moved.

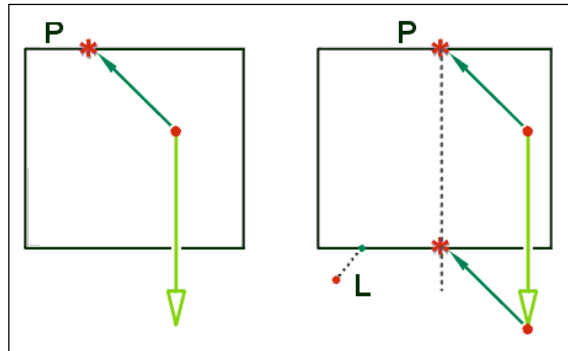
- +copy*      creates a copy of the symbol
- copy*      symbol is moved.

If relocate symbol *at right angle* is active, the symbol is moved to the seam allowance line at a right angle. If relocate *in symbol direction* is active, the symbol is moved to the seam allowance line in the run of the symbol direction

**Grain line 10 tool****Step-by-step guide**

- ⇒ Call *Grain line 10* from the *symbols* menu
- ⇒ Construct the base point
- ⇒ Adjust the direction of the grain line with the sub menu *direction construction*
- ⇒ Quit direction construction with the right mouse button 
- ⇒ If necessary, click a cutting line. Clicking the cutting line can be initiated in the interactive environment at a later stage.
- ⇒ Interactive adjustment of the grain line (length of grain line, direction, lateral relocation). If a cutting line is required but has not been selected already, select *Click cutting line* in the context menu.
- ⇒ Quit interactive adjustment with *End* in the menu on the right

The length of the grain line can be set. Alternatively, the grain line can be lengthened to a cutting line to be selected, see Picture 8-19. The length of the grain line results from the intersection with the cutting line. The direction of the grain line as well as the lateral relocation can be altered interactively.



Picture 8-19

**The Convert into notch tool**

With the *Convert into notch* tool, existing short lines of up to 10mm length can be converted into notches. Follow the right principle when clicking the line, the line is converted into a 5mm long slit notch.

## 8.5 Manufacturing symbols

As opposed to the symbols described in section 8.4, the manufacturing symbols can consist of multiple line elements and their shape may vary.

*Notch 10* plays a special role, it does not generate an independent object, but change the shape of the line.

***The manufacturing symbols are not detected as symbol objects during export and print/plot. Within the pattern pieces, manufacturing symbols must not be positioned outside the piece perimeter or intersect the perimeter.***

Otherwise, these symbols are integrated into the perimeter and/ or an error message appears during preparation for transfer to the layplan.

### Manufacturing symbols menu

*Seam 10* ▪ *Seam 20* ▪ *Seam 30*

*Seam 40* ▪ *Seam 50* ▪ *Bartack 10*

*Buttonhole 10* ▪ *Buttonhole 20* ▪ *Buttonhole 30*

*Buttonhole 40*

*Notch 10* ▪ *Notch 10 (v type)*

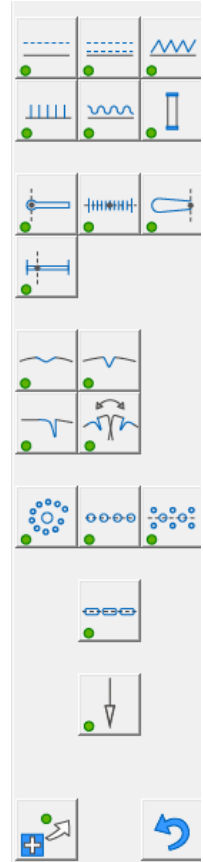
*Notch 20* ▪ *Notch 30*

*Perforation 10* ▪ *Perforation 20* ▪ *Perforation 30*

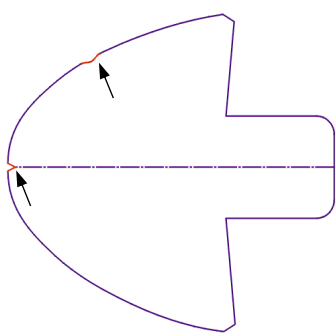
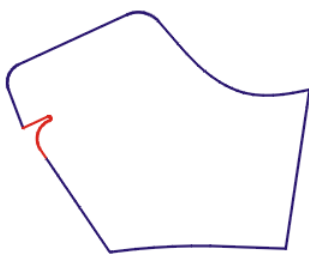
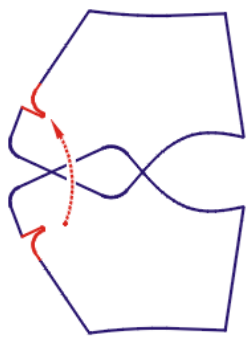
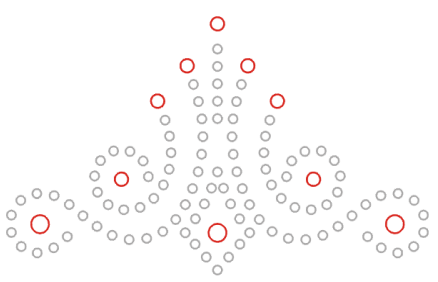
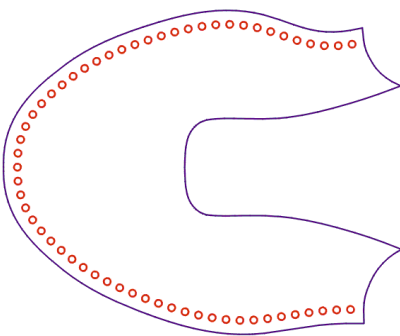
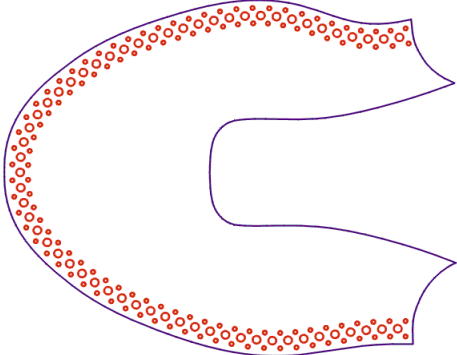
*Marking line 10*

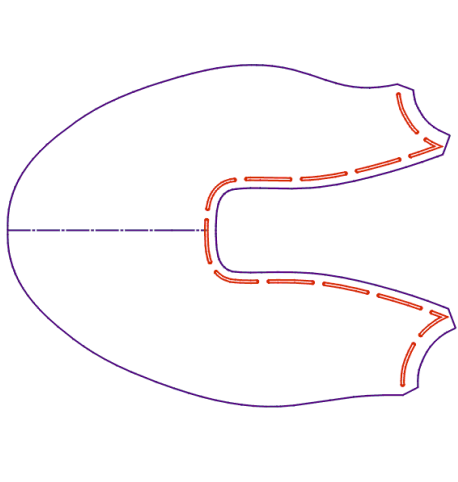
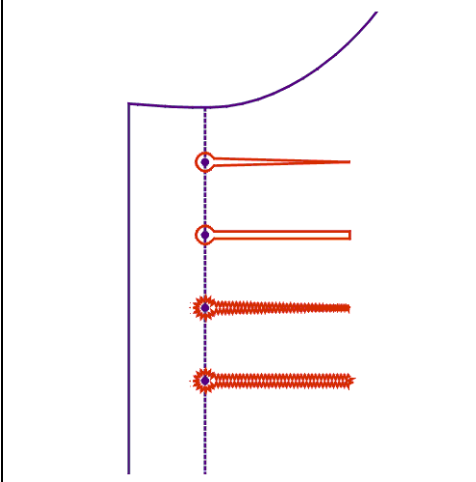
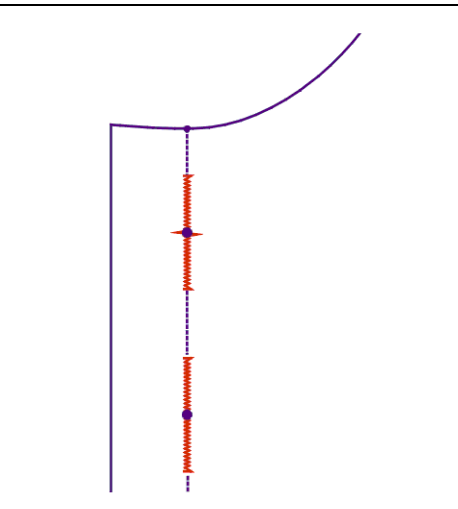
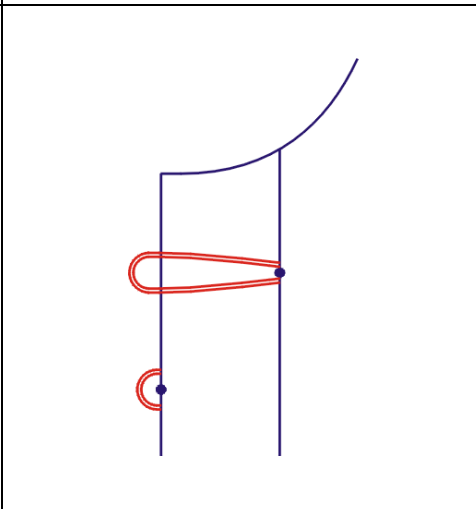
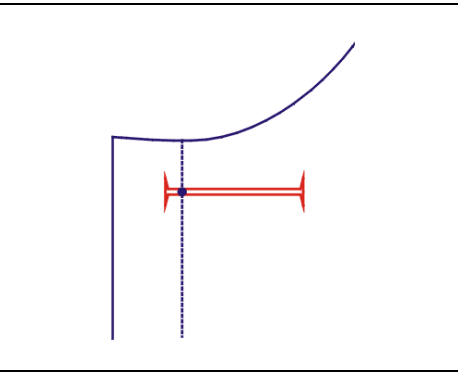
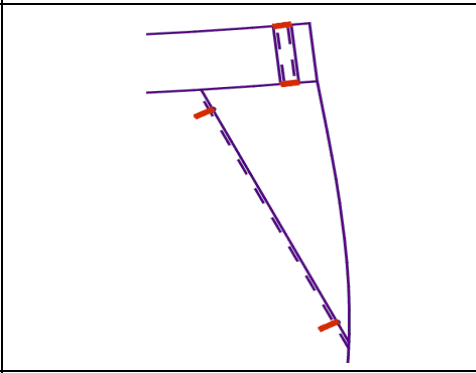
*Grain line 10*

start the tool automatically ▪ reset



Overview over the interactive manufacturing symbols

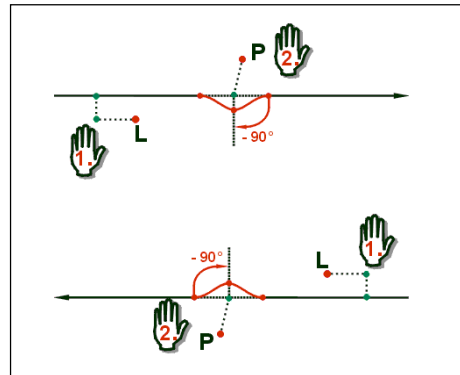
 A diagram of a shoe last (upper part) with a purple outline. Two small red notches are marked on the upper edge, each with a black arrow pointing to it.	 A diagram of a shoe last (upper part) with a purple outline. A red notch is marked on the left side of the upper edge.
<b>Notch 10</b>	<b>Notch 20</b>
 A diagram of a shoe last (upper part) with a purple outline. A red dashed line with arrows indicates a notch along the side edge.	 A diagram of a shoe last (upper part) with a purple outline. The interior is filled with small red circles, representing perforations.
<b>Notch 30</b>	<b>Perforation 10</b>
 A diagram of a shoe last (upper part) with a purple outline. The interior is filled with small red circles, representing perforations.	 A diagram of a shoe last (upper part) with a purple outline. The interior is filled with small red circles, representing perforations.
<b>Perforation 20</b>	<b>Perforation 30</b>

	
Marking line 10	Buttonhole 10
	
Buttonhole 20	Buttonhole 30
	
Buttonhole 40	Bartack 10

### Notch 10 tool

#### Step-by-step guide

- ⇒ *basic menu* → *manufacturing symbols*
- ⇒ select *Notch 10*
- ⇒ Click line along which *Notch 10* is to be constructed
- ⇒ Construct the position for the notch (Picture 8-20)
- ⇒ Adjust the options
- ⇒ End interactive adjustment with *End*

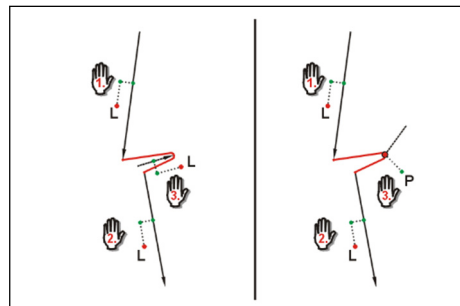


Picture 8-20

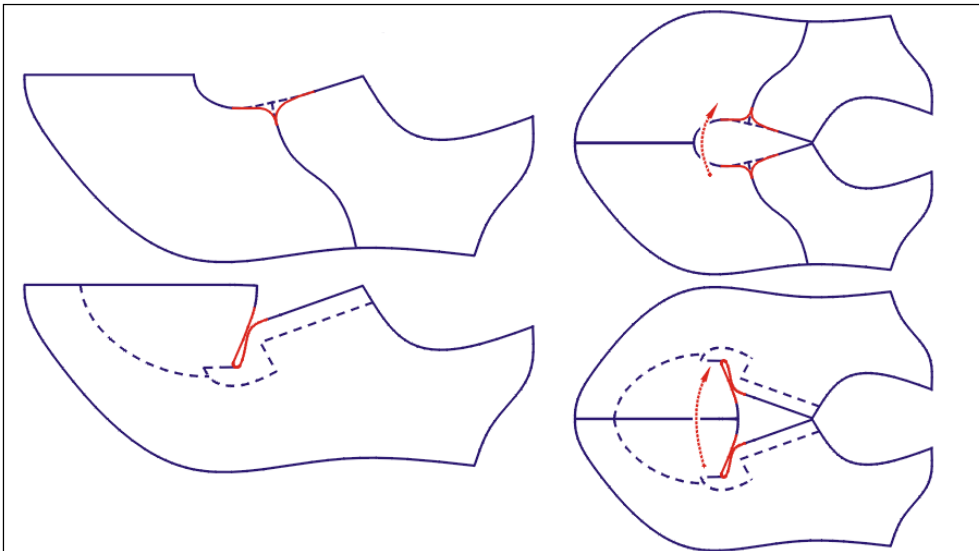
### Notch 20 and co-ordinated Notch 30 tools

#### Step-by-step guide

- ⇒ *basic menu* → *manufacturing symbols*
- ⇒ select *Notch 20*
- ⇒ click line before *Notch 20*
- ⇒ click line after *Notch 20*
- ⇒ Construct the position for the notch (Picture 8-21)
- ⇒ Adjust the options
- ⇒ End interactive adjustment with *End*



Picture 8-21



Picture 8-22

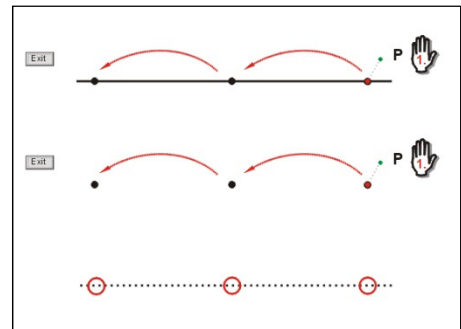


This notch type is available as a simple version Notch 20 or a co-ordinated version Notch 30. The step-by-step guide for Notch 30 is the same as for Notch 20 with additional clicks for the co-ordinated notch. With the third click, the user determines whether the position of the notch is constructed via a line or a point. The shape of Notch 20 /30 can be adjusted via the option to round or v type, symmetrical or asymmetrical. The end of the notch can be extended or shortened in mm or %. Application options are shown in Picture 8-22.

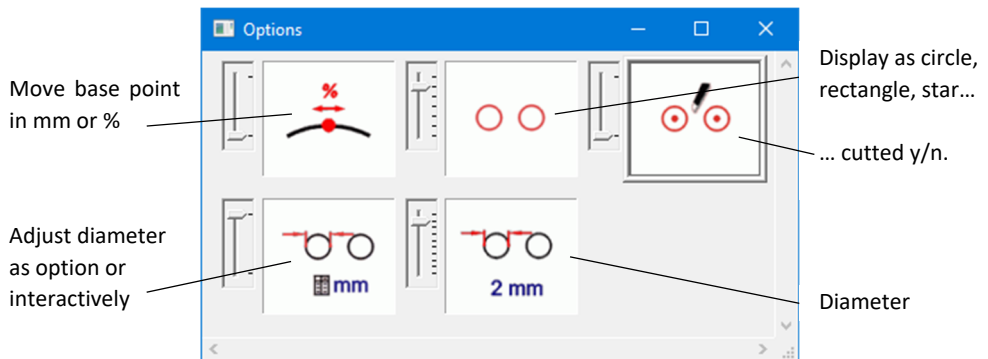
### Perforation 10 tool

#### Step-by-step guide

- ⇒ *basic menu* → *manufacturing symbols*
- ⇒ select *Perforation 10*
- ⇒ Construct up to 50 positions for the selected symbol (Picture 8-23)
- ⇒ Adjust the options
- ⇒ End interactive adjustment with *End*



Picture 8-23

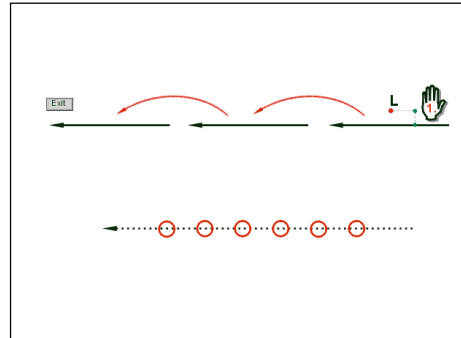


Picture 8-24

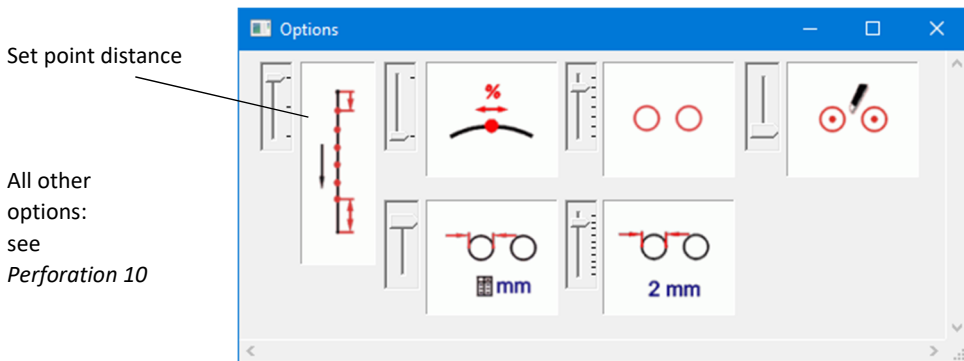
After having positioned the symbols, various options can be adjusted.

**Perforation 20 tool****Step-by-step guide**

- ⇒ *basic menu* → *manufacturing symbols*
- ⇒ select *Perforation 20*
- ⇒ Click the lines for which a perforation is to be added.
- ⇒ Adjust the options
- ⇒ End interactive adjustment with *End*



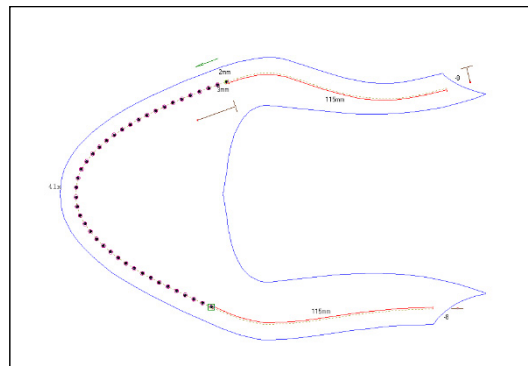
Picture 8-25



Picture 8-26

After having clicked the desired lines, various options and adjustments can be selected.

The perforation can be moved parallel or asymmetrically from the clicked line sequence, see Picture Picture 8-27.

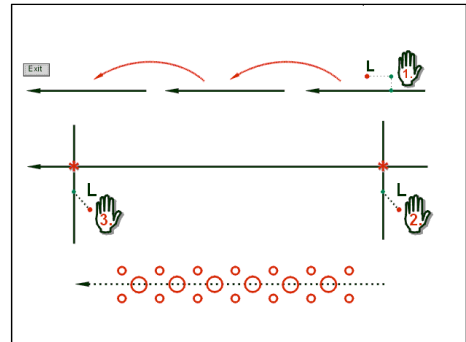


Picture 8-27

## Perforation 30 tool

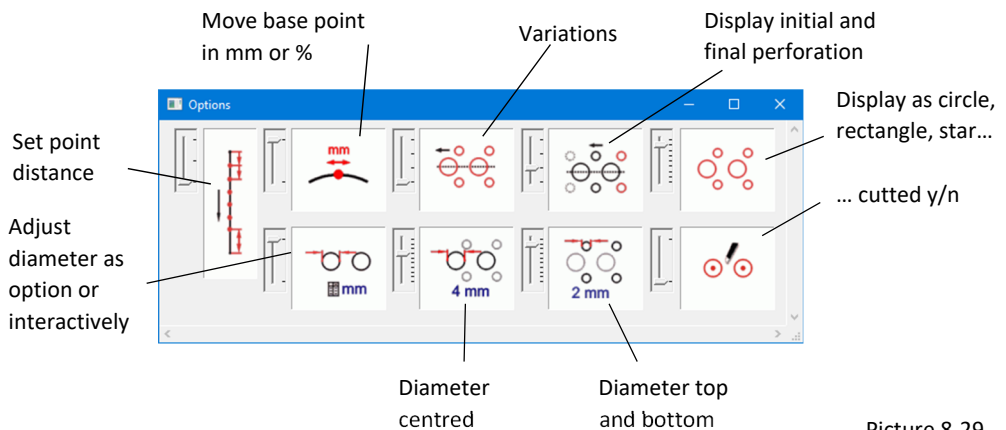
## Step-by-step guide

- ⇒ *basic menu* → *manufacturing symbols*
- ⇒ select *Perforation 30*
- ⇒ Click the lines for which a perforation is to be added, see Picture 8-28.
- ⇒ Click the lines defining the end of the perforation sequence
- ⇒ Adjust the options
- ⇒ End interactive adjustment with *End*



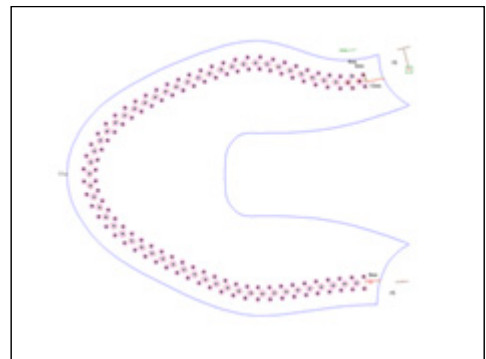
Picture 8-28

After having positioned the symbols, various options can be adjusted.




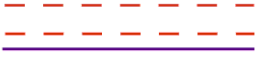




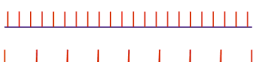
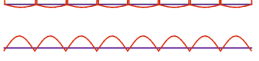
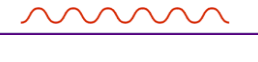
Picture 8-29

The perforation can be moved parallel or asymmetrically from the clicked line sequence, see Picture 8-30.



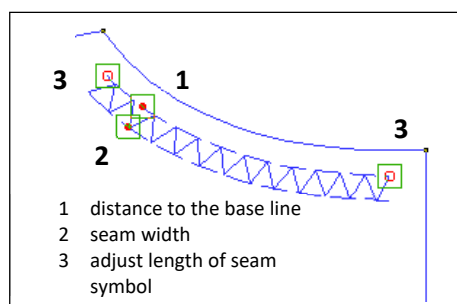
Picture 8-30

## Overview over the interactive seam symbols

<b>Seam 10</b> lockstitch		<b>Seam 20</b> double lockstitch	
<b>Seam 30</b> zigzag stitch	 		 
<b>Seam 40</b> decorative stitches	 	<b>Seam 50</b> gather	

### Step-by-step guide

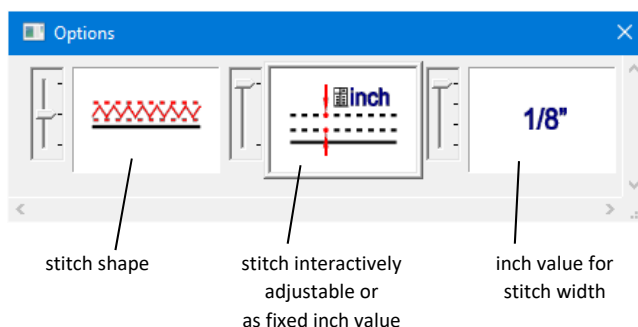
- ⇒ *basic menu* → *manufacturing symbols*
- ⇒ Select seam symbol
- ⇒ Click on one or up to 45 lines
- ⇒ Click on *Exit*
- ⇒ Activate one of the new seam symbols with double-click
- ⇒ Adjust the options
- ⇒ Interactive adjustment of stitch distance and possibly stitch width
- ⇒ End interactive adjustment with *End*



Picture 8-31

### Significance of the options and drag cursor

For the interactive adjustment of the seam symbols, there is exactly one drag area in which the stitch width, the distance to the base line and the length of the seam symbol can be adjusted interactively, see Picture 8-32.



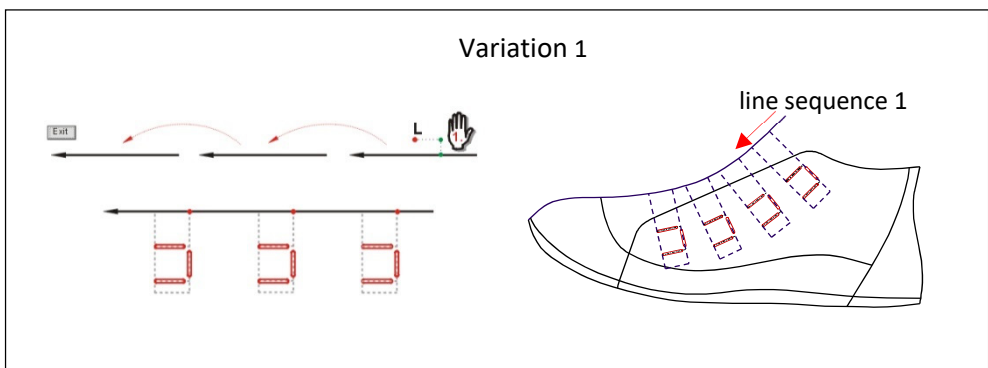
Picture 8-32

## 8.6 Fastening 10 (velco) tool

### Step-by-step guide

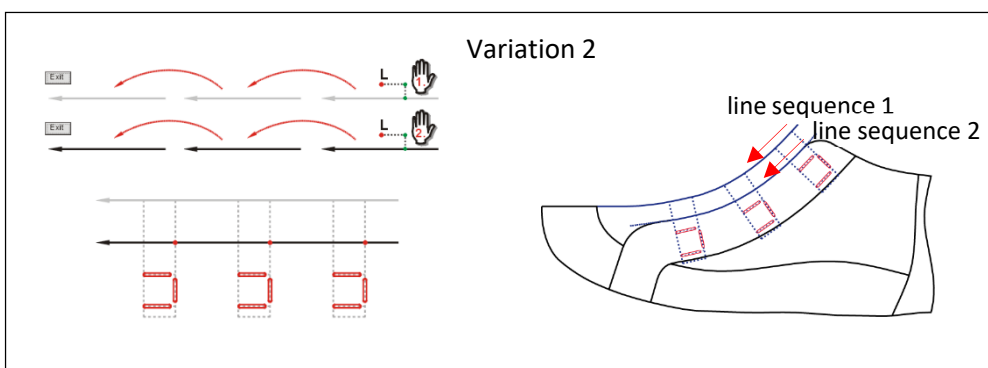
- ⇒ *basic menu* → *call* → *Grafis-Support programs*
- ⇒ *Select Fastening 10 (velcro)*
- ⇒ Click the lines for the fastening
- ⇒ Adjust the options
- ⇒ End interactive adjustment with *End*

Variation 1: only one line sequence is clicked, the fastening adjustments relate to the clicked line sequence, see Picture 8-33.

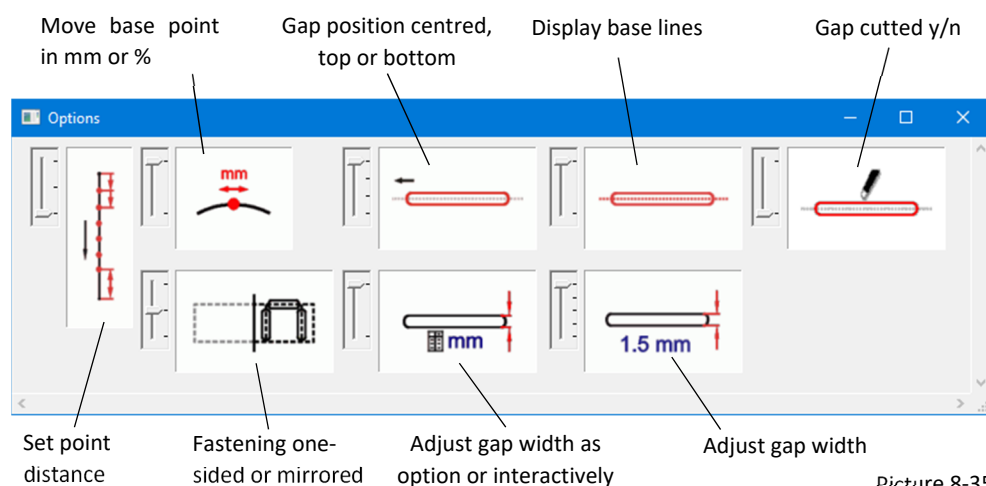


Picture 8-33

Variation 2: two line sequences are clicked. The fastening adjustments relate to the second line sequence, see Picture 8-34

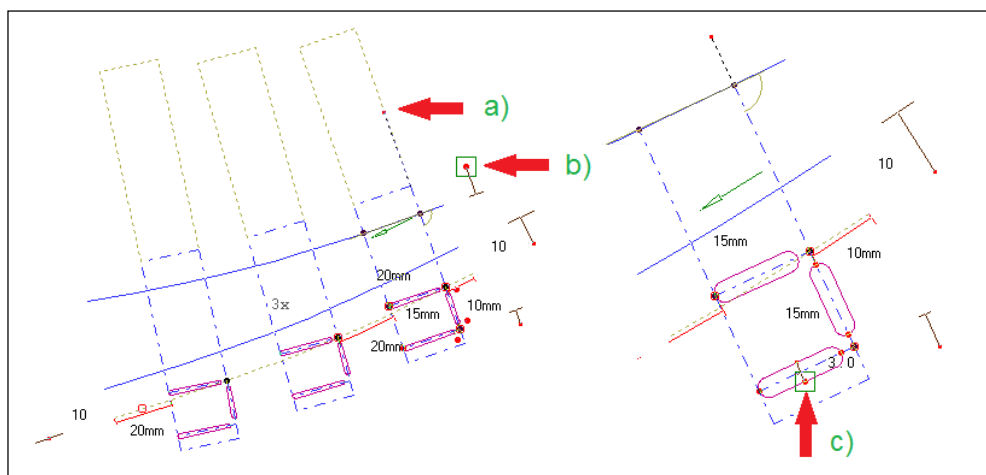


Picture 8-34



Picture 8-35

After having clicked the required lines, various options and adjustments can be selected, such as for example: direction of the fastener (a), addition to length of strap (b) and – if gap width is interactive – the width of the marking line (c), see Picture 8-36.



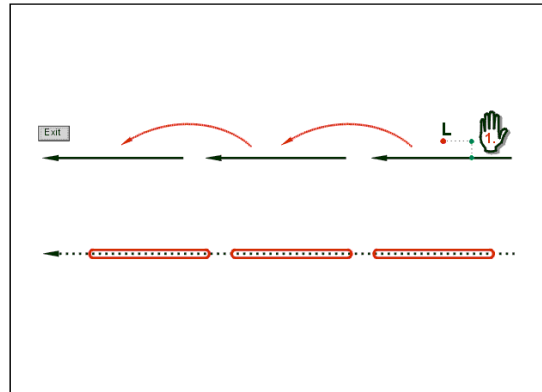
Picture 8-36

## 8.7 Marking line 10 tool for creation of templates

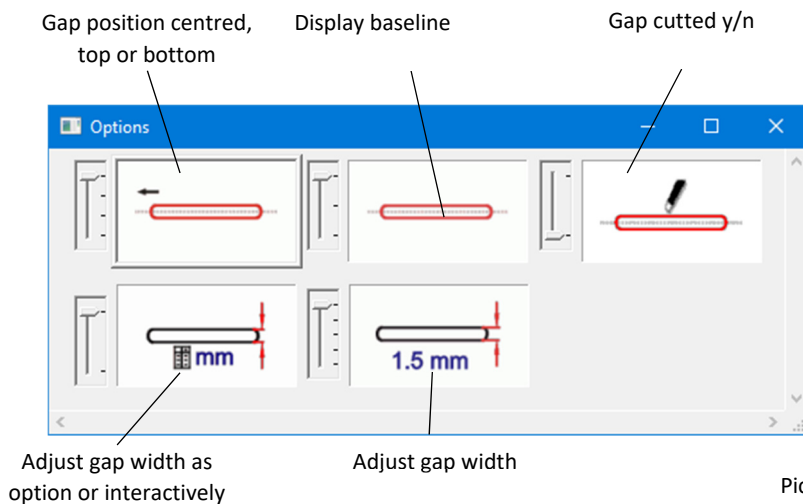
Part of production preparation is the creation of templates for sewing, for positioning of pattern pieces or embroidery. The templates must be generated for all sizes. The templates are constructed with the *Marking line 10* tool.

Step-by-step guide

- ⇒ *basic menu* → *manufacturing symbols*
- ⇒ select *Marking line 10*
- ⇒ Click the lines for the marking line, see Picture 8-37.
- ⇒ Adjust the options
- ⇒ End interactive adjustment with *End*

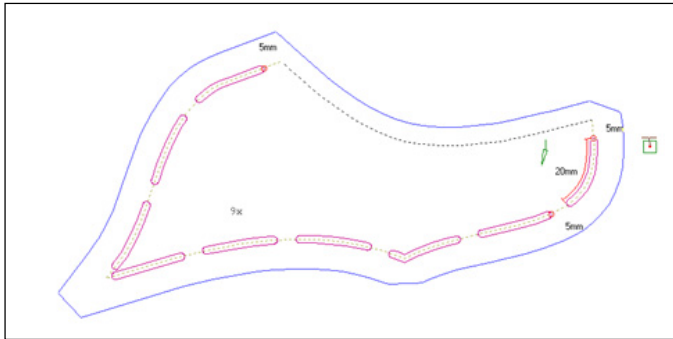


Picture 8-37



Picture 8-38

After having clicked the desired lines, various options and adjustments can be selected.



Picture 8-39

The number of gaps, the bridge width and the starting and end point can be altered in the drag area *Adjustments*, see Picture 8-39.

# 8.8 Attributes

## The *attributes* menu

The menu attributes allows for alteration of line type or changing of a point into a particular mark.

### Alteration of line type

Step-by-step guide

⇒ *basic menu* → *attributes*

⇒ Activate the line type required

⇒ Click the line

Each line can be turned into one of the following line types:

### Line types with structure...

continuous, dotted line with small distance, dotted line with greater distance, dashed, dot-dash rough, dot-dash fine or

### Line types with significance...

annotation line, grain line, split line, cut internal line or seam line.

### Attributes menu

Line types...

continuous line ▪ dotted line small distance ▪ dotted line great distance  
dashed ▪ dot-dash rough ▪ dot-dash fine

grain line ▪ split line ▪ annotation line

seam line ▪ cut internal line ▪ symmetry line

+/-chain

cross ▪ big point ▪ small point

asterisk ▪ arrow

reset



After activating the line type, the line to be altered in the construction is to be clicked.

If the option *chain* is active connected lines, e.g. the contour, are assigned the selected attribute.

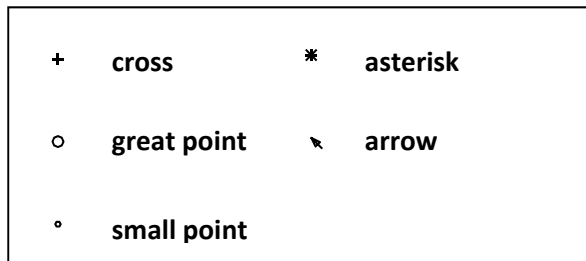


The line types with structure have significance during plot/print, e.g. for plotter/cutters. The line types with significance are required in the marker making and for data export.

### Setting a point mark

Step-by-step guide

- ⇒ *base menu* → *attributes*
- ⇒ Activate the mark type required
- ⇒ Click the point



Picture 8-40

Each point can be changed into one of the point marks shown in Picture 8-40. For further modification, it is still treated as a point.

To change a point into a mark activate the selected mark type and click the point. The mark *cross* corresponds with the original point.



## Content

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### 9.1 Spread for pleats, pivot open and close



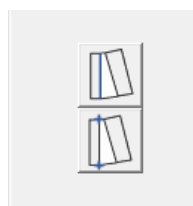
#### The spread menu

The *spread* function for preparation of pleat construction is the contents of this section.

#### Spread menu

click spread line

spread line defined by two points



re-define spread line

spacing 1

at the starting point of the spread line

spacing 2

at the final point of the spread line

+/-change direction

spread...

all ▪ single lines ▪ single points

reset...

all ▪ single lines ▪ single points

deposit ▪ +/-spread lines



### Step-by-step guide

- ⇒ Construct the spread line or starting and final point of the spread line with the functions of the *points and lines* menu
- ⇒ *basic menu* → *spread*
- ⇒ Determine spread line via:
  - click spread line*
    - ...if a spread line is available or
    - spread line defined by two points*
      - ...if the spread line is to be defined by its starting and final point.
- ⇒ Construct the spread line, then the actual *spread* menu opens
- ⇒ Possibly, construct the spread line again after having clicked *re-define spread line*
- ⇒ Enter the *spacing amount* at the starting and final point of the spread line and adjust *+/-change direction*
- ⇒ Activate *spread: single points, single lines* or *all* and click the respective objects
- ⇒ Possibly, reset by activating *reset: single points, single lines* or *all* and clicking the respective objects
- ⇒ Adjust *+/-spread lines*
- ⇒ Terminate by clicking *deposit*

### Spread line

After having constructed the spread line either with *click spread line* or *spread line defined by two points*, the actual *spread* menu opens. The spread line is displayed in black (yellow - if a line of the construction is situated underneath) and the target line in red. **All required Grafis objects will be spread according to 'spread line → target line'.** Correction of the spread line is possible by clicking *re-define spread line*.

### Distances between spread line and target line

The position of the target line is to be adjusted. The following options are available:

- alter the spacing between the starting points of spread and target lines *spacing 1*,
- alter the spacing between the final points of spread and target lines *spacing 2*,
- alter the spread direction by clicking the switch *change direction*.

### Spreading objects

As soon as the target line is in the required position spreading of the individual objects ensues. The option *spread all* spreads the complete part from the spread line onwards. Then, individual lines or individual points can be spread, additionally

by activating *spread single points* or *spread single lines* and clicking the objects. If too many objects were spread with *spread all*, individual points or lines can be reset with *reset single points* or *reset single lines*. With *reset all* all spread objects are reset.

### Deposit

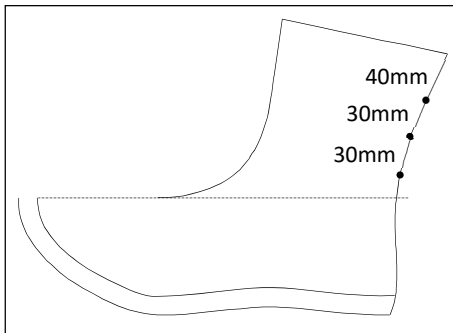
After having spread all required objects the switch *spread line* is to be adjusted:

- +*spread line* the spread line is drawn,
- spread line* the spread line is not drawn.

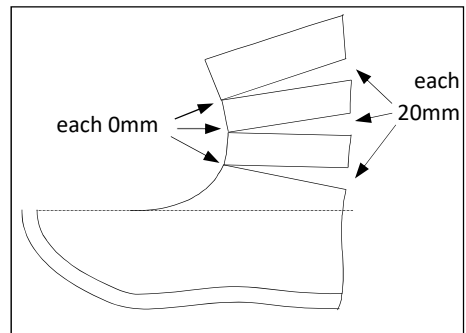
To terminate spreading click *deposit*.

### Exercise

In this exercise, an ankle boot with pleats in the heel seam is to be created. Open the 'basic style' from section 5.5. Adjust *Basic shoe 10* interactively to setting 3 in the option *Boot leg variation*. In *Shoe type 11* set the option *Corner styling lacing top and bottom* to setting 1. In the drag area *Styling outside* move the point for the relocation of lacing edge to 0. Enter the lines according to Picture 9-2 into the fifth part of the part organisation. Raster the heel seam with the tool *Raster 10*, starting at the top. Adjust the following interactively: three points at a distance of 40mm from the top and distance between the points 30mm. Construct a line from each raster point respectively which is 'cut on' to the front edge of the boot leg. Spread the pleats with the function *spread with line*, see Picture 9-1; at the heel line, spread by 20mm and at the front edge spread by 0mm. Save the style as 'Exercise Pleats'.



Picture 9-2



Picture 9-1

## 9.2 Shorten dart

This menu offers functions for relocation and shortening of darts, creation of dart hoods and pinching with a new dart.



The *relocate dart* function is not relevant for shoe construction and is therefore, not explained, here.

### Shorten dart

Schrittfolge

- ⇒ *basic menu* → *dart*
- ⇒ Adjust the *shortening amount*, by which the dart is to be shortened
- ⇒ Activate *shorten dart*
- ⇒ Click both dart lines

### Calling the function *shorten dart*

The function *shorten dart* is contained in the *dart* menu. With this function an existing dart can be shortened by a specified *shortening amount*.

**Entering a negative value lengthens the dart.**

After having entered the amount and activated *shorten dart*, Grafis asks for the two dart lines. The shortened dart appears on screen. The distance between the original and the new apex is exactly the amount entered.

### Dart menu

relocate dart

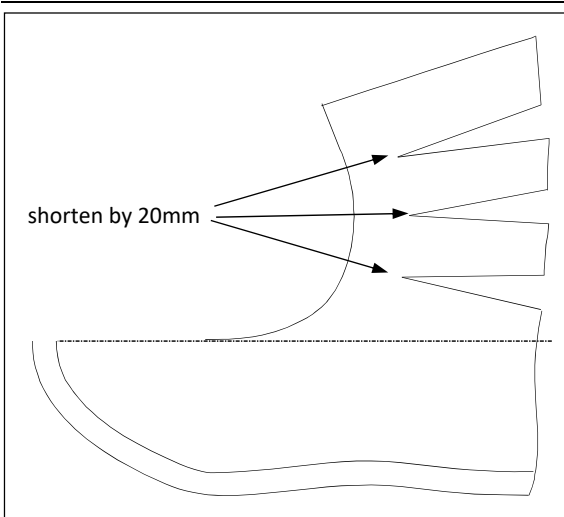
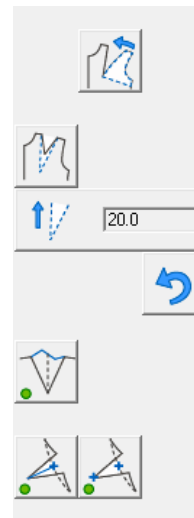
shorten dart

shortening amount

reset

Dart hood 10 tool

Pinch 10 tool ▪ Pinch 20 tool



Picture 9-3

### Exercise


Open the style 'Exercise pleats' from section 9.1. Shorten the darts by 20mm respectively, see Picture 9-3. Save again.

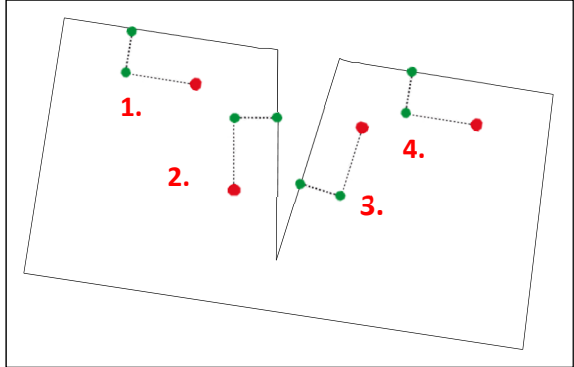
### 9.3 Hoods on darts and pleats

The tool for the construction of hoods on darts and pleats *Dart hood 10* is contained in the *dart* menu.



Step-by-step guide

- ⇒ *basic menu* → *dart* and call the *Dart hood 10* tool
- ⇒ Click on four lines **contour – dart – dart – contour** in a continuous direction (right principle! Picture 9-4)
- ⇒ The line clicked first determines the direction of the dart, in Picture 9-4 from left to right.
- ⇒ Close the *darts* menu with 
- ⇒ Double-click on the new dart hood
- ⇒ Interactive adjustment of the drill hole



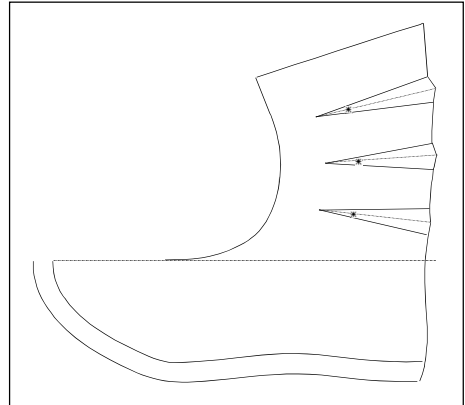
Picture 9-4

#### Exercise

Open the style 'Exercise Pleats' from section 9.3. Construct the dart hood according to Picture 9-5.

The dart is to be folded downwards from the boot leg edge.

Save again.



Picture 9-5


## 9.4 Pinch with new dart

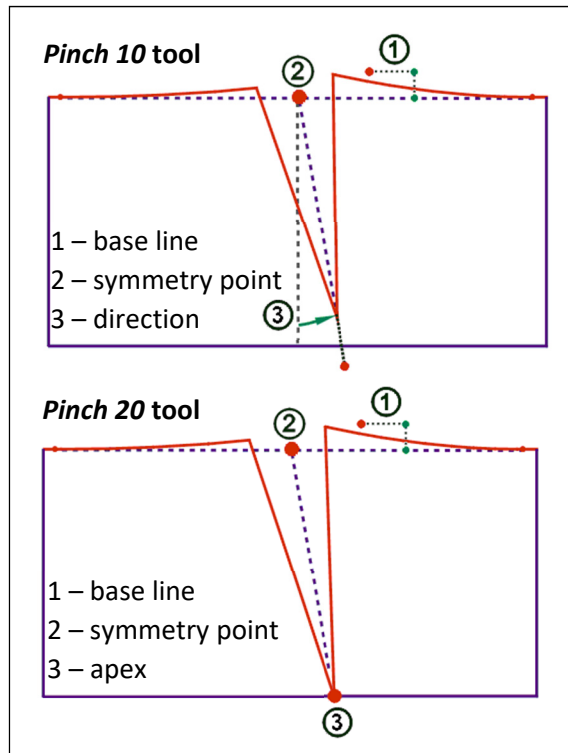
The two tools for pinching through construction of new darts can also be found in the *darts* menu. With both tools, the pinch amount and the correcting curve can be adjusted interactively. The tools differ only in the way the dart point is defined.

With the *Pinch 10* tool the direction of the dart is constructed and the dart length is adjusted interactively. With the *Pinch 20* tool the apex is determined directly with the sub-menu point construction, Picture 9-6.

***Clicking (1)(3)(3) instead of (1)(2)(3) when calling the tool Pinch 20, creates the symmetry point as a perpendicular from the apex onto the base line.***

### Step-by-step guide

- ⇒ *basic menu* → *darts* and call the tool *Pinch 10* or *Pinch 20*
- ⇒ Click the base line into which the dart is to be inserted
- ⇒ Construct the symmetry point
- ⇒ Depending on the tool selected: construct the direction of the dart or the apex
- ⇒ Close the darts menu with 
- ⇒ Double-click on the new dart
- ⇒ Interactive adjustment of the dart content

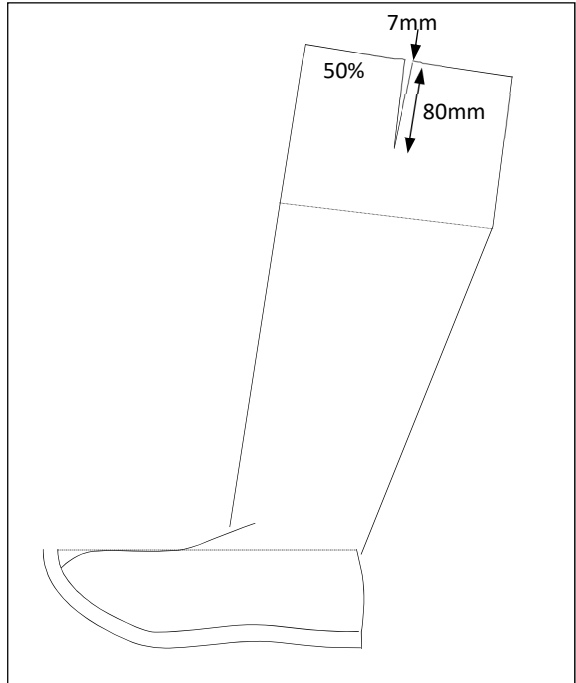


Picture 9-6



### 1st Exercise

The upper edge of a boot leg is to be pinched. Call *Last 10* and *Basic shoe 10* in the second part of the part organisation. Select interactively the last variant of the boot leg options. Save the adjustments in *save shape* as 'shape boot leg'. Leave the interactive interface. Insert all lines you need for the boot leg in the third part of the part organisation. Construct a dart on the upper edge of the boot leg with the *Pinch 10* tool. The dart begins at 50% of the upper edge and has to be adjusted right angled to the edge. Adjust interactively a pinch amount of 7mm and a dart length of 80mm, Picture 9-7. Save the exercise as 'Exercise with Pinch 10 tool'.



Picture 9-7

### 2nd Exercise

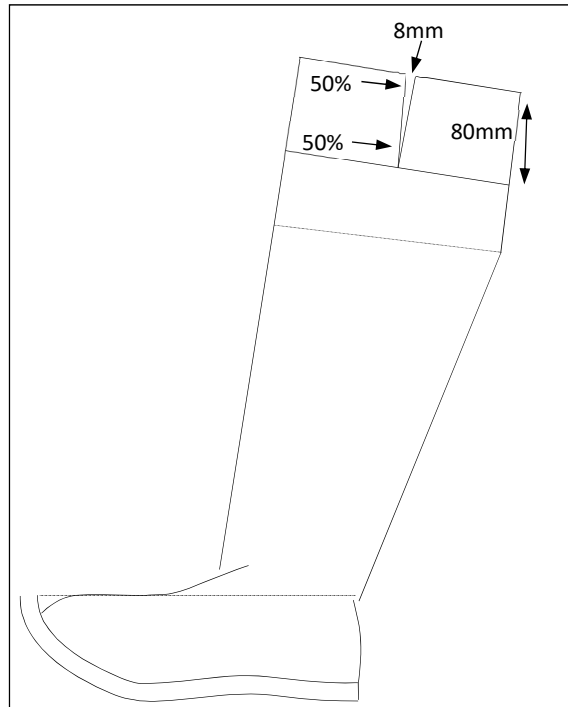
In this exercise, a separate panel at the top of the boot leg is to be constructed and pinched slightly.

Call *Last 10* and *Basic shoe 10* into the second part of the part organisation. Load the saved shape 'shape boot leg' from the 1st exercise. Insert all lines required for the boot leg into the third part of the part organisation.

Construct a parallel of 80mm to the edge of the boot leg with *Parallel 10*. Cut the parallel 'on' to the back boot leg line with *separate*.

Construct a dart in the top edge of the boot leg with the tool *Pinch 20*. The dart is to run from

the centre of the top edge to the centre of the parallel. The pinch amount is 8mm, see Picture 9-8. Save the style as 'Exercise with Pinch 20 tool'.



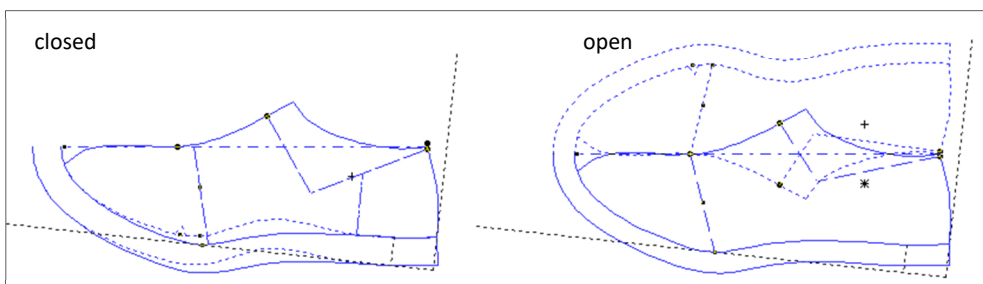
Picture 9-8

## Content

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### 10.1 Interactive tools Mirror and Transform


The interactive tools *Mirror 10/20/30* and *Transform 10/20/30* have been developed especially for detailing shoe uppers. As a rule, an outer last is designed first. Then, the visual appearance of the outer last is transferred to the inner last. The shoemaker designs either in an **open** or **closed** fashion. With the open method, the inner last is positioned as a mirror image above the outer last; with the closed method, the inner last is not mirrored above, see Picture 10-1.

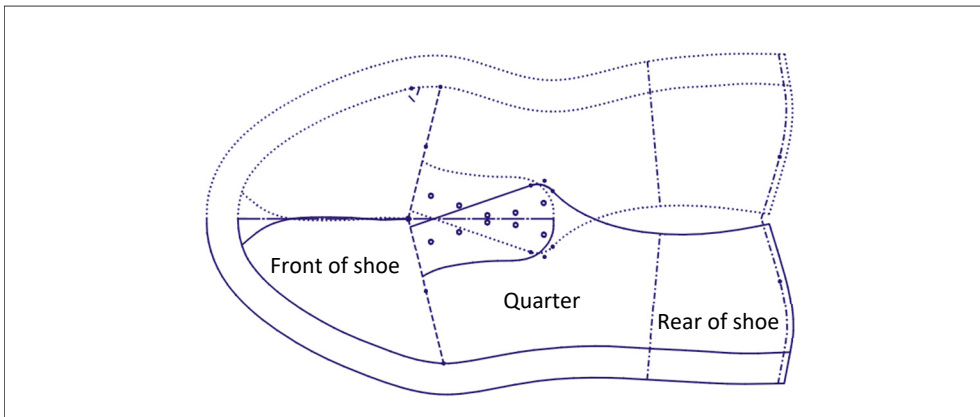


Picture 10-1

To transfer the appearance of the outer last to the inner last the six tools available, *Mirror 10/20/30* and *Transform 10/20/30*, are usually employed as follows, Picture 10-2:

	Closed fashion	Open fashion
<b>Front of shoe</b>	<i>Transform 10</i> tool	<i>Mirror 10</i> tool
<b>Rear of shoe</b>	<i>Transform 20</i> tool	<i>Mirror 20</i> tool
<b>Quarter</b>	<i>Transform 30</i> tool	<i>Mirror 30</i> tool


Calling these six tools ensues via *call list* → *Grafis Support Programs* or via right-click onto the *transform* button  in the basic menu.



Picture 10-2

### Calling interactive transformation tools 10/20

The following step-by-step guide applies to all four interactive transformation tools *Mirror 10/20* and *Transform 10/20*:

- ⇒ Call the tools via *call list* → *Grafis Support Programs* or via right-click onto the *transform* button  in the basic menu
- ⇒ [only for *Mirror 10/20*] click the mirror axis
- ⇒ Click one or more lines to be transformed
- ⇒ right-click or click on *End*
- ⇒ click one or more points to be transformed
- ⇒ right-click or click on *End*
- ⇒ activate the transformation tool by double-clicking or via <F12>
- ⇒ adjust the option *Object transformation off/all/individual*
- ⇒ adjust the transformation

### Options of the interactive transformation tools 10/20

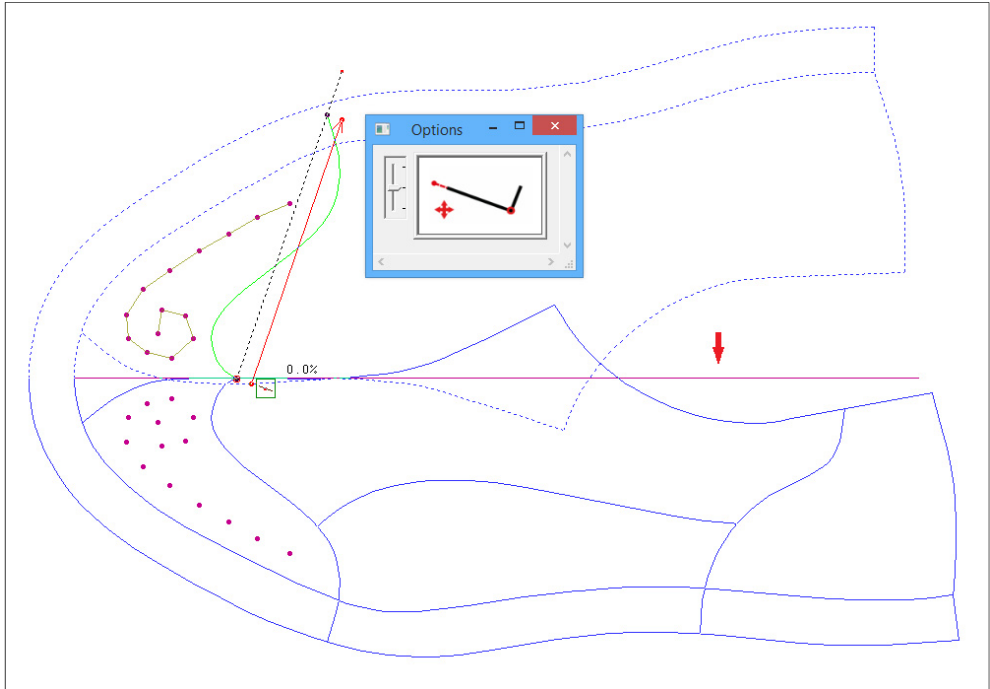
#### *Object transformation off/all/individual*



With setting 1, no move/rotate/compression is carried out. Only mirroring in the *Mirror 10/20* tools remains active. With setting 2, all objects are transformed **as a group**. And with setting 3, all objects are transformed **individually**. In setting 3 *all objects individual*, each object has the corresponding number of drag points for adjusting the transformation.

### Tools *Transform 10* and *Mirror 10*

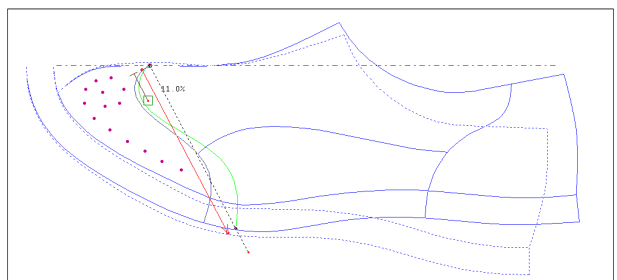
The design of the inner last and outer last for the **front of the shoe** is usually fairly symmetrical. In this area no rotation and /or compression is required.



Picture 10-3

The tool *Mirror 10* mirrors line and /or points along a mirror axis. Then, the **position and direction** of the mirrored objects can be modified interactively as a group or individually, Picture 10-3. Scaling along the length axis or, where applicable, along the width axis is also possible. The objects relevant for the transformation are highlighted in colour.

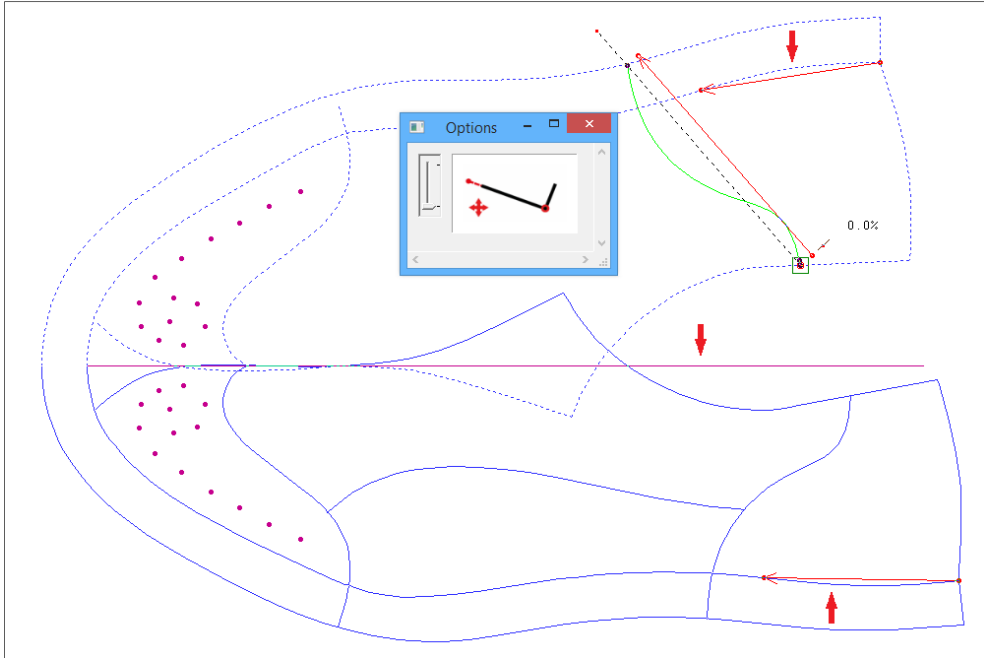
As tool *Mirror 10*, the tool *Transform 10* enables modification of the position and direction of the selected objects, Picture 10-4.



Picture 10-4

### Tools *Transform 20* and *Mirror 20*

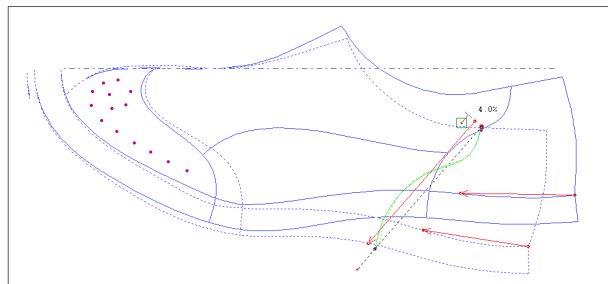
The position of the **rear of the shoe** can, in some circumstances, differ significantly from the front of the shoe. To transfer the design of the outer last to the inner last, transformation aides, in particular rotations are usually required.



Picture 10-5

The tool *Mirror 20* mirrors lines and /or points across a mirror axis. In addition, these objects are transformed with a **combined rotate and move** operation, Picture 10-5. Then, the position and direction of the mirrored objects can be modified interactively as a group or individually. Scaling along the length axis or, where applicable, along the width axis is also possible. The objects relevant for the transformation are highlighted in colour.

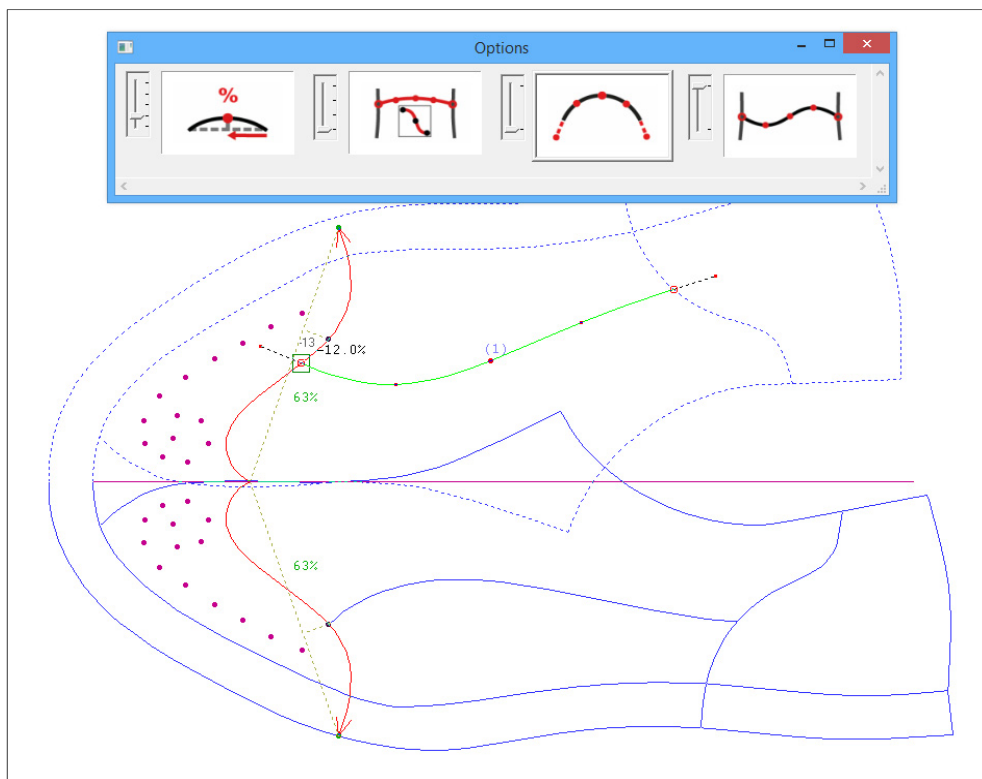
As tool *Mirror 20*, tool *Transform 20* transforms the objects via a combined rotate and move operation, Picture 10-6. Then, the position and direction of the objects can be modified.



Picture 10-6

### Tools *Transform 30* and *Mirror 30*

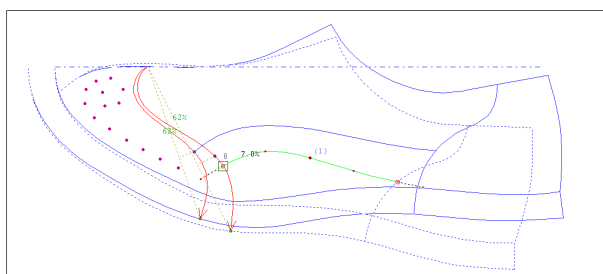
In the *quarter*, usually, **stretching and compression** is applied. Often, curves already exist, defining the **boundary of the quarter**. In this area, the design elements of the outer last are to be transferred to the inner last.



Picture 10-7

The tool *Mirror 30* mirrors lines along a mirror axis. Additionally, the lines are transformed via a **combined rotate and move operation** in order to position them appropriately, Picture 10-7. The base point positions are transferred in mm or % into the mirrored position. The lines are now mounted onto these points with different construction options. The construction options can be selected via an option switch.


The tool *Transform 30* transforms accordingly for closed method, Picture 10-8.



Picture 10-8

### Calling *Transform 30* and *Mirror 30*

The following step-by-step guide applies to both interactive tools *Mirror 30* and *Transform 30*:






- ⇒ call the tool via *call list* → *Grafis Support Programs* or via right-click on the transformation button  in the basic menu
- ⇒ click the mirror axis
- ⇒ click first and second boundary line of the outer last (source area)
- ⇒ click first and second boundary line of the inner last (target area)
- ⇒ click one or more lines to be transformed
- ⇒ right-click or click on *End*
- ⇒ activate the transformation tool via double-click or <F12>
- ⇒ adjust the options
- ⇒ adjust the transformation for each individual line

### Options for *Transform 30* and *Mirror 30*

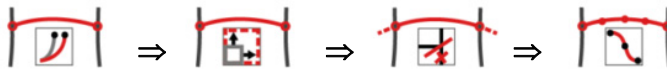
#### *Position absolute / relative*



The design element has already been transferred to the inner last. With this option you define where the element is bound onto the boundary lines of the inner last.

	The target positions for the beginning and end are calculated in millimetres along the respective boundary line.
	The target positions for the beginning and end are calculated in percentage along the respective boundary line.
	... as in setting 1 but the millimetres are calculated along the direct connection between the beginning and the end of the boundary line.
	... as in setting 1 but the percentages are calculated along the direct connection between the beginning and the end of the boundary line.
	The target position <u>at the beginning</u> is calculated in millimetres along the first boundary line and cut at the second boundary line.



**Construction method for hooking in**

The design element has already been transferred to the inner last and the target position has been determined. With this option you decide how the element is shaped. There are four adjustment options:

	Hook in, in the sense of <i>curve manipulation</i> in the <i>curve</i> menu.
	Scale
	Cut
	New construction with freehand points or direction curve, optionally starting at the original curve.
<p>For this option you can additionally select:</p> <div style="display: flex; align-items: center; justify-content: center;"> <span style="margin: 0 10px;">⇒</span> <span>... with /without direction handles</span> </div> <div style="display: flex; align-items: center; justify-content: center; margin-top: 10px;"> <span style="margin: 0 10px;">⇒</span> <span>... manipulation of the original curve or new shaping with freehand drag points</span> </div>	

## 10.2 Transformation

### The transformation menu



The functions of this menu allow for moving, rotating, scaling and mirroring of Grafis objects. The eight transformation types are:

- 2 move transformations
- 1 turn and move transformation
- 2 mirror transformations
- 2 turn transformations
- 1 scale transformation

#### Transformation menu

move...

move...: by dx and dy

move value dx

move value dy

move...

from point to point ▪ set points

turn with...

turn point and angle ▪ set points

turn angle

turn with...

turn point from point to point ▪ set points

turn and move...

with four points ▪ set points

scale transformation

scale

scale value in x direction

scale value in y direction

mirror...

mirror at...two points ▪ set points

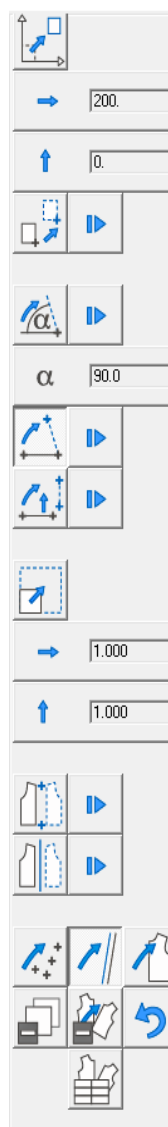
mirror at ...line ▪ set line

objects to be transformed

points ▪ lines ▪ part

+/-copy ▪ revers transformation ▪ reset

transformation list



## Object types

You can transform:

- points - single-
- lines - single -
- the complete part

### Step-by-step guide

- ⇒ Adjust the transformation parameters
- ⇒ Select the type of object (*points, lines...*)
- ⇒ Activate the transformation
- ⇒ Adjust *+/-copy*: the original objects remains/ does not remain existent
- ⇒ Set the transformation direction with *+/-reverse transformation* in reverse/ normal direction, e.g. change of sign for set angle.

No significance with mirror!

- ⇒ Click the objects to be transformed within the construction.

*Reset* resets the last transformation step.

## Move by dx and dy

This move function (translation) with pre-set values requires the entry of the move value in x direction dx and y direction dy.

The move values can be positive or negative:

dx= - ....mm to the left

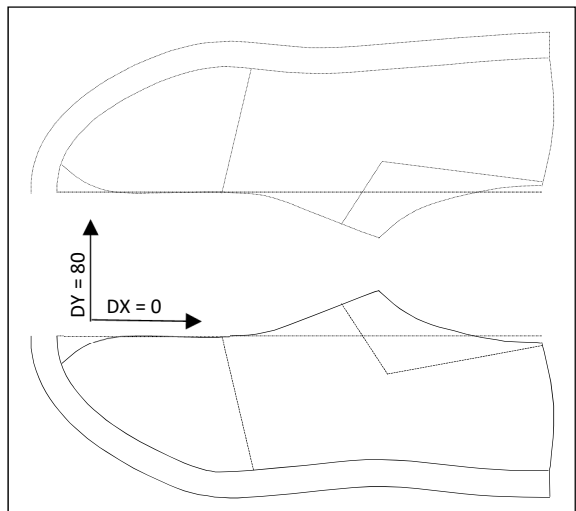
dx= + ....mm to the right

dy= - ....mm downwards

dy= + ....mm upwards

### Exercise

Call *Last 10*. Then, call *Basic shoe 10* into the second part of the part organisation and insert the complete *Basic shoe 10* with insert part into the third part of the part organisation. Move the lines of the last upwards with *move* dx = 0 and dy = 80, see Picture 10-9.



Picture 10-9

First enter the values for dx and dy, select *lines* and set the switch to *-copy* and *-reverse transformation*. The *move* transformation is active. You can now click the lines to be moved. Move the mirror line with *+copy*. Activate *points* and also move the corresponding points with *-copy*. Save the exercise as 'Exercise move with XY-coordinates'. Switch to *+reverse transformation*. You can now transform the objects back again. The transform settings remain in place also after quitting the *transformation* menu.

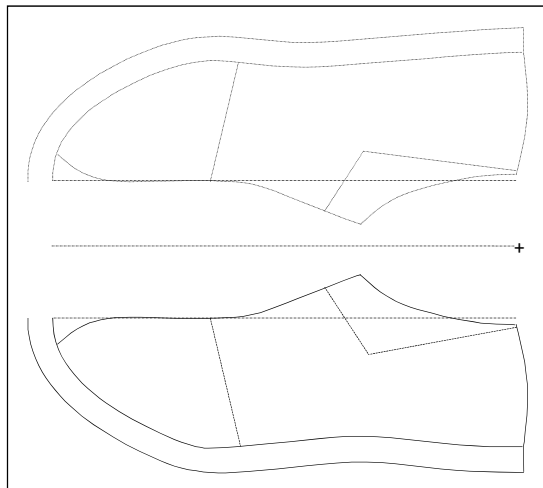
### Move from point to point

The objects are moved about the connecting line between two points of the construction.

After having clicked set points the starting and final point of the move line have to be constructed. Then, *move from point to point* is active and the move of objects can begin.

#### Exercise

In the style from Exercise 1, construct a point at 50% between the two mirror lines with *point between two points*. Move the mirror line to this point with *move from point to point*, see Picture 10-10. Save the exercise as 'Exercise move from point to point'.



Picture 10-10

### Turn with turn point and angle

With the transformation function *turn with turning point and angle* the objects are rotated about a constructed pivot point by a given angle.

**Note: The set angle remains constant throughout all sizes!**

After having activated *set turn point* the pivot point is to be constructed and the angle in ° is to be entered. Then, the transformation *turn with turn point and angle* is active and turning of objects can begin.

### Turn about a turn point from point to point

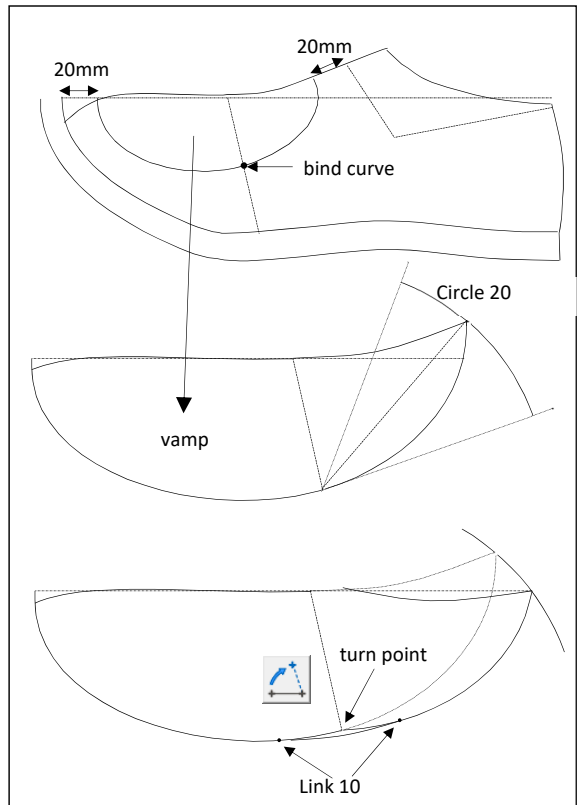
This transformation rotates the objects about a constructed pivot point. The angle is determined by the angle between this pivot point and two constructed points.

Having selected *points*, the points are to be clicked in the following order **turning point → starting point of the rotation angle and turning point → final point of the rotation angle**. Then, *turn about a turn point from point to point* is active and the rotation of objects can begin.

#### Exercise

The vamp for a loafer is to be constructed. For simplification purposes, construct the vamp on the inner last and then, mirror it for the outer last. Call *Last 10*. Call *Basic shoe 10* into the second part of the part organisation. Insert the lines of the outer last into the third part of the part organisation.

Construct a curve with the function *curve new* from the intersection mirror line/ sole edge to the intersection upper opening/ top edge of outer last. Move the first intersection of the curve 20mm to the right and the second intersection 20mm to the left, see Picture 10-11 top. Add an auxiliary point and bind this onto the point on the ball line. Set a direction at the beginning and end point of the curve at a right angle to the mirror line respectively. Insert the lines of the vamp together with the mirror line and the ball line into a further part of the part organisation. Process the vamp so that the protruding lines are cut. Separate the vamp curve at the ball line.



Picture 10-11

To avoid too much width at the top area of the vamp, this area must be transformed via *turn point to point*. Construct an interactive *Circle 20* about the intersection ball line/ vamp curve to the top edge of the construction. With the function *turn point to point* the top part of the vamp is transformed to the intersection mirror line/ circle. The turning point is the intersection ball line/ vamp curve. Transform the vamp curve to the ball line with *-copy*. Lengthen the mirror line to the intersection vamp curve/ circle. Link the two partial lines of the vamp curve with *Link 10*, see Picture 10-11 bottom. Now, the vamp curve can be mirrored at the mirror line.

### Mirror at two points

The objects are mirrored at the connecting line of two points, if there is no mirror line.

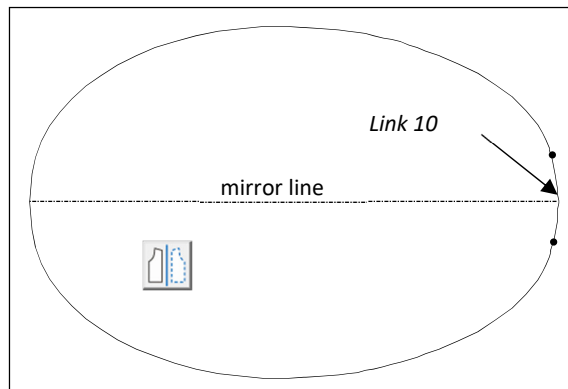
To activate this function the line *set points for mirror* is to be clicked and the points of the mirror line are to be defined with the sub-menu point construction. Then, the objects to be mirrored can be clicked.

### Mirror at a line

The objects are mirrored at an existing line of the construction. To activate this function, first click *set line for mirror* and then determine the mirror line within the construction. Then, the objects to be mirrored can be clicked.

#### Exercise

Mirror the vamp from Exercise 3 at the mirror line, see Picture 10-12.



Picture 10-12

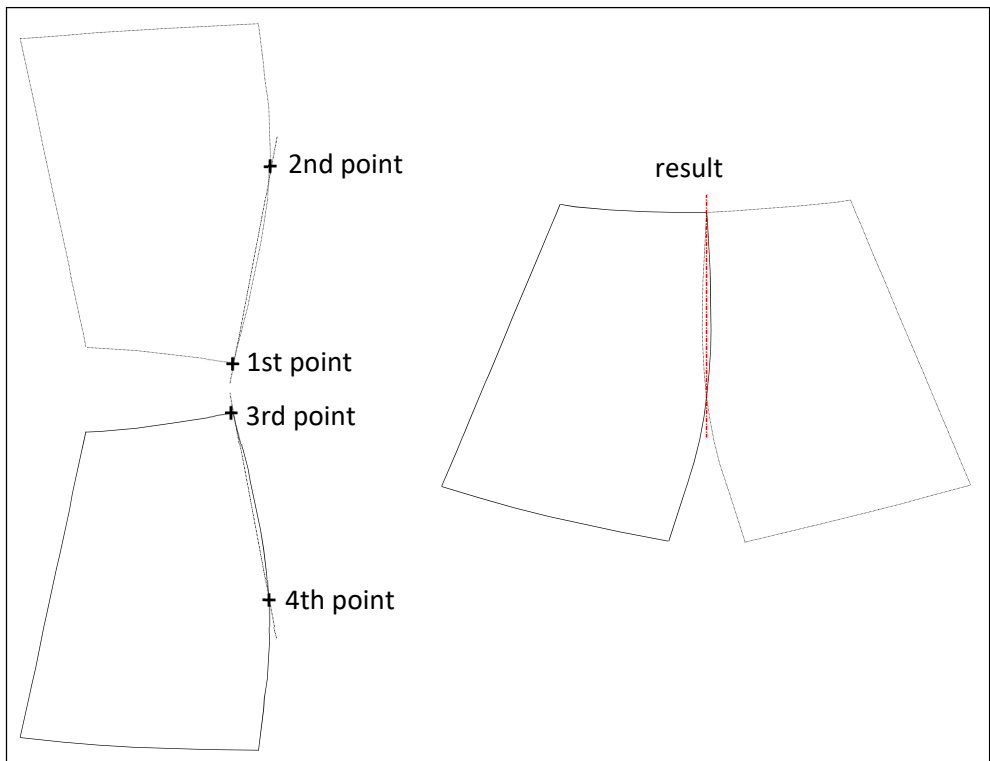
### Turn and move

The objects are moved and rotated in one operation. For this function four points are to be clicked. The move vector is defined by its starting and final point. The rotation angle is defined by the moved starting point and the final point of the angle.

After having activated *set points for turn and move* the points are to be clicked in the order **starting point of the move vector** → **starting point of the rotation angle** → **final point of the move vector** → **final point of the angle**. Then, *turn and move* is active and the transformation of objects can begin.

### Exercise

In this exercise, a one-piece heel cap, resembling a pair of 'trousers', is to be constructed from the split heel cap. Open the 'Basic style' from section 5.5 and activate the *Basic Shoe 10*. Set the option *Heel cap in mm* then, activate *Shoe type 11* and set the option *Bar tack curve* to the last setting. In the drag area *Lining and Details* a mirror line appears at the heel curve. Insert the lines required for the 'trousers' from the inner and outer last into a new part in the part organisation. Cut off the protruding line segments with *Corners*, see Picture 10-13.



Picture 10-13

Transform the lines from the two lasts together with the function *turn and move* from the *transformation* menu; the 1st point is transformed to the 3rd point and the direction of the 2nd point to the direction of the 4th point. Align the 'trousers' horizontally along the mirror line with the function *align*.

## Scale

The objects are reduced and increased relative to absolute zero.

The *scale value in x direction* (FX) applies to the X component of the objects in the construction only, the *scale value in y direction* (FY) to the Y component.

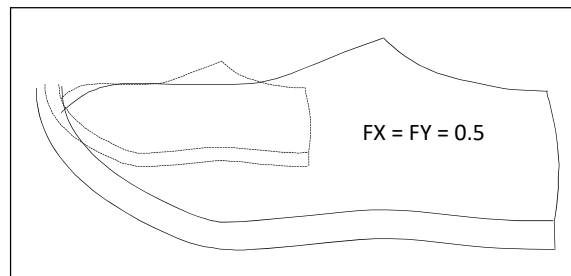
The following applies: FX = FY = 1.00 no change in scale; FX = 1.10, FY = 1.00 stretching of the pattern by 10% in horizontal direction; FX = FY = 0.90 shrinking by 10% in all directions.

***Different values in Fx ad Fy distort the construction in width and height. The same values increase or reduces the construction to scale; Fx=Fy=0.5 halves the dimension of the construction and Fx=Fy=2 doubles it.***

### Exercise

Insert the contour lines of the *Basic shoe 10* into a new part of the part organisation. Reduce the scale by 50%, see Picture 10-14.

Reset the record and double the scale.



Picture 10-14

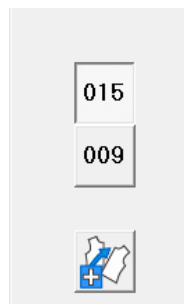
## Transformation list

***All transformations carried out in the active part can be re-activated.***

To activate the last transformation of a transformation type, click on the corresponding button:

- *move by DX and DY*
- *move from point to point*
- *turn with turn point and angle*
- *turn with turn point from point to point*
- *turn and move*
- *scale*
- *mirror at two points*
- *mirror at a line*

### Transformation list menu



record step

record step


+/-reverse transformation



In case no transformation of this type has been carried out in this part, setting of a new transformation begins automatically. If the selected transformation has already been applied, you can continue to transform or reverse the transformation with *+reverse transformation*, immediately.

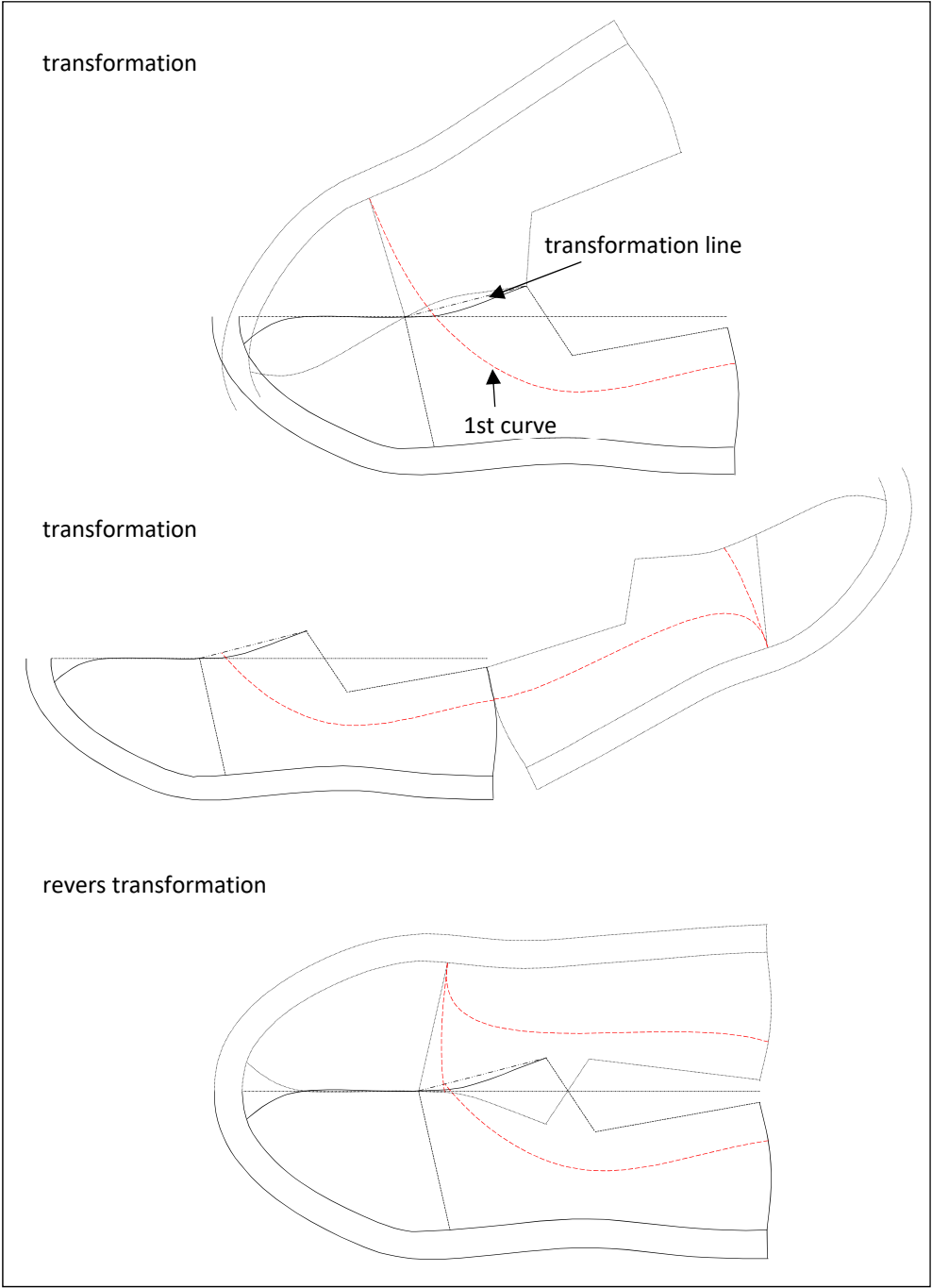
Step-by-step guide for selection of a previous transformation:

- ⇒ Activate the transformation type
- ⇒ Click on *transformation list*
- ⇒ Select one of the displayed record steps
- ⇒ Clicking on an object shows a preview of the selected transformation. If required, the transformation direction can be switched with *+/-reverse transformation*.

To select a previous transformation first, activate the respective transformation type then, click on *transformation list*. The *transformation list* menu appears showing up to ten previous transformations of the active transformation type. The menu displays the respective record step in which the transformation has been carried out. In this menu you can also see a preview of the transformation by activating the record step and then, clicking on individual objects of the construction. The objects will be transformed for a few seconds. Then, you can select a different record step and let individual objects be transformed for a few seconds. Once you have found and activated the required transformation switch back to the *transformation* menu with . Transforming with the previous transformation can begin.


### Exercise

A shoe is to be constructed with two panel seams from the outer last to the inner last respectively. Call *Last 10* and then, call *Basic Shoe 10* into a further part of the part organisation. Insert the required lines into another part. Construct a line from the ball point to the upper opening. Place the inner and outer last together along this line by transforming the inner last to the outer last with *turn and move*. The reference points are the ball point and the upper opening tip, see Picture 10-15 top.



Picture 10-15

Now, construct a curve starting at 25% of the heel line on the outer last to the intersection ball line/sole edge of the inner last. Separate the curve at the upper edge of the inner last. Transform the inner last to the heel line of the outer last with *turn and move*. Reference points are the intersection heel line/upper opening and 25% along the heel line, see Picture 10-15 centre. Transform with *-copy*.

Draw a curve from the heel line to the intersection of the first curve with the sole edge. At the heel line, transfer the direction of the first curve for a smooth transition. *Turn and move* is still active in the *transformation* menu. Activate *+reverse transformation* and carry out a reverse transformation for the last transformation. A menu showing the previous transformations for *turn and move* can be opened via the *transformation list*. Activate the first transformation with *+reverse transformation* and click a few objects of the construction. You will see a preview of the object's position after the reverse transformation. If the required transformation is still active, switch back to the *transformation* menu with  and relocate the lines of the inner last together with the new panel seam back to its original position with *-copy*, see Picture 10-15 bottom.

### 10.3 Align part

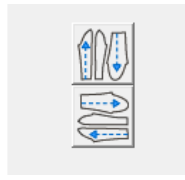


As opposed to the previous transformations *align part* does not apply to individual objects of the construction but to the whole active part.

The *align part* menu opens directly from the basic menu. Parts can be aligned vertically or horizontally. Having activated the corresponding function, a line of the part is to be clicked following the right principle.

#### Exercise

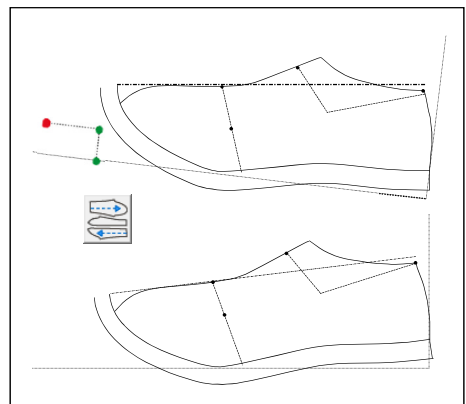
Open the style 'Basic style' from section 5.5 and insert the lines and points of the outer last into the fourth part of the part organisation. Align the inserted outer last with the function align horizontally, see Picture 10-16.



#### Align part menu

align part vertical

align part horizontal



Picture 10-16

## 10.4 Insert with transformation

With the *insert* function from the basic menu, points, lines or all objects of a part can be inserted into a part with a higher part number. This process has already been described in section 5.1.

During insertion of objects one of the two insert transformations can be carried out directly:

- move transformation *move from point to point* or
- move-rotate transformation *turn and move*.

***Insert with transformation is useful if a part with a large number of points/lines is to be inserted, as these will not have to be clicked individually but are transformed automatically.***

***Objects from a maximum number of 10 parts can be inserted into the active part.***

### Functions of the insert menu

#### Select objects:

All visible objects belonging to an inactive part with a lower part number can be inserted into the active part with these functions. One of the type of objects *points*, *lines* or *parts* is to be selected and the objects are to be clicked one after the other. The inserted objects appear in a different colour and, after having pressed <F5> removed from the original object.

With *reset single* or *reset all*

individual inserted objects can be reset step-by-step or completely.

The selected coloured objects are accepted into the active part only after having called a function in the *deposit objects* section of the menu.

#### Insert menu

select objects...

points ▪ lines ▪ part

reset single ▪ reset all

deposit objects...

without transformation ▪ move ▪  
turn and move

reset

tool...

Insert points ▪ Insert lines ▪  
Insert part



**Deposit objects:**

This block of functions determines **HOW** the objects or parts are deposited in the new part. In section 5.1 parts were inserted exclusively *without transformation*. However, Grafis allows for parts to be moved or rotated during insertion. This transformation is stored as a hereditary step and repeated automatically during grading.

**1. without transformation**

The selected objects are inserted without transformation, see section 5.1.

**2. move from point to point**

Moving a point of the object to be inserted to a point of the active part. All objects to be inserted are moved according to the transformation type *move* in the menu *transformation*. The difference is that individual objects do not have to be clicked but are moved automatically to the pre-defined position.

**3. turn and move**

Move and rotation of the insert object according to the identical instruction of the transformation type with the same name in the transformation menu; here also, the objects are transformed automatically.

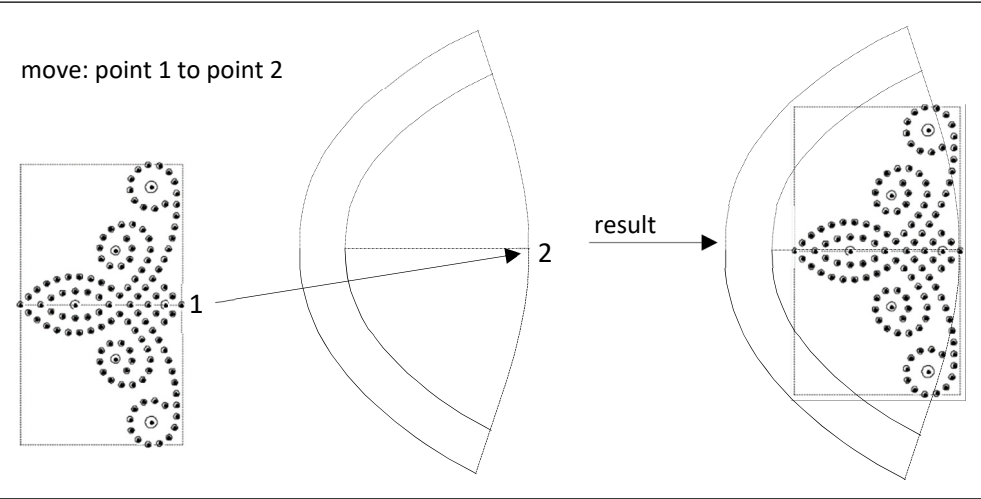
**4. Hook in**

An object is hooked into a part; it is proportionally increased or reduced in size, depending on the clicked points. The hooked part is graded proportionally to the part into which it was hooked.

**Exercise on insert with move transformation**

*Perforation 10* is to be inserted into the toe cap of the shoe construction and to be moved to a particular position. The tool has already been called into a part with a lower part number than the toe cap.

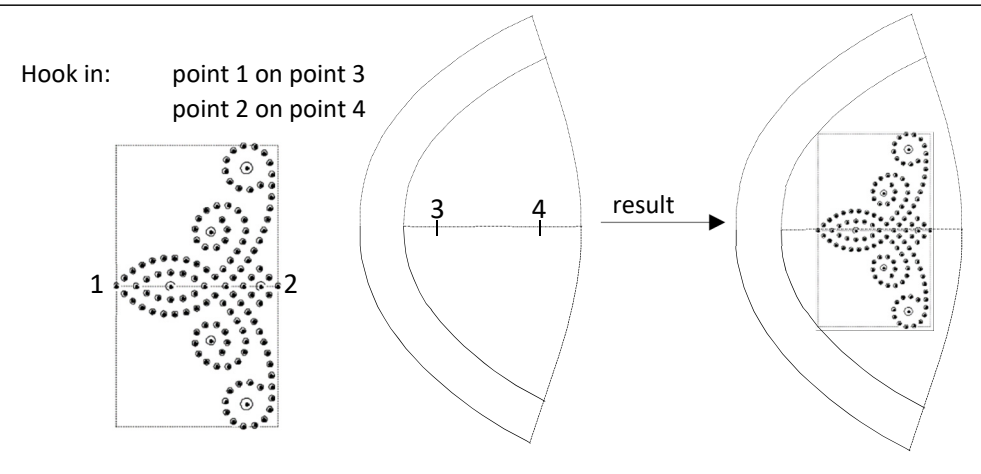
After having inserted the lines of the toe cap and depositing them *without transformation*, they appear in blue, the *Perforation 10* is inserted as a part. After having activated move, a point of the part to be inserted (red) must be clicked. Then, the desired position in the already deposited part (blue) must be clicked, see Picture 10-17. The *Perforation 10* is automatically moved to this position without size adjustment.



Picture 10-17

### Exercise on insert with hook in

The procedure follows the same steps as the previous exercise. However, to deposit *Perforation 10*, activate *hook in*. Now, click the start and end point of the part to be inserted (red). Then, define the start and end point of the already deposited part (blue). The start point of the red part is placed onto the start point of the blue part; the end points are placed correspondingly, increasing or reducing the part to the hooked in proportionally, see Picture 10-18. The hole diameters are altered also.



Picture 10-18

## Content

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### 11.1 The Part assistant



As detailed in section 2.1, style development in Grafis Shoe construction ensues in four stages:

- Load the background image of a last
- Call and adjust the interactive *Last 10*
- Develop a draft with all required design elements
- Derive the production patterns such as vamp, tongue, outer and inner lacing, heel, lining etc.

Derivation of production pattern pieces usually involves the following repetitive operations:

- insert lines and points into the production part
- close the net contour
- add seam allowances
- close corners
- add symbols to the seam allowance
- set point symbols such as drillholes
- set grain line and special lines
- assign part parameter

The existing Grafis functions from the different Grafis menus have been compiled in individual dialogues for exactly these operations in the part assistant. The operations carried out with the part assistant are recorded with these Grafis functions.

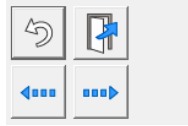
***Using the part assistant reduces the time required for deriving production pieces significantly.***

Having run through up to 10 dialogues, the part assistant switches to the next empty part and the user can continue immediately with generating the next production piece.

### Start and navigate the part assistant

Start the part assistant via the *basic menu* → *part assistant*. If the active part is empty, the first dialogue *Insert objects* opens. If the active part already contains objects (lines and points), the second dialogue *Search contour* opens automatically.



The following buttons for navigation can be found in all dialogues of the part assistant:




reset ▪ exit

backward <D> ▪ forward <F>



navigates backward and forward between the dialogues. Once all operations in the active dialogue are completed,  (shortcut <F>) switches to the next dialogue. If you realise in the last dialogue *Part parameter* that something needs changing in a previous dialogue for example, you can navigate back to the respective dialogue with . The recorded operations are preserved and carried out again during forward navigation. This applies only up to and including dialogue 4 *Seam allowances*. Backward navigation to dialogue 3 *Search contour* resets all previously recorded operations.

With  reset all recorded operations in the active dialogue. Operations recorded in other dialogues remain.

**You can normally switch between the functions in the dialogue with <TAB>.**



saves the part in its current state and ends the part assistant.

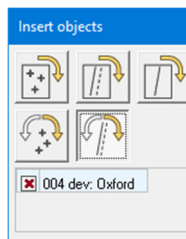


### ■ Dialogue 1 – Insert objects

In dialogue 1 *Insert objects* all lines and points required for completion of the production pattern are transferred into the active part.

Create a new style and open four new parts in the part organisation. Call *Last 10* into

the first part, call *Basic shoe 10* into the second part and *Shoe type 21* into the third part. Transfer all lines and points from the third part into the fourth part 'dev. Oxford' with the insert tool *Insert part* and develop an oxford style.

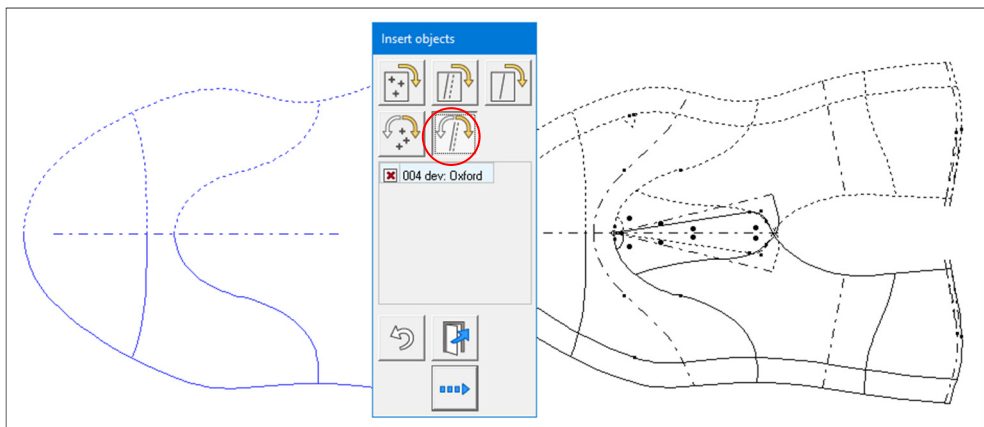


insert in frame all...

points ▪ lines ▪ continuous lines


individual points/lines in/out



list of source parts



Picture 11-1

Open and activate another part 005, hide all parts and switch only part '004 dev. Oxford' to be visible. The fifth part becomes the active part into which the objects for the production pattern 'O: vamp' are to be inserted. Activate the *part assistant* from the *basic menu*.

Using <TAB> activate the second button in the second row and click on all lines for the vamp. Part 004 appears in the list of source parts. Click on *reset* or  in the list of source parts. Select the suitable function with <TAB> and insert all required lines

and points according to Picture 11-1. With   *individual points/lines in/out* you can accept or remove individual points in the source part or the active part via clicking.

This dialogue of the part assistant may be used simply for inserting objects for example for a pattern development part. In this case, quit the part assistant after


having inserted the required objects with .


**All objects inserted in this dialogue cannot be released subsequently with 'Reset click'.**


 (shortcut <F>) switches to the next dialogue.

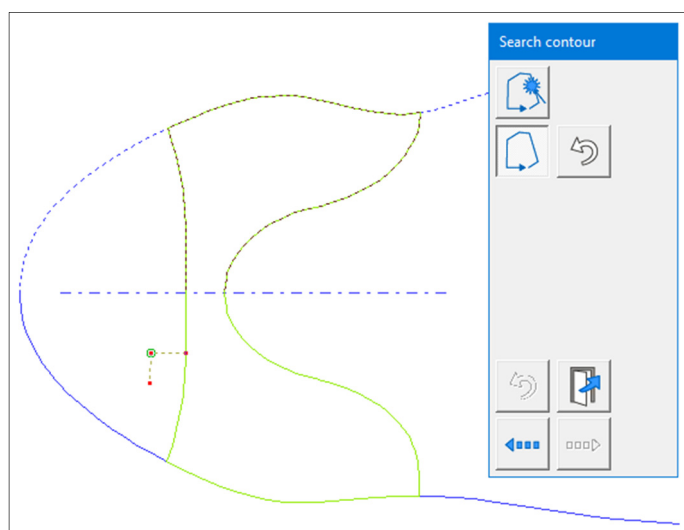
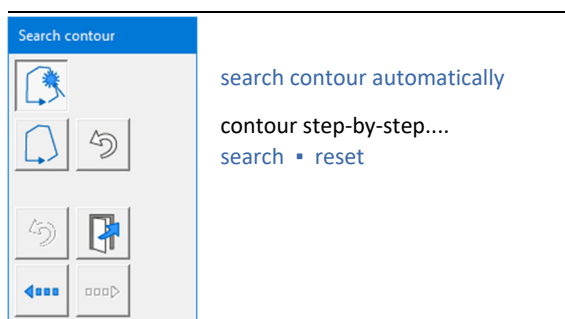
### ▪ Dialogue 2 – Search contour

With dialogue 2 *Search contour* the lines of the net contour and their order and direction are determined.

If only very small overlaps at the lines occur, first try searching for the contour with  *search contour automatically*. Activate the function and click on a line. If the desired contour is not found automatically, switch with <TAB> to

 *search contour step-by-step* and click the lines of the contour one after the other, see Picture 11-2.

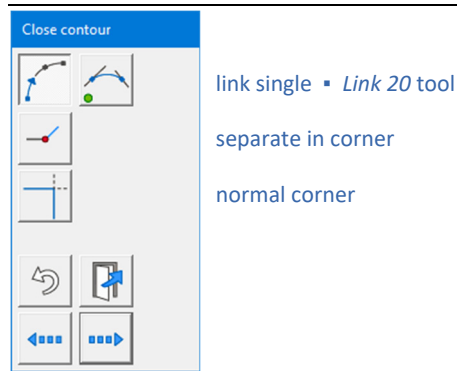
Only if button  is active is the net contour defined and you can move on to the next dialogue.



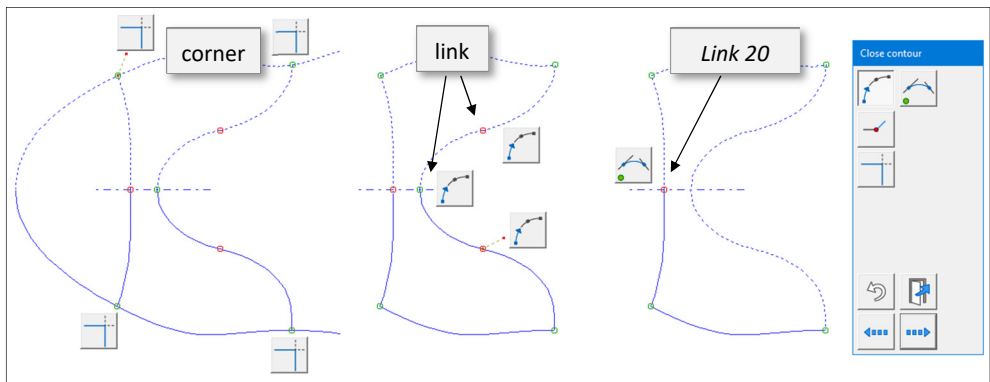
Picture 11-2

### ■ Dialogue 3 – Close contour


With dialogue 3 *Close contour* gaps or overlaps in the contour are removed. In this dialogue you find the function *link single* and the tool *Link 20* from the *link* menu, the function *separate in corner* from the *separate* menu and the *normal corner* from the *corner* menu.



All line transitions are marked by a green or red point. The functions from this dialogue can be applied to these line transitions. Red points indicate very flat line transitions which should be linked. The user can treat flat transitions either with *link single* or with the *Link 20* tool. As the assistant is aware of the order and direction of the lines, a simple click on the line transition is sufficient.



Picture 11-3

In this dialogue *separate in corner* may be useful to enable future corner treatment or in preparation for export of the parts. After having activated the function *separate in corner* the positions of the net contour, where it can be separated, are marked with .

Close the contour of part 005 according to Picture 11-3 and then move on to the next dialogue.

### ■ Dialogue 4 – Seam allowances

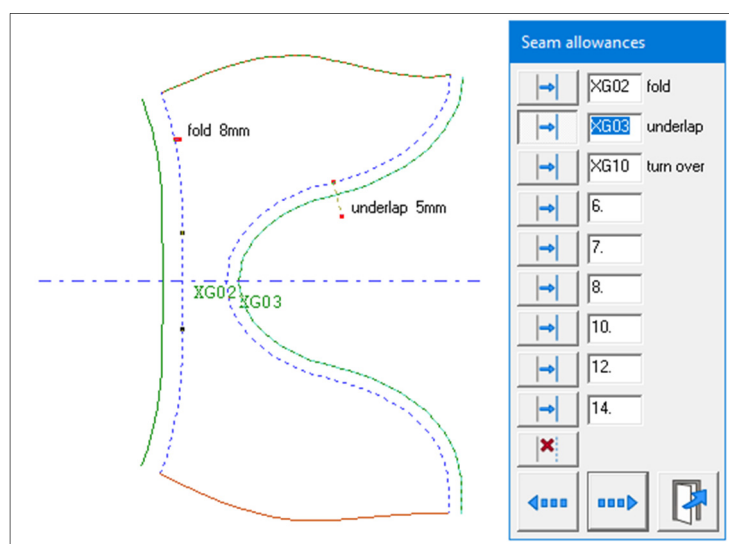
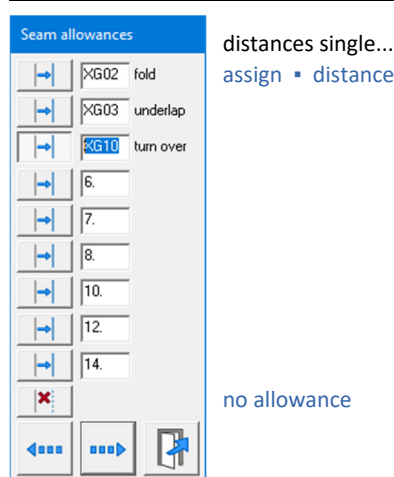
In dialogue 4 *Seam allowances* the seam allowances are added to the net contour.

***As opposed to all other dialogues of the part assistant, this dialogue can be opened and edited subsequently via <F12>.***

Initially, all lines of the net contour are assigned zero distance. In the dialogue, you can assign a total of nine distance values with numbers, x or z values. This assignment is saved in the style. The application of global x values  $xg$  are particularly useful, here, see Section 12.1. Enter the desired value and then click one or more lines.

For the construction in Picture 11-4, the top and bottom lines are not

assigned an additional value. The right contour line is assigned a distance for the underlap and the left contour line is assigned a distance for a fold. Both values are deposited as global x values. Then, move on to the next dialogue.

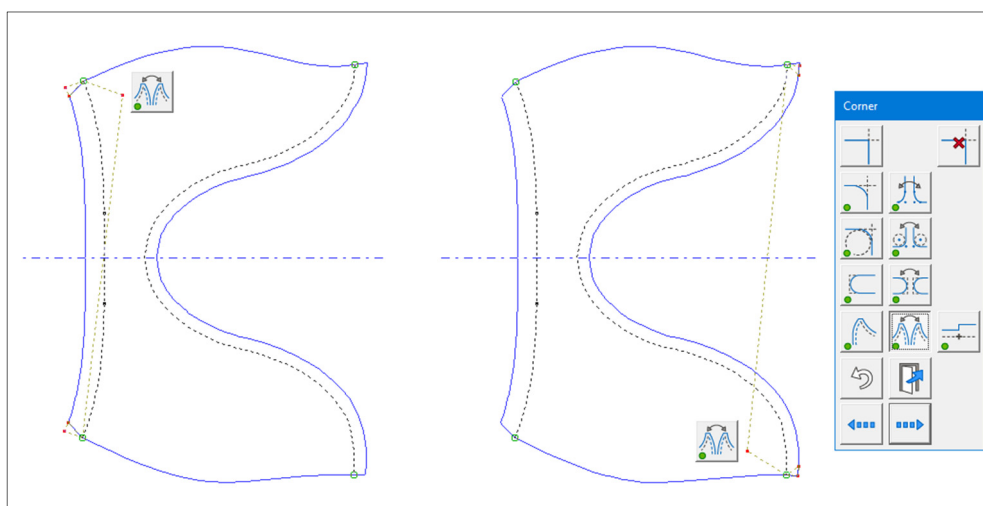
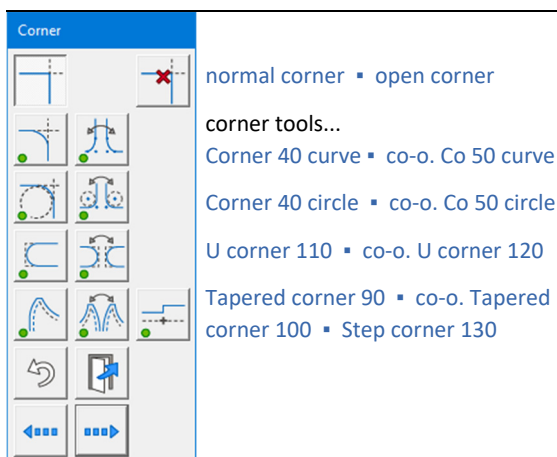


Picture 11-4

## ■ Dialogue 5 – Corners

In dialogue 5 *Corners* the remaining line transitions are closed via corner treatment. The line transitions are indicated by green points.

Select the required corner type with <TAB>. When the cursor is close to a line transition, a preview of the corner construction appears. Click on the line transition to re-assign or edit the corner construction.



Picture 11-5

To alter a corner, no reset is required. The part assistant automatically updates the record.

For the example in Picture 11-5 set two *co-ordinated Tapered corners 100*. Take note of the preview when clicking the lines; the position of the cursor defines the construction direction of the tapered corner.

- **Dialogue 6 – Existing symbols**

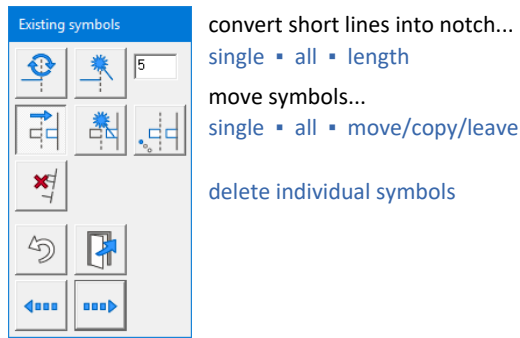
This dialogue appears only if there are line symbols or short lines at the net contour. Otherwise this dialogue is skipped. This is usually the case for shoe construction.

### Convert lines into notch

The first row of functions is only visible if there are short, totally straight lines of maximum 15mm length at the net contour which can be converted to a notch. Such short lines are marked with a red point.

### *Move line symbols*

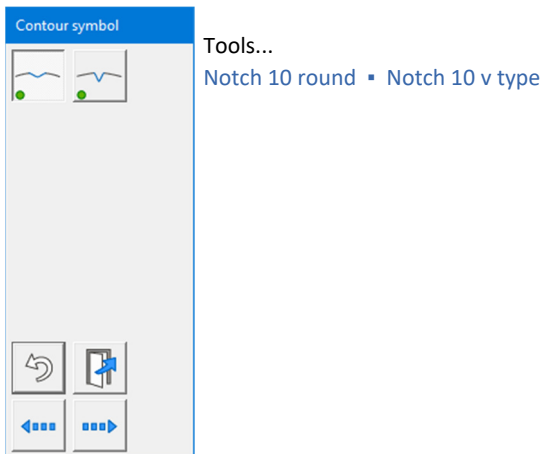
With the functions of the second row you can move line symbols onto the seam allowance. All line symbol which can be moved are marked by a green point.



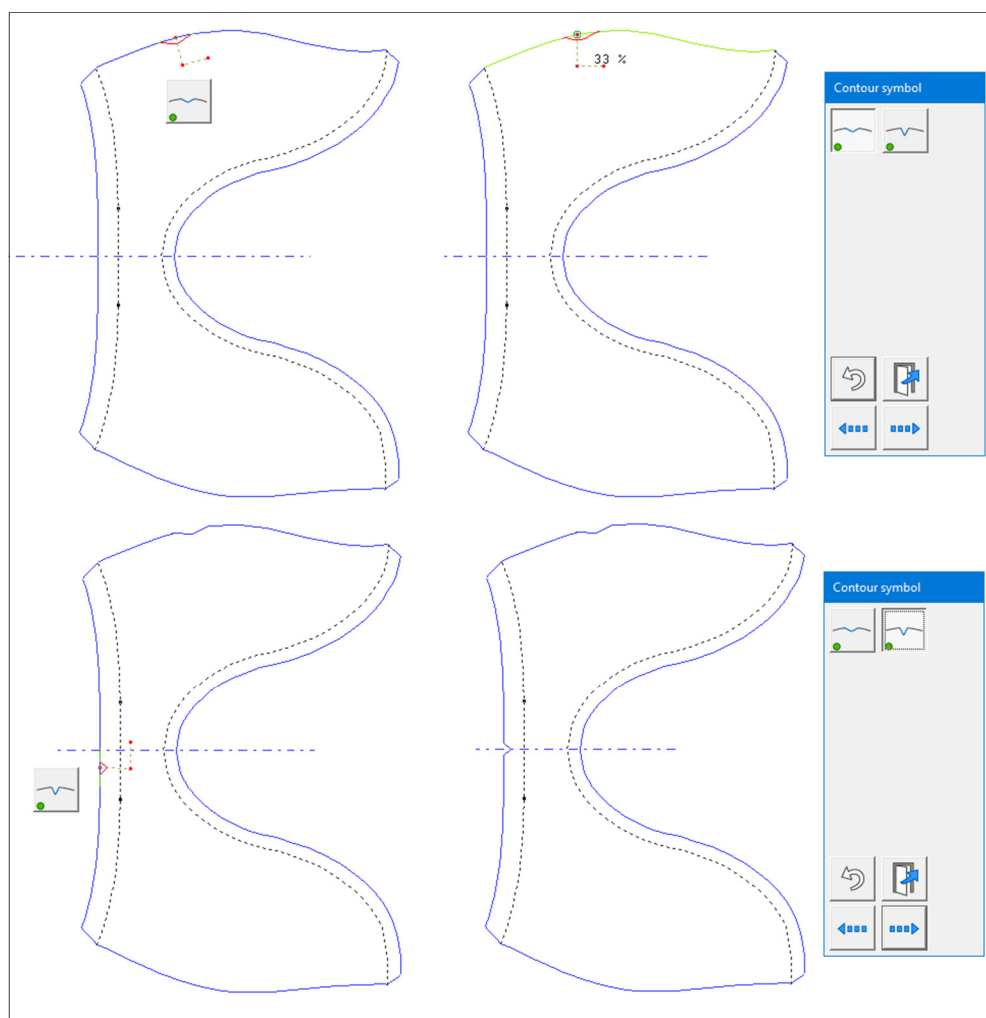
- **Dialogue 7 – Contour symbols**

In dialogue 7 *Contour symbols*, new contour symbols are constructed to the outer contour.

Select the required contour symbol and click the line into which the symbol is to be embedded. Note its **alignment**. Then, the sub-menu point construction opens for construction of the exact **position** of the notch, see Picture 11-6. In Picture 11-6



*Notch 10 round* is set at 33% on the upper line and then *Notch 10 v type* is set onto the intersection of the left line with the mirror axis.



Picture 11-6

### ■ Dialogue 8 – Point symbols

In dialogue 8 *Point symbols* new point symbols are set inside the pattern.

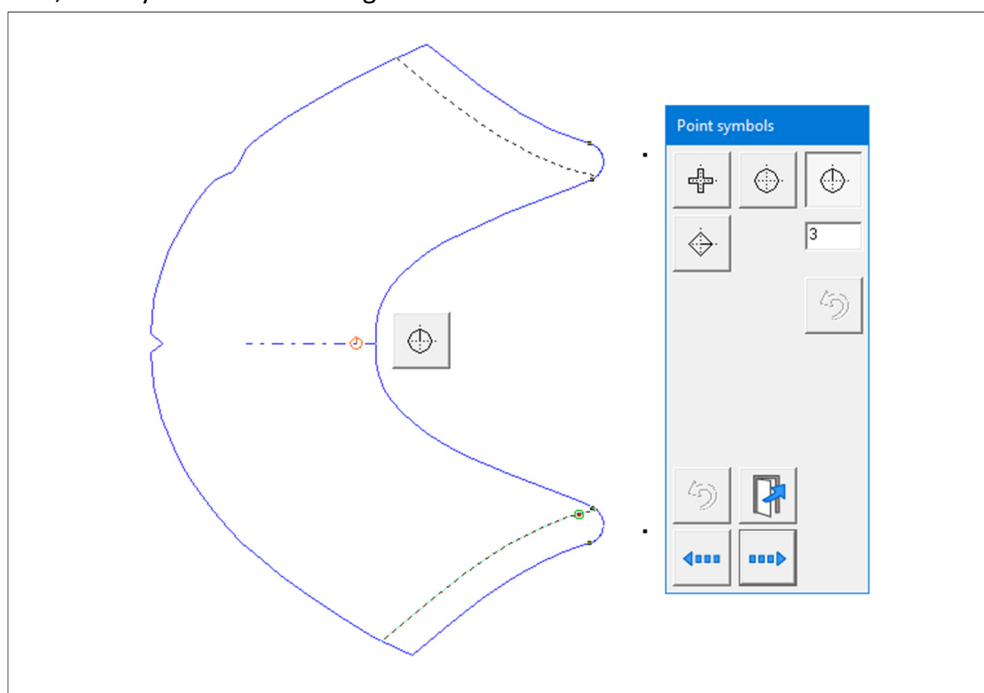
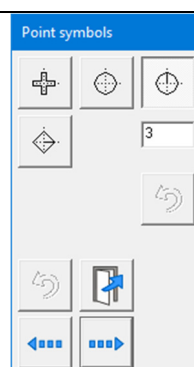
First, enter the desired symbol length, active the type of symbol and then set the symbol with the sub-menu point construction.

In Picture 11-7, as an example, the *drillhole* symbol has been constructed onto the mirror axis, exactly 5 mm from the right contour line.

cross ■ circle ■ drillhole

drillhole plotted ■ symbol length

reset last symbol






Picture 11-7




### ■ Dialogue 9 – Special lines


In dialogue 9 *Special lines*, the grainline and annotation line are constructed or assigned.

If a grain line or annotation line already exists, it can be deleted with  or  and then re-constructed at a new position or with a new direction.

 calls the tool *Grainline 10*.

With  an existing line can be marked as a grainline.

With  an existing line can be

marked as an annotation line. With , a new line is constructed with the tool *Line 10*. It is instantly assigned the attribute *annotation line*.

grain line...

*Grainline 10* ■ assign grain line ■

delete grain line

annotation line...

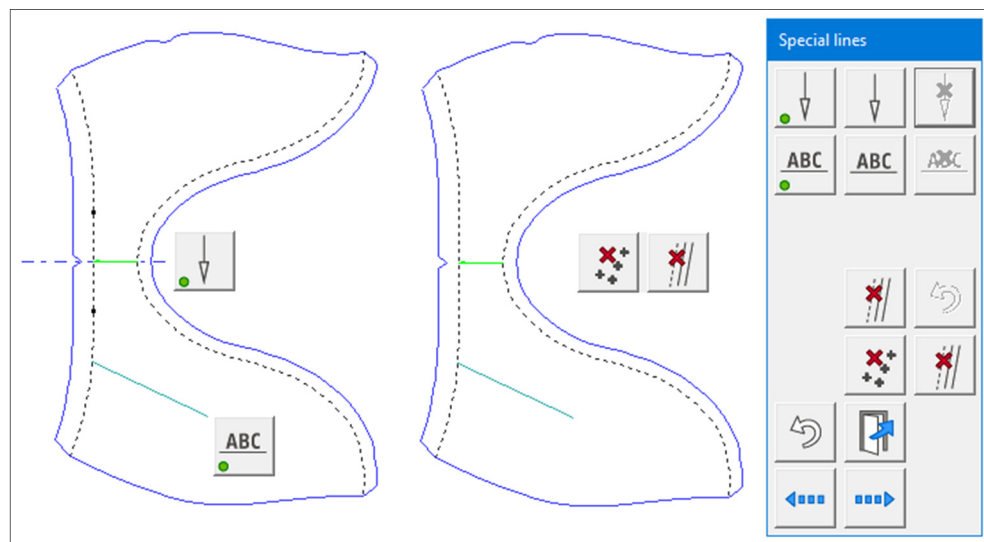
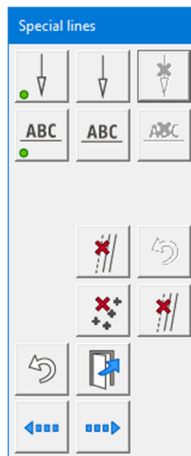
annotation line with *Line 10* ■ assign

annotation line ■ delete ann. line

delete single lines

delete...

all points ■ all unused lines



Picture 11-8



**At the end of the actual construction process, it is useful to delete all points and all unused lines. Click once onto  and  respectively.**

The part assistant saves the deleting of points and unused lines as a last record step in this part. This record step can be reset at a later date, if required, and the points/lines become visible again.

Set the grainline and the annotation line as displayed in Picture 11-8 and delete all points and all unused lines.

### ■ Dialogue 10 – Part parameter

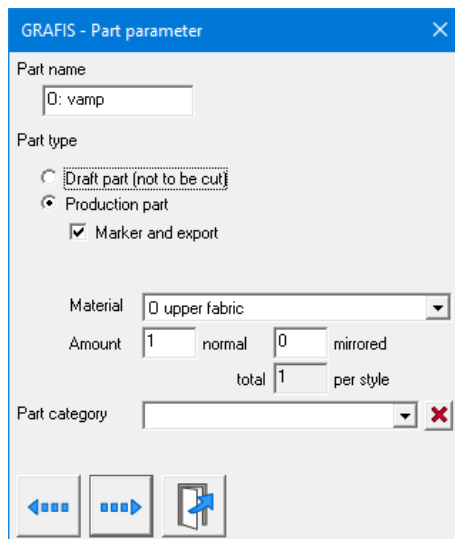
In the last dialogue of the part assistant, assign the part name and the part parameter to the part, see section 17.1 and Picture 11-9.

After clicking  the system automatically move on the next part or a new part is opened and the part assistant begins with dialogue 1 *Insert objects*. Alternatively, quit the part assistant with  and return to the basic menu.

### Subsequent alterations

Before quitting the part or the part assistant, you can navigate and edit backwards and forwards at will from dialogue 4 *Seam allowances* to dialogue 10 *Part parameter*. Recorded steps in other dialogues remain intact. Moving to dialogue 3 *Close contour* or lower resets all subsequent steps.

After having quit the part or the part assistant, all interactive functions called within the part assistant can be activated and adjusted via double-click or <F12>. Via <F12> or double-click onto the seam allowance, dialogue 4 *Seam allowances* can be opened for this part. The record is saved in blocks in the order of the dialogues. Resetting the record in the basic menu is therefore possible.



Picture 11-9

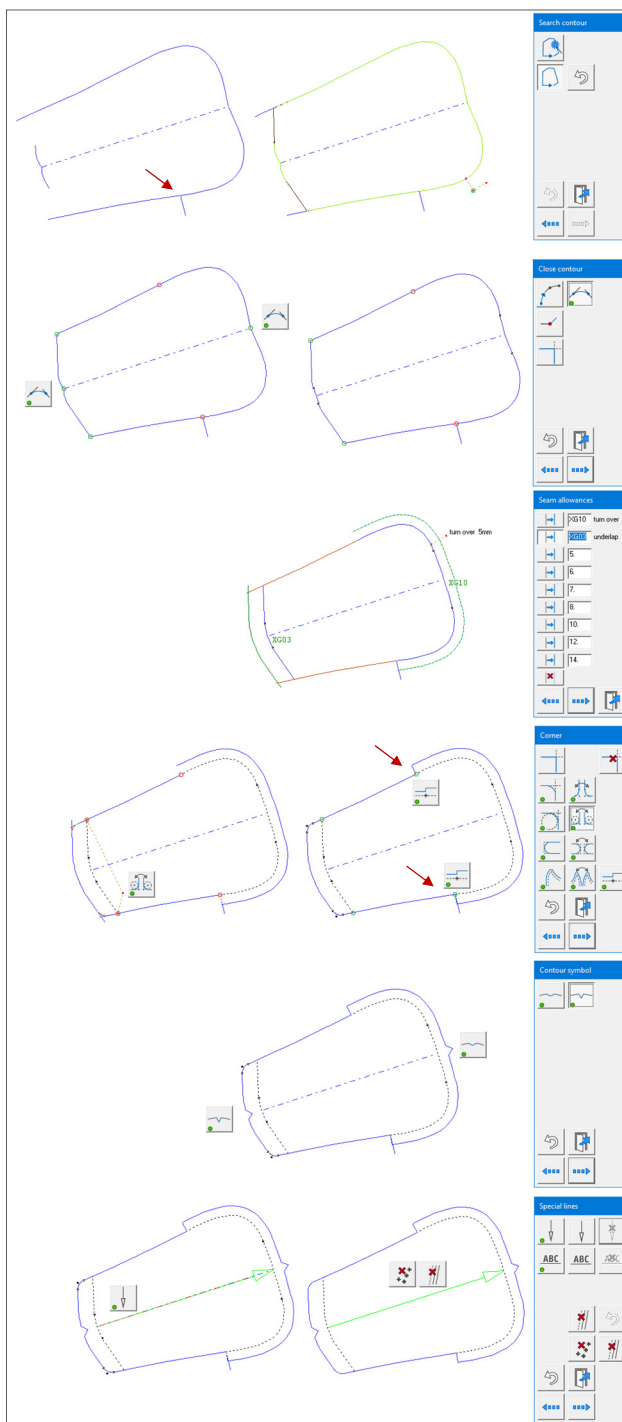
### Development of a tongue

The development of a tongue with the help of the part assistant is shown in Picture 11-10.

First, insert the lines for the half tongue with the part assistant. As further construction steps are required, leave the part assistant for now.

Cut the auxiliary line at the bottom and mirror the tongue at the dashed line. After these preparations, restart the part assistant and continue with the contour search.

For this production pattern, the use of *Step corner 130* is particularly emphasised.



Picture 11-10

## 11.2 Stack parts

### The stack menu

The *stack* menu is opened via the *Extras* → *Stack* pull-down menu or from the toolbox. With the functions of this menu, the graded stack of a part can be stacked at a construction point or the point of a line. The **outlay** function spreads all sizes next to one another in the order in which they are listed in the size table. The outlay is reset with repeated stacking or *test run*.



#### Stack menu

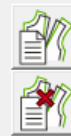
set stack point

set direction point

set recorded stack point

delete recorded stack point

outlay



Step-by-step guide for stack at a construction point or point of a line:

- ⇒ *set stack point* and click the stack point in the construction.
- ⇒ If required: determine direction point in the same way.

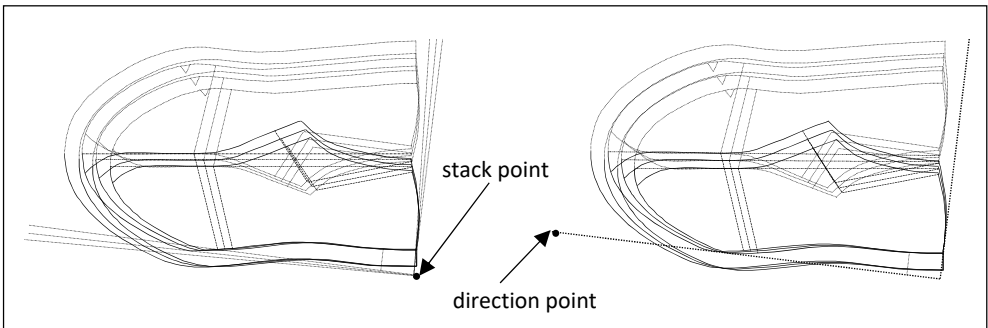
#### Set stack point

Having selected *set stack point* opens the sub-menu point construction, which is explained in detail in Chapter 7.

To stack a graded part first, activate set stack point, select a suitable option from the sub-menu point construction and then, click the required stack point of the construction, see Picture 11-11 left.

#### Set direction point

Having stacked a part at a particular point, a direction point can be determined. The patterns remain stacked at the stack point. The sizes of the part are rotated about the stack point so that the direction from stack point to direction point is identical in all sizes, see Picture 11-11 right.



Picture 11-11

### Recorded stack point

With the function *set recorded stack point* a point can be selected as the stack point for the active part. Stacking always ensues at the end of the grade run. In a mother part, setting a recorded stack point is not permitted. Activating *delete recorded stack point* displays the current stack point. Clicking deletes it.

### 11.3 Drag, rotate, flip parts

<F3> or the pull-down menu *Edit* → *Drag/rotate parts* opens the *drag/rotate* menu. Here, parts can be dragged, rotated or flipped to one another. Rolling parts, explained in the following section, is also controlled via this menu.



***The part to be moved is to be clicked.*** A drag cursor in form of a crosshair with circle appears offering the following functions:

#### Drag

Click inside the circle and drag with the left mouse button pressed down.

#### Rotate

Click outside the circle and rotate with the left mouse button pressed down.

#### Flip (mirror)

Click the symmetry axis about which the part is to be flipped (mirrored).

#### Additional functions

After having clicked on a part, the following functions are also available:

#### Scale

Adjust the display scale by clicking

- 1 : 0.2 for 5 times enlargement
- 1 : 1 for scale 1:1 (original size)
- 1 : 3 for 1/3 scale
- 1 : 5 for 1/5 scale
- 1 : 10 for 1/10 scale

The current scale is indicated immediately below this button.  
NB: The function keys <F2>, <F4> and <F6> are still active.

### Direction

Rotating the drag cursor in degrees by clicking the relevant button in the *rotate part* section. The current rotation is indicated immediately below this button.

### Nil rotation of the part

Reset the rotation of the part to nil.


### Set drag cursor

The drag cursor can be reset with the sub-menu point construction, see explanation in the previous section.

### Set drag cursor to point

The part is moved to a constructed point of another part with the drag cursor.

### Drag another part

After pressing  the drag cursor can be moved quickly to another part and dragged immediately.

### End

Dragging is terminated with 2x .

**The <F8> function key switches between 'parts in original (construction) position' and 'parts in transformed working position'.**

### Drag/rotate menu <F3>

activate drag/rotate ▪  
set drag cursor ▪  
set drag cursor to point

roll see section 11.4

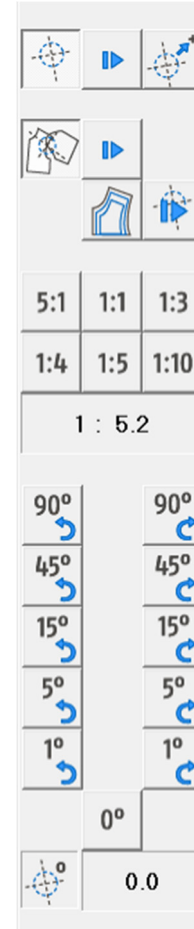
select scale

current scale



rotate part

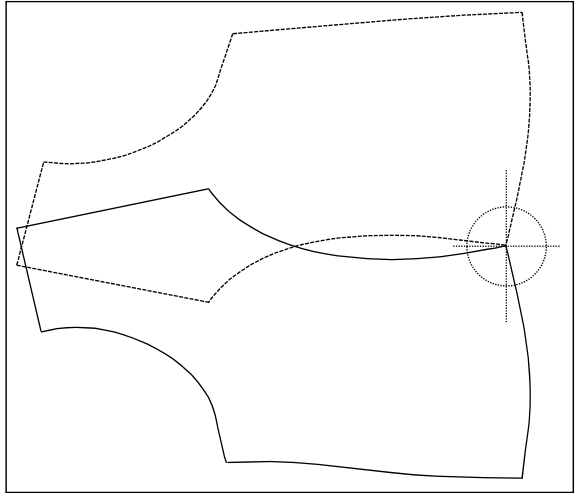
nil the direction of the part

current direction of the part




### Exercise with drag, rotate and flip

Open the Basic style from section 5.5 with *Last 10*, *Basic Shoe 10* and *Shoe type 11*. Insert the quarter of the outer last into a further part and the quarter of the inner last into the next part of the part organisation, leaving the two quarters visible. Press <F3> and activate *drag*, *rotate*, *flip* by clicking on any line. Activate  and select the intersection heel line/ upper opening of the inactive (black) part. Activate  and select the



Picture 11-12

intersection heel line/ upper opening of the active part, see Picture 11-12. Try also rotate and flip. Quit the *drag/rotate* menu with .



Press the <F8> key. The parts are placed in their original position and after renewed pressing of <F8>, they are repositioned as before. After pressing <F5> the parts are laid out in a rectangle. Now press <F8> again.

## 11.4 Roll parts

Roll parts along one another can also be found in the *drag/rotate* menu, accessed via the <F3> key or via the pull-down menu *Edit* → *Move parts*.

### Set roll

Step-by-step guide

- ⇒ Select *set roll* from the menu
- ⇒ Click one or more roll lines in the part to be moved. The roll direction must be considered and communicated to the system with the help of the right principle.
- ⇒  terminates line selection in the part to be moved.
- ⇒ Click one or more roll lines in the part to remain stationary. Here, the roll direction must also be communicated.
- ⇒  terminates line selection in the stationary part.
- ⇒ Determine start point for rolling in the part to be moved.
- ⇒ Determine start point for rolling in the stationary part.

## Adjust roll

With **set new start point for roll** new start points can be selected. Setting new start points is useful where ease has been included and the line sections are to be checked one after the other.

Roll ensues in the base size only. Occasionally, other sizes are to be checked as well as the base size.

Activate **select size for roll**. All sizes in which both parts are available will be offered. Select a size and roll.

Switching to the drag mode from section 11.2 is possible via activate **drag/rotate**. Switching from the drag mode back to the last set roll mode is possible via **activate roll**.

## Roll parts in drag/rotate menu <F3>

drag/rotate  
see section 11.4

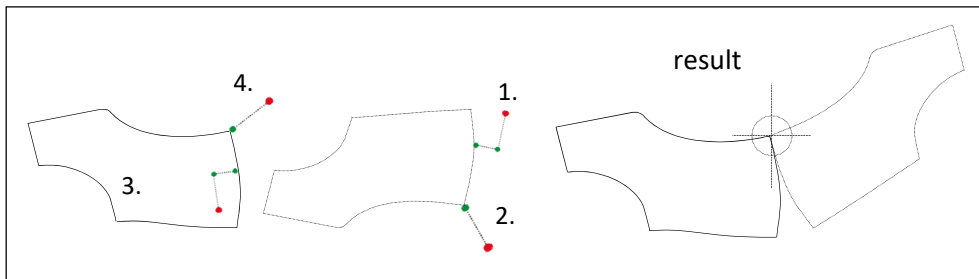
activate roll ▪ set roll

select size for roll ▪  
set new start point for roll



## Exercise on rolling parts

Roll the two quarters from the previous exercise against one another along the heel line. Follow the step-by-step guide above and consider the click sequence and direction. Having successfully adjusted the roll lines and the starting points, a drag cursor appears. Rolling ensues by dragging the drag cursor with the left mouse button pressed, see Picture 11-13. Flipping during rolling is also possible.



Picture 11-13



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**12.1 The construction parameter X value**

The application of the construction parameter x value and the resulting manifold styling options is one of the outstanding features of Grafis. The skilful use of x values allows for creation of style variations or trend adjustments through adjustment of the x values, only.

**The X values**

X values are size-related construction parameter. The numerical values are logged in x value tables and can represent lengths, distances, radius or angles, for example. X values can be altered after completion of a style at any time. Thus, later modification of the style is possible in a very effective manner.

There are three different types of x values:

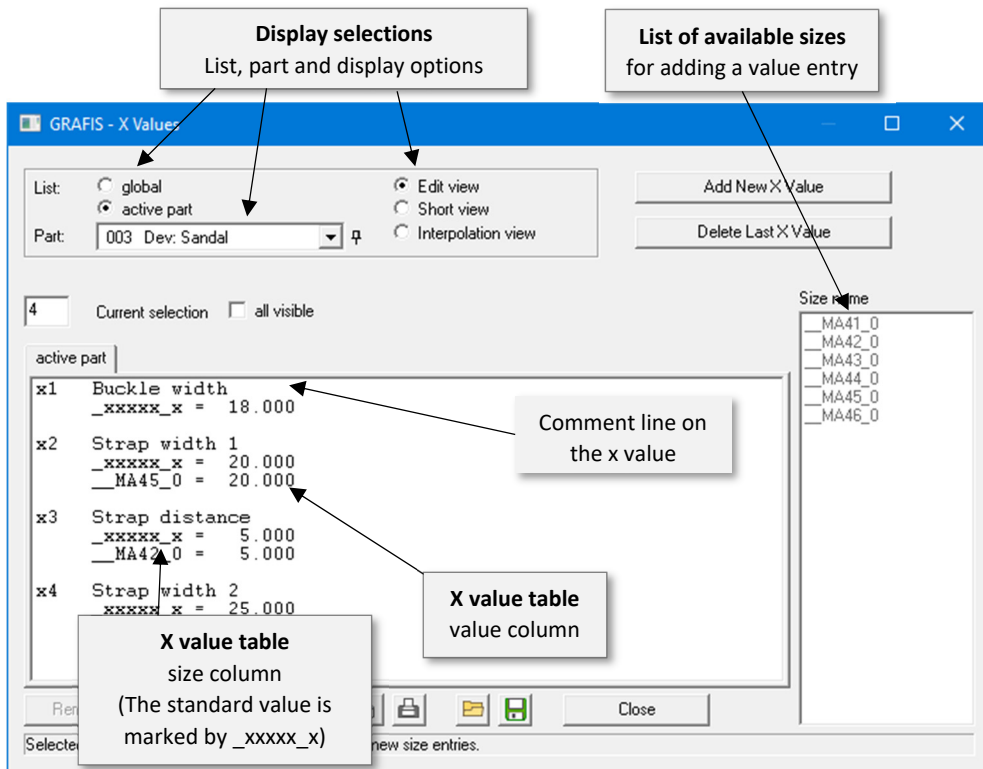
- x values of the construction record,
- x values of non-interactive basic blocks and
- x values of all parts (global x values).

The difference relates to the validity of the respective type of x value. The application of x values is identical for all types and is elaborated on the x values of the construction record.

***The x values of the interactive constructions can only be edited in the drag interface and are greyed out in the x value list.***

## Step-by-step guide

- ⇒ Open the x value table from the pull-down menu *Extras* via *X Values...* or from the toolbox
- ⇒ Select the list *global* or *active part*
- ⇒ Adjust one of the view options *Edit view*, *Short view* or *Interpolation view*
- ⇒ Add, edit or delete size-related x value assignments



Picture 12-1

## The x values of the basic blocks

Each basic block contains a prepared x value table. The x values represent lengths, percent, or angles which are variable according to the respective construction instruction, e.g. ease or position and length of the darts. The implementation of the x value into the basic block and pre-assignment of an appropriate value ensued by the developer of the basic block. The user has the option to modify the basic block to his own requirements by altering the x values.

### **The x values of the construction record**

The x values of the construction record are user defined and implemented during construction. Thus, the respective construction step can be altered later.

***Before starting the construction consider for which construction steps the use of x values would be beneficial for flexible pattern modification!***

In the following menus the use of x values offers great modification options:

- *parallel* menu: distance for parallels
- *raster* menu: distance values and number of points
- *lengthen* menu: values for lengthen by and lengthen to
- sub-menu point construction: values for relative length or partial length
- *dart* menu: ...% of dart to be relocated
- *spread* menu: distance of spread line
- *curves* menu: bind starting point, final point and base points of the new curve via the point construction sub-menu
- *transformation* menu: move amount, scale factor, rotation angle
- *points and lines* menu: distance values, relative values for point construction, length of a line

### **The x values of all parts (global x values)**

Global x values apply to all parts of the style. They can be used for example for:

- seam allowance self / lining,
- ease,
- distances for markings,
- adaptation factors for stretch etc.


***The x values of all parts are additionally indicated with a G (for 'global'); small and capital letters have the same significance. Example: XG5 or xg5.***

XG5 stands for the fifth x value of the x value table of all parts whereas x5 stands for the fifth x value of the construction record of the active part. This rule applies to calculation with z values as well as direct entry into numerical fields

***You can switch between record x value tables of different parts in the 'Grafis X Values' window, directly. Merely select the required part number in the 'Part:' field.***

### Step-by-step guide for editing x values

⇒ Insert new x value into the x value table:

- *Extras* → *X Values...*
- Select the list *active part* or *global*
- Click on *Add new X Value*. A maximum of 80 x values can be opened per part.
- Double-click the comment line and enter the description for the new x value. Be careful to use clear definitions!
- Double-click on the standard value (to the right of *\_xxxxx\_x=*), enter the value and <ENTER>
- possibly: insert size-related x value entries
- possibly: delete the last x value with *Delete last X Value*
- Quit with  or with *Close*

⇒ Continue the construction and enter an x value (e.g.: X2 oder XG1) instead of a numerical value

### The Grafis - X values window

The *Grafis - X values* window offers the following option for display of the required x value table, see Picture 12-1.

#### Liste

For each part one of the following x value tables can be displayed:

- global (the x values of all parts) or
- the x values of the active part.

The x value list of the interactive constructions remains greyed out.

#### Part:

Select the part for which the list of x values is to be displayed.

#### Display options:

The x value table can be displayed in the options

- *Edit view*,
- *Short view* or
- *Interpolation view*.

The **Edit view** with all size entries is the most detailed option.

In the **Short view** only the x value numbers and description and the standard value *\_xxxxx\_x* are displayed.

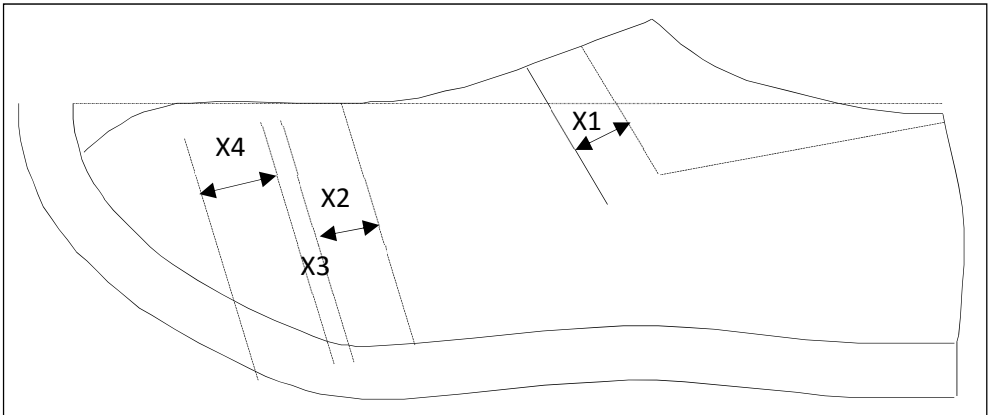
Interpolated values for specific sizes can be viewed in the **Interpolation view** after having clicked the size in the *Size name* field.

**Generate new x value and apply it to the construction**

Open the list of x values of the construction record via *Extras* → *X values...* and select *List: active part*. The file card *active part* is active. Switch to *Edit view*. Open a number of new x values by clicking on *Add new x value* and delete a few by clicking on *Delete last x value*.

**Exercise**

Start a new style, call *Last 10* and then, *Basic Shoe 10* into a further part. Insert the lines into another part, see Picture 12-2.



Picture 12-2

Open the x value window and enter x values for the active part for the buckle width, the strap width for the first strap, the strap distance and the strap width for the second strap and assign the following values:  $x_1 = 18\text{mm}$ ,  $x_2 = 20\text{mm}$ ,  $x_3 = 5\text{mm}$  and  $x_4 = 25\text{mm}$ . With *parallel* construct a parallel to the upper opening with  $x_1$ . Construct a parallel to the ball line with  $x_2$  and a parallel to this parallel with the strap distance  $x_3$ . A further parallel is to be constructed for the second strap with  $x_4$ , see Picture 12-2. Alter the x values and do a test run. Save this exercise as 'Exercise Sandal 2'.

**Alterations to x values are only visible after test run and grading.**

**An x value must be defined before it can be used in a construction step. Should this not be the case, Grafis will refuse processing.**

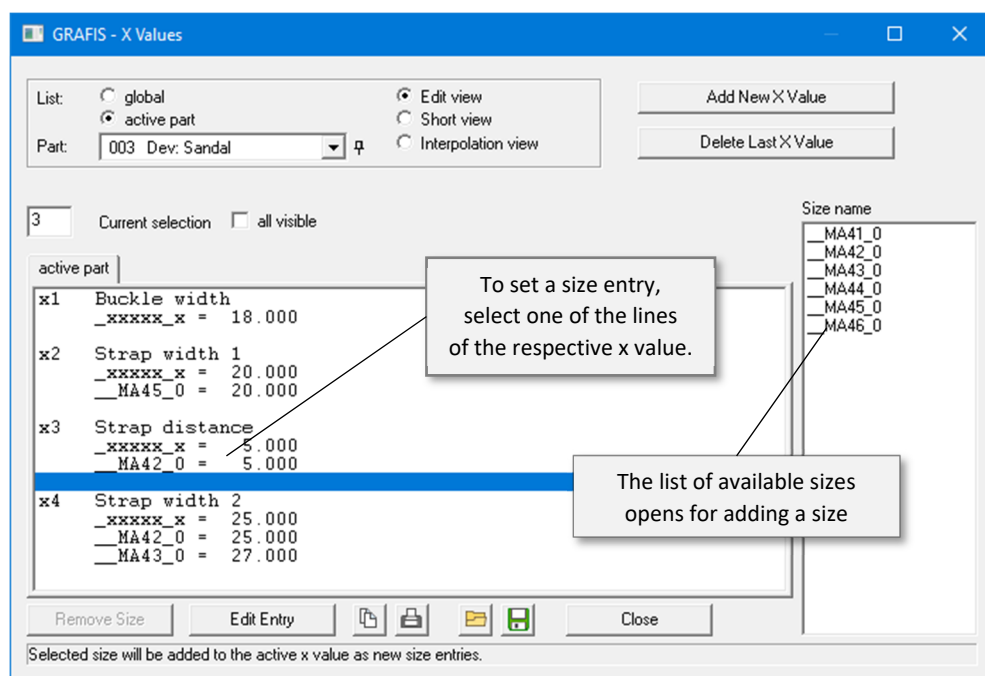
**Whether an x value is interpreted in mm, in percent or in degrees depends on the function with which the x value is used.** When entering the x value as a relative length, the x value is used as a percentage. When entering the x value as a rotation angle, the x value is an angle in degrees.

### Redirecting an x value

x values of the construction record can be redirected to global x values. The character set in the comment line of the respective x value is supplemented with =>{XG4}, here for the redirection to the fourth global x value. If this character set is removed, the original values apply.

### Size-related x values

Adding, editing and deleting size-related x values can ensue in the *Edit view*, only Picture 12-3.



Picture 12-3

To **add x value entries** the x value or one of the corresponding size-related x value entries are to be highlighted. The list of available sizes from which sizes can be selected by clicking opens to the right. Each selected size is accepted into the x value table.

**A size can be assigned a value, only if it is available as a size on the workstation!**

Adding new x value entries is followed by **editing the values** by double-click on the numerical value or clicking on *Edit entry*. With *Edit entry* the next numerical value is offered, automatically.

To **delete or edit x value entries** the entry is to be highlighted and *Remove Size* is to be clicked.

### Rules for size related value assignment

X values can be altered in correspondence with the size. However, it is not necessary to assign each size with a value. The following cases apply:

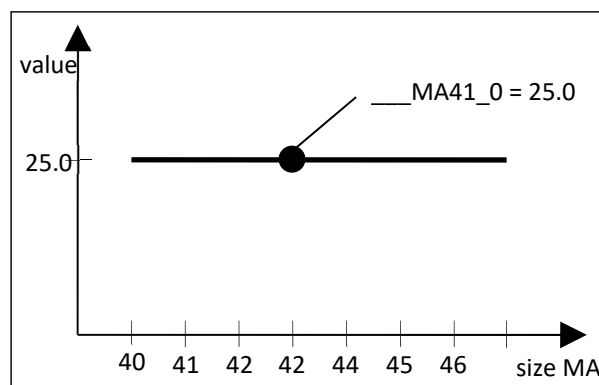
#### **Case 1: The x value is identical for all sizes.**

In this case, only the standard value `_xxxxx_x` is to be assigned. Further entries are not necessary.

#### **Case 2: The x value is to be identical for all sizes of the same last type.**

The standard sizes are organised in last types.

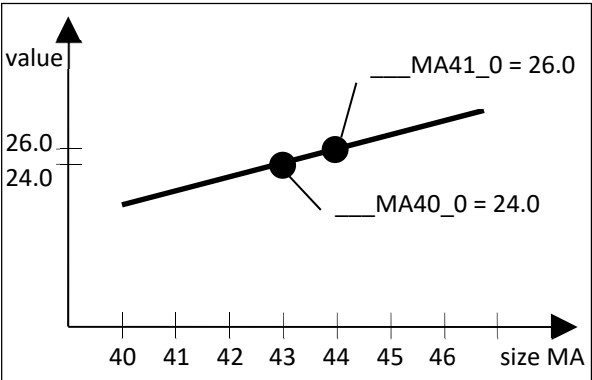
If only one size of a last type is assigned a value this value applies to all other sizes of this last type, see Picture 12-4.



Picture 12-4

**Case 3: An even alteration to the x values for the sizes within a last type is to ensue.**

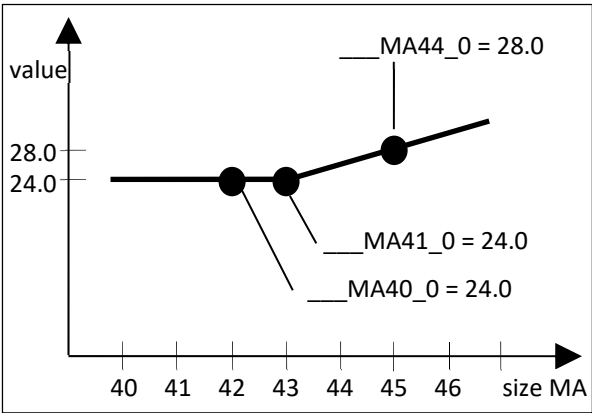
In this case it is sufficient to assign **two** sizes of the relative last type with the required x values. The even alteration of the x value is continued throughout all sizes of the last type, see Picture 12-5.



Picture 12-5

**Case 4: The x value is to be altered unevenly within a last type.**

In this case it is necessary to assign values to a number of sizes. The following rule applies: an even alteration of the x value ensues between two adjacent sizes. The even alteration continues for the sizes before the first and after the last entered size, but for the respective last type, only, see Picture 12-6.



Picture 12-6

***These rules apply to standard sizes of a last type, only.***

***Individual sizes can be assigned x values, also. Furthermore, an individual size can be assigned the x value of a standard size via x value references, see section 12.3.***

***Enter the x values absolutely necessary for the required dependency into the x value table, only. This makes care easier and reduces mistakes.***

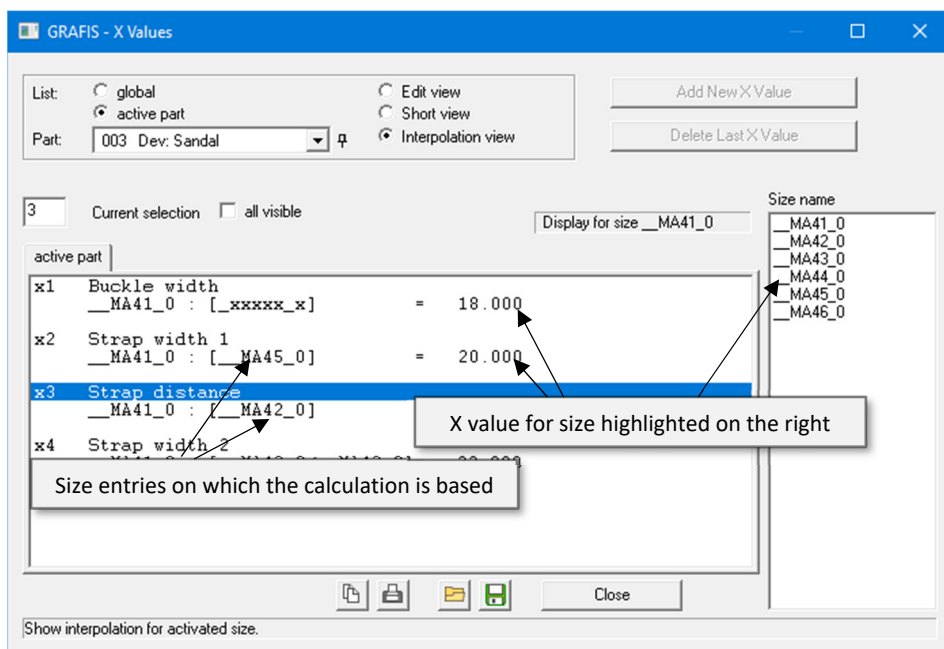
***After having altered x value entries test run should always ensue!***



### Checking the calculation of x values

Checking x value calculations is made easy with the *Interpolation view* option, Picture 12-7. Select the respective sizes in the *Size name* list. In the x value table only the x values of the respective size are displayed. Additionally, the sizes used for calculating the x value are stated. The calculation variations are displayed as shown for size \_\_MA45\_0:

1. The standard value applies to the respective size (\_\_xxxxx\_x), e.g.:  
x1 Buckle width  
\_\_MA45\_0: [\_\_xxxxx\_x]
2. A specific value is assigned to the respective size, e.g.:  
x2 Strap width 1  
\_\_MA45\_0: [\_\_MA45\_0]
3. For the last type of the respective size only one size entry is available (here: size \_\_MA42\_0). It applies to the respective size, also, e.g.:  
x3 Strap distance  
\_\_MA41\_0: [\_\_MA42\_0]



Picture 12-7

4. The x value of the respective size is calculated from two size entries (i.e.: size \_\_MA41\_0 and size \_\_MA43\_0), e.g:

X4 Strap width 2

\_\_MA45\_0: [**\_\_MA42\_0/\_\_MA43\_0**]

### Exercise

Alter the x value table of the exercise of section 12.1 as follows:

x1 Buckle width

\_\_xxxx\_x = 18.000

x2 Strap width 1

\_\_xxxx\_x = 20.000

\_\_MA41\_0 = 15.000

\_\_MA42\_0 = 15.000

\_\_MA43\_0 = 20.000

\_\_MA44\_0 = 20.000

\_\_MA45\_0 = 25.000

\_\_MA46\_0 = 25.000

x3 Strap distance

\_\_xxxx\_x = 5.000

\_\_MA42\_0 = 5.000

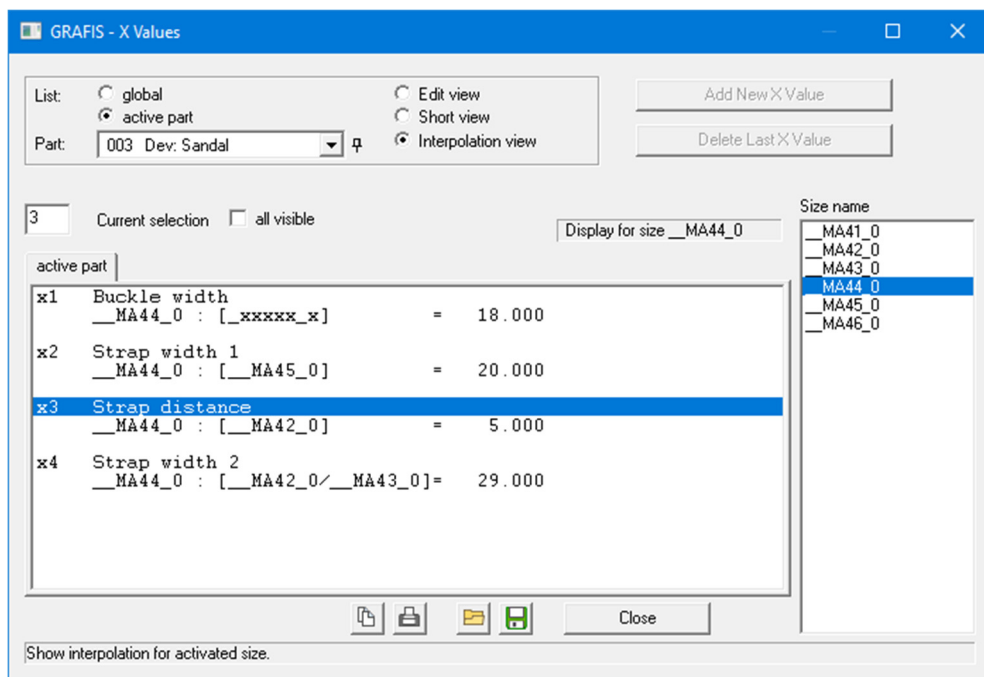
x4 Strap width 2

\_\_xxxx\_x = 25.000

\_\_MA42\_0 = 25.000

\_\_MA43\_0 = 27.000

Then switch to the interpolation view and select the respective sizes one after the other in the *Size name* list. For size \_\_MA44\_0 all information appears according to Picture 12-8. Analyse the values for other last types. Supplement the x value table with your own entries and check the implications on the x values of other sizes. Start *test run* and *grading*.

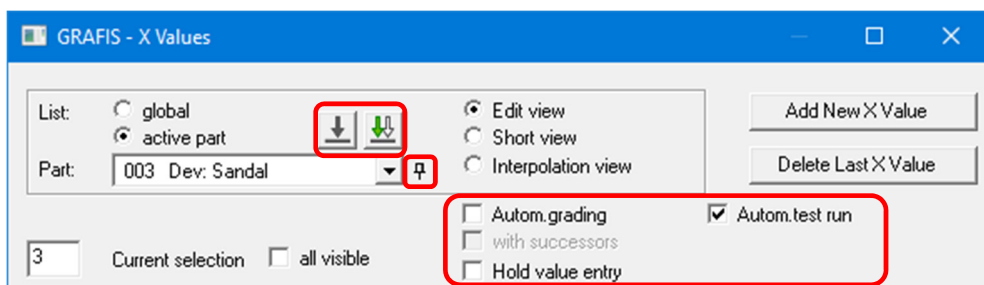


Picture 12-8

### Additional functions

The pin is an echo and cannot be clicked. While the pin is visible, the x values of the selected non-active part are shown. If the pin is not visible, the x values of the active part are shown automatically.

In Grafis Setup advanced users can activate the option *Additional functions in the x value window*, see Picture 12-9. These additional options help during visual adjustment of the user's x values. With the buttons test run and grading, the active part can quickly be calculated after having altered the values. *Automatic grading with / without successors* and *Automatic test run* starts automatic calculation of the construction after alteration of values. *Hold value entry* activates the hold function for the altered x value.



Picture 12-9

## 12.2 Size-dependent adjustment of interactive constructions

### Step-by-step guide

- ⇒ Assign size table with at least the sizes to be adjusted
- ⇒ Activate construction with double-click or from the overview with <F12>
- ⇒ Select the drag area in which drag points are to be adjusted size-dependently
- ⇒ Open the *Break sizes* window by clicking on *break sizes* in the menu on the right
- ⇒ Transfer break sizes
- ⇒ Make size-dependent adjustments to individual drag points either
  - in each size or
  - in one size, maintaining the set increments.

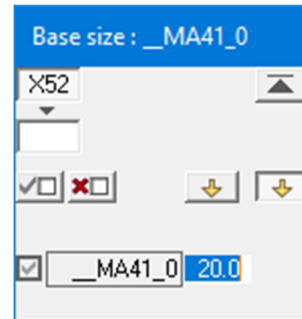
The aids *stack* and *ruler* can be used during dragging.

### How does drag work?

Each interactive construction is variably adjustable via a multitude of x values. As opposed to the x values of the construction record, the x values of the interactive construction are 'visible' through drag points. Moving a drag point alters one or two x values. You can see the value of the current x value and its number in the value window (Picture 12-10).


The construction is recalculated after each alteration of the value. The effect on the complete construction is immediately visible. As the logic of a construction, for example of a bodice, can be extensive, powerful computers should be used. Otherwise, the construction changes in jumps. If this is the case for you check whether a raster is active.

Size-dependent adjustment of an interactive construction means adjusting the x values of the construction depending on size.



Picture 12-10

### Select break sizes

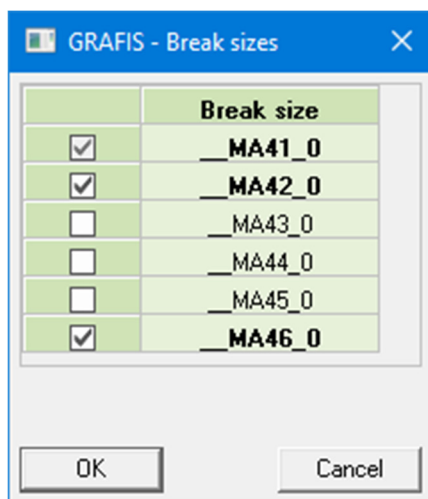
First, assign the size table with at least the sizes you probably need as break sizes. Then, activate the construction with double-click or with <F12> and select the drag area in which the drag points are to be adjusted size-dependently. Click on *break sizes*  in the menu on the right. The *Break sizes* window opens, see Picture 12-11.

The list of break sizes in Picture 12-11 contains all sizes which can become break sizes of the active drag area. These are all activated sizes of the size table or their reference size. Further information on reference sizes can be found in section 12.3. The first position of the list is occupied by the base size.

The **base size** of the interactive construction is the size, which is adjusted interactively if no other break sizes are activated. The size in the first position in the size table is automatically also the base size of the interactive construction.

### Exercise

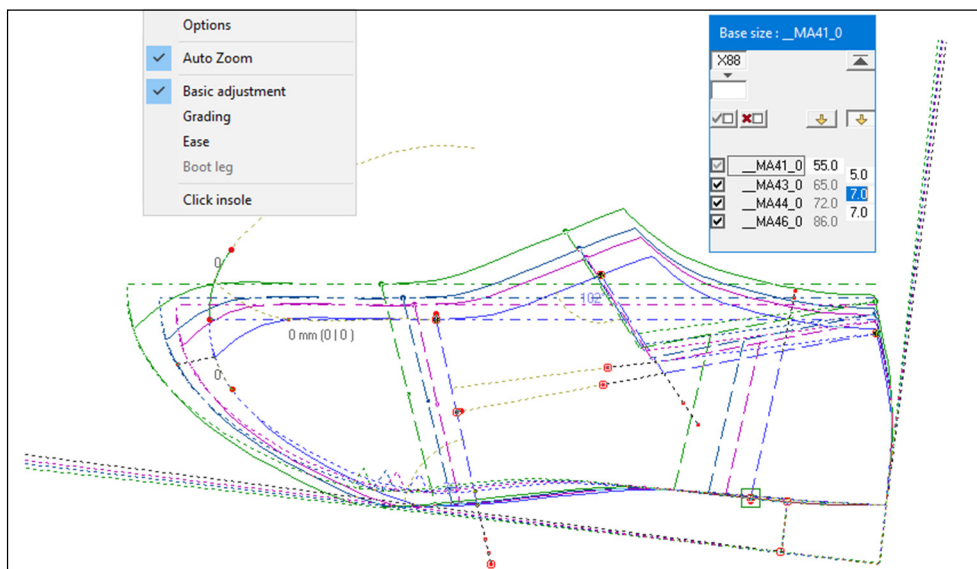
Open the 'Basic style' from section 5.5. The shoe is to be graded in the sizes \_MA41 to \_MA46. Enter these sizes into the size table. The first position of the size table is to be assigned with \_MA41. In the interactive interface, load a break size in the *Grading* drag area for grading of length and width and enter the respective grade rule.



Picture 12-11

As the grading is continuous throughout all size, one break size is sufficient. The heel cap is to start at a different distance from the heel throughout the sizes. Therefore, select the option *Heel cap in mm*. In the drag area *Basic adjustments* you need the size up to which the grading is to be identical and the size from which the grading is different. Load the break sizes and set the grade rules according to Picture 12-12.


**Only sizes (or their reference size – see section 12.3) listed and activated in the size table can be adjusted interactively.**



Picture 12-12

## The value window

The break sizes activated in the drag area appear in the value window, see Picture 12-10.

Click on the left of the two buttons . Each size can now be dragged individually or adjusted with values. Use this display option while no grade has been determined for this drag point.

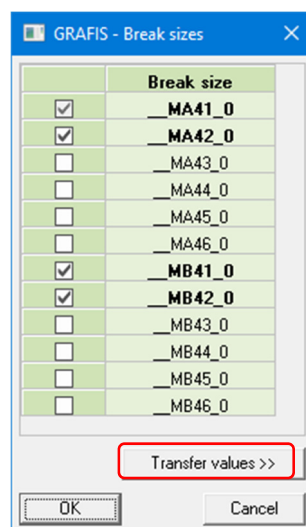
Click on the right of the two buttons . In this display option you can

- edit the increments with numeric values or
- adjust one of the offered sizes interactively, maintaining the increments. The other sizes are altered respectively after release of the mouse button.


## Transfer values from break size to break size

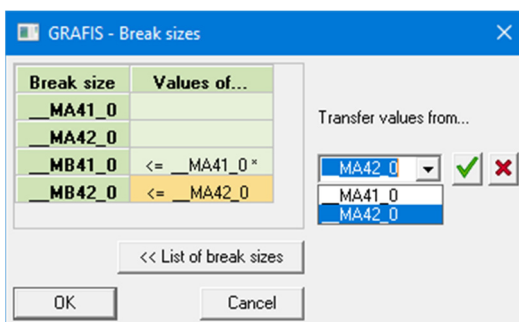
A construction prepared for last type men \_\_MA is now also to be produced in last type \_\_MB. If you have not been able to immerse yourself in the alternative break size from section 12.4, simply activate the respective short sizes as break sizes and assign the values of the sizes \_\_MB. This process will be explained in the following and is only required in drag areas with more than one break size.

The list of break sizes in Picture 12-13 belongs to a drag area in which initially the men sizes \_\_MA41, and \_\_MA42, had been adjusted. Additionally, the last type \_\_MB is to be adjusted. These have already been entered in the size table and activated in the break size table. If the *Grafis - Break sizes* dialogue is now closed with *OK*, all sizes of the last type \_\_MB will be assigned the values of size \_\_MA41.



Picture 12-13

For a suitable pre-assignment of the short sizes, click on *Transfer values>>*, see Picture 12-13. The *Grafis - Break sizes* dialogue changes according to Picture 12-14 right. Now click in the column *Values of...*, select the corresponding size from the last type \_\_MA, in the column *Transfer values from...* confirm with  and continue assigning values



Picture 12-14

with the next size. After having clicked *OK* all sizes of the first column *Break size* will be assigned with the values from the sizes of the column *Values of...*

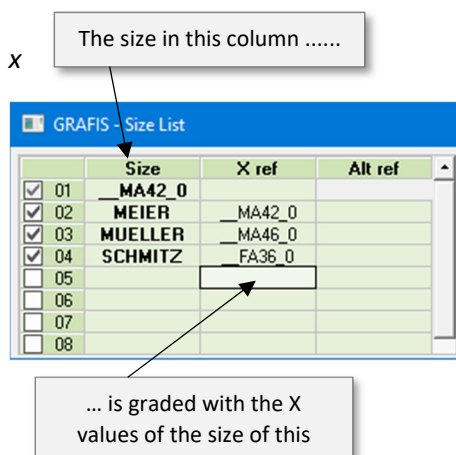
***This transfer of values is a one-time operation and must be carried out for each drag area with break size-dependent adjustments. No permanent link is created, such as is possible with the alternative break size from section 12.4.***

### 12.3 The X value reference

In the size table you can find the column *x reference* (Picture 12-15), which influences the calculation of x values.

***All sizes for which an entry exists in the 'x reference' column of the size table are calculated with the x values of the assigned x value reference size (short: x reference).***

With the x value reference, sizes in the size list are assigned with x values of other sizes.



Picture 12-15

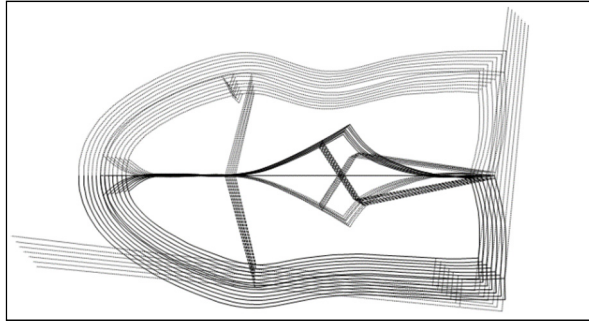
***The x value reference is usually used to assign the x values of a standard size to an individual size.***

When entering an individual size into the size table, the x value reference is assigned by default with the standard size on which the individual size is based. If no x value reference is entered the standard value applies to individual sizes. Entering, editing and deleting the x value reference ensues analogous to editing the size column.

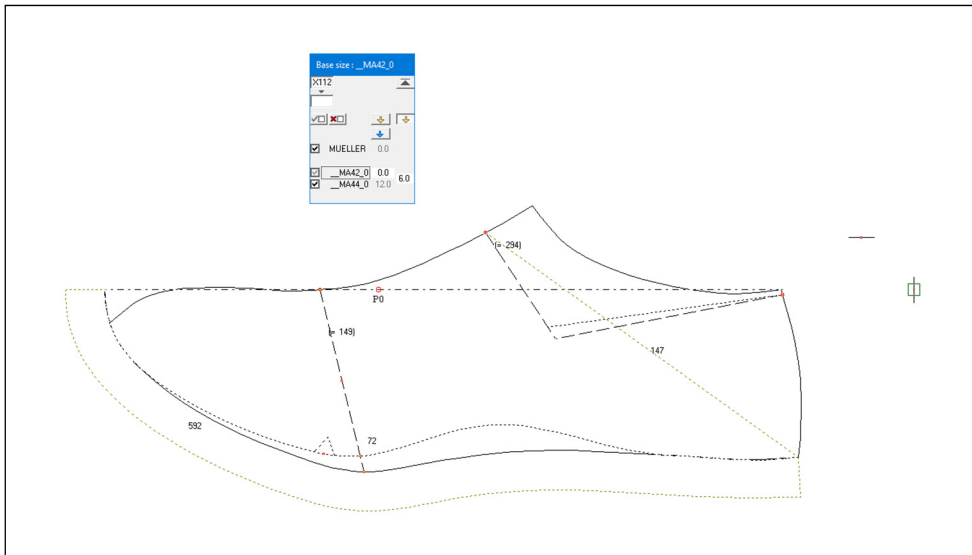
## Exercise

Open the 'Basic style' from section 5.5 and load the standard men's sizes \_\_MA40 to \_\_MA46, base size \_\_MA42 into the size table. In the interactive interface go to the *Grading* drag area and open the list of break sizes. In addition to base size \_\_MA42 activate the size \_\_MA44 and close the list of break sizes.

Activate the drag points for length and width grading and set a grade rule of 6mm in length and 5mm in width. Grade all sizes, see Picture 12-17.



Picture 12-17



Picture 12-17

The shoe style is now to be graded with customer-specific measurements. Create an individual size for customer Miller based on the standard last type \_\_MA46 and enter this into the grade table. Via the x value reference to the standard size \_\_MA the size-dependently set length and width for the \_\_MA-sizes also applies to individual 'MA'-sizes. Now, remove the x value reference in the grade table and grade again. The values are now transferred from the settings for the base size, see Picture 12-17.



## 12.4 The alternative reference size

***This section is for advanced users. Beginners are advised to read through all application examples and then, come back at a later date for a more detailed look if required.***

The alternative reference size has system-wide effect and should therefore, only be applied by experienced Grafis users. The function has been developed to allow users to apply changes to X values quickly from one last type to another last type. The alternative reference size is particularly interesting for

- ***companies***, which manufacture styles for different last systems/ last types and
- ***made-to-measure*** where styles are developed in a standard size range and then, adjusted to individual customers' wishes.

### Assigning an alternative reference size

Open a style and make size-dependent adjustments for last type \_MA\_0. Switch on the alternative reference size in the Grafis Setup. An additional column, *Alt. reference* appears in the size table into which standard size tables can be entered. The size in the *Alt. reference* column acts as alternative reference size to the size in the second column.

### Rules and effects of the alternative reference size

The alternative reference size takes effect if no settings have been saved for the size to be graded in the following areas

- individual X values,
- individual drag areas of interactive constructions,
- individual grade points in grade rule grading and
- curve adjustments.

***The alternative reference size is a 'deviation' size if for this size or its X value reference no settings are entered in the above four cases.***

When calculating a value in one of the above four cases, a matching size entry is searched according to a pre-set priority. This priority is slightly different during grade rule grading as no grade rules can be saved for an individual size. The numbers in Picture 12-18 and Picture 12-19 state the priority for search of a matching size entry.

**Priority for search of a matching size entry for X values, in drag areas and for curves:**

	Size	X ref	Alt ref
<input checked="" type="checkbox"/> 01	MA42_0	1.	
<input checked="" type="checkbox"/> 02	MA43_0		
<input type="checkbox"/> 03			
<input checked="" type="checkbox"/> 04	USA8_5	MA42_0	1.
<input checked="" type="checkbox"/> 05	USA9_5	MA43_0	
<input type="checkbox"/> 06			
<input checked="" type="checkbox"/> 07	USA8_5B	MB42_0	1. MA42_0 2.
<input checked="" type="checkbox"/> 08	USA9_5B	MB43_0	MA43_0
<input type="checkbox"/> 09			
<input checked="" type="checkbox"/> 10	MB42_0	1.	MA42_0 2.
<input checked="" type="checkbox"/> 11	MB43_0		MA43_0
<input type="checkbox"/> 12			
<input checked="" type="checkbox"/> 13	MC42_0	MB42_0	1. MA42_0 2.
<input checked="" type="checkbox"/> 14	MC43_0	MB43_0	MA43_0
<input type="checkbox"/> 15			
<input checked="" type="checkbox"/> 16	MEIER	MA42_0	1.
<input checked="" type="checkbox"/> 17	SCHMITZ	MA43_0	
<input type="checkbox"/> 18			
<input checked="" type="checkbox"/> 19	MEIER	1.	MA42_0 2.
<input checked="" type="checkbox"/> 20	SCHMITZ		MA43_0
<input type="checkbox"/> 21			

Picture 12-18

**Priority for search of a matching size entry for grade rules of single grade points:**

	Size	X ref	Alt ref
<input checked="" type="checkbox"/> 01	MA42_0	1.	
<input checked="" type="checkbox"/> 02	MA43_0		
<input type="checkbox"/> 03			
<input checked="" type="checkbox"/> 04	USA8_5	MA42_0	1.
<input checked="" type="checkbox"/> 05	USA9_5	MA43_0	
<input type="checkbox"/> 06			
<input checked="" type="checkbox"/> 07	USA8_5B	MB42_0	1. MA42_0 2.
<input checked="" type="checkbox"/> 08	USA9_5B	MB43_0	MA43_0
<input type="checkbox"/> 09			
<input checked="" type="checkbox"/> 10	MB42_0	1.	MA42_0 2.
<input checked="" type="checkbox"/> 11	MB43_0		MA43_0
<input type="checkbox"/> 12			
<input checked="" type="checkbox"/> 13	MC42_0	1. MB42_0	MA42_0 2.
<input checked="" type="checkbox"/> 14	MC43_0	MB43_0	MA43_0
<input type="checkbox"/> 15			
<input checked="" type="checkbox"/> 16	MEIER	MA42_0	1.
<input checked="" type="checkbox"/> 17	SCHMITZ	MA43_0	
<input type="checkbox"/> 18			
<input type="checkbox"/> 19			
<input type="checkbox"/> 20			
<input type="checkbox"/> 21			

Picture 12-19

## Summary

- The application of the alternative reference size is only useful if a style is to be manufactured in different last types or if a prepared style is to be adjusted specifically for a particular person.
- The alternative reference size is a 'deviation' size if for the size or its X value reference no settings have been saved..
- The alternative reference size effects the X values of a construction, adjustments to interactive constructions, curve adjustments and grading with grade rules.
- As a rule, a style should be completely adjusted and checked for one last type. Only then, should the style be adjusted for further last types or for particular persons via the use of the alternative reference size.
- Take notes for each style detailing exactly which part/construction of the style has been globally adjusted and in which parts/constructions specific adjustments have been made for the different last types or a particular person. Only with good documentation can the style development be recreated at a later date.
- During grade rule grading the grade of one last type can be transferred once onto another last type.

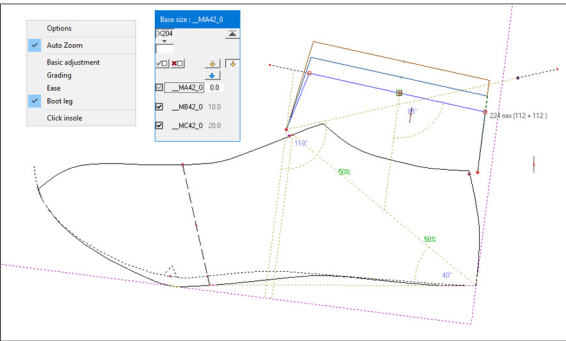
**Application example**

**Boot style with different boot leg heights**

A boot style for last type `_MA` has already been adjusted. Now, this style is to be manufactured with different boot leg heights throughout the grade run. The basic settings for length and width grading are to remain intact throughout the styles.

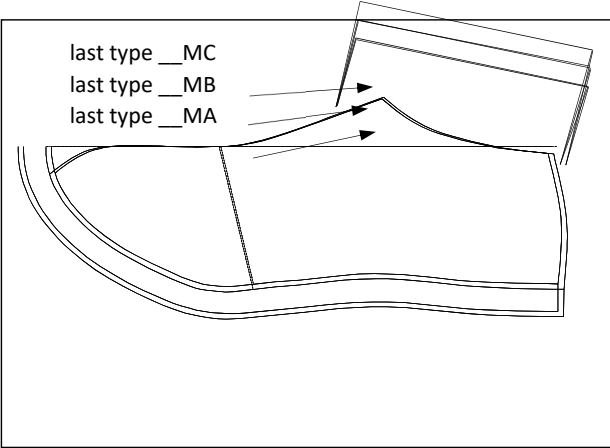
	Size	X ref	Alt ref
<input checked="" type="checkbox"/> 01	<code>MA42_0</code>		
<input checked="" type="checkbox"/> 02	<code>MA43_0</code>		
<input checked="" type="checkbox"/> 03	<code>MA44_0</code>		
<input checked="" type="checkbox"/> 04	<code>MA45_0</code>		
<input checked="" type="checkbox"/> 05	<code>MA46_0</code>		
<input type="checkbox"/> 06			
<input checked="" type="checkbox"/> 07	<code>MB42_0</code>		<code>MA42_0</code>
<input checked="" type="checkbox"/> 08	<code>MB43_0</code>		<code>MA43_0</code>
<input checked="" type="checkbox"/> 09	<code>MB44_0</code>		<code>MA44_0</code>
<input checked="" type="checkbox"/> 10	<code>MB45_0</code>		<code>MA45_0</code>
<input checked="" type="checkbox"/> 11	<code>MB46_0</code>		<code>MA46_0</code>
<input type="checkbox"/> 12			
<input checked="" type="checkbox"/> 13	<code>MC42_0</code>		<code>MA42_0</code>
<input checked="" type="checkbox"/> 14	<code>MC43_0</code>		<code>MA43_0</code>
<input checked="" type="checkbox"/> 15	<code>MC44_0</code>		<code>MA44_0</code>
<input checked="" type="checkbox"/> 16	<code>MC45_0</code>		<code>MA45_0</code>
<input checked="" type="checkbox"/> 17	<code>MC46_0</code>		<code>MA46_0</code>

Picture 12-22



Picture 12-22

Set up the size table according to Picture 12-22. Activate the *Boot leg* drag area. Add a break size for each last type and set the boot leg height differently for each last type, see Picture 12-22. Quit the interactive interface and grade with a result similar to Picture 12-22.



Picture 12-22

## 12.5 The Z values

The z values complete the palette of construction parameters so that basic blocks can be drafted from scratch. Z values allow for calculation of construction parameters with numerical values or values measured in the construction.

### What are Z values?

Z values are calculated construction parameters. For the calculation of z values

- all defined construction parameters (x, xg and g values),
- previously defined z values,
- measurements from the construction, so-called process data (e.g. GL, AB, TL),
- numerical and mathematical functions can be used.

**From Version 12 onward, a case differentiation can be entered for z values with up to three conditions. Use the input assistant.**

Defined z values are applied in the same way as x values.

### Entering and altering z values

Entering and altering z values is started with the function key <F11> or via *Extras* → *Z Values...* With few exceptions this is possible in all menus after *test run* or a record function. Pressing the <F11> key opens the z value entry window (Picture 12-23). The z value with its calculation formula is entered into the *Formula* column and a corresponding comment is entered into the *Text* column. Longer comments can be entered into the large edit window below the z values.

Rstep	Formula	Text	Min	Max	Value
067	z01=GL	inner insole back			174.7
067	z02=GL	outer insole back			167.4
075	z03=AB	distance turning point - inner heel corner			173.6
075	z04=AB	distance turning point - outer heel corner			166.4
178	z05=GL*100/(GL+GL)	percentage position of centre line on insole			48.5
178	z06=				

inner insole back

OK

Picture 12-23

The calculated result for the style size appears in the *Value* column. Having selected the z value, an existing z value can be re-assigned. After correction of the selected z value, the construction record runs to the saved record step and re-determines the z value.

Switching to long format also displays the values for the other sizes in the grade table. The display can be switched from *Normal display* to *Difference to first size* or *Relative difference*. The order of sizes can be arranged according to the order in the grade table or according to standard sizes.

In addition, the z value list can be printed or copied to the clipboard. The z value list displays the record step during which the z value was entered. A z value can only be deleted if it is no longer required for a correct record run. When resetting the Grafis record the z values which are part of the record step are also reset.

### ***Use z values also for displaying warnings!***

For example, if a distance may never be smaller than 100mm, generate a z value  $z....=AB$ , enter the value 100 in the *Min* field and measure the distance after having pressed <ENTER>. In case the value is actually smaller, a warning appears 'Warning: value fallen below minimum  $z....=AB$ '. Ensure a suitable comment for the z value!

### **Syntax (spelling) of the z value entry**

- Each instruction is to begin with  $z1=$  or  $z20=$ . It is recommended to enter the z values in the given ascending order.
- Small and capital letters have the same significance. Spaces are ignored.
- The calculation of expressions in brackets is possible.
- Angles are to be entered in degrees (e.g.:  $\sin(45)$  for the sine of 45 degrees).
- Mathematical expressions with correct syntax are accepted only.
- Defined x and g values, mathematical functions and process data can be used to calculate z values (see examples). Processing previously defined z values is also possible.

***The calculation of z values is recorded. Resetting the record resets the z values also!***

### **Permitted operators**

+	for addition
-	for subtraction
*	for multiplication
/	for division
#	for exponent











**Permitted operands**

<b>X3</b>	x values X3 = third value of the x value table (construction record) of the current part
<b>XG5</b>	x values of all parts XG5 = fifth value of the global x value table of all parts of the style
<b>Z4</b>	z value z4
<b>numbers</b>	numbers, e.g. 12; -12.0; 23.6 with the point as decimal point
<b>Pi</b>	the constant pi (=3.1415927)

**Functions permitted as operands**

<b>cos</b>	for cosine
<b>sin</b>	for sine
<b>tan</b>	for tangent
<b>atn</b>	for arc-tangent
<b>sqr</b>	for square root
<b>btr</b>	for absolute value

**Process data permitted as operands**

<b>gL</b>	full length of a clicked line	
<b>Ab</b>	distance between two points	
<b>TL</b>	partial length of a line	
<b>Ri</b>	direction of a line in the 'click point'	
<b>WS</b>	angle at intersection point of two lines	
<b>WP</b>	angle out of three points	
<b>Ax</b>	horizontal distance	
<b>Ay</b>	vertical distance	
<b>xK</b>	x co-ordinate value of a point	
<b>yK</b>	y co-ordinate value of a point	

For the process data GL, RI and WS existing lines of the construction are to be clicked. The other process data XK, YK and AB determined with the point construction sub-menu.

### Examples for correct z values

$$z1 = 12.3 - 124.3 + 100 - 33 - .123$$

$$z2 = 123.4 - \pi + gL + \sin(Ri - Ri)$$


$$z3 = (gL + gL) * 1.05 + g1 / 100$$

$$z5 = \sqrt{(xK - xK)^2 + (yK - yK)^2}$$

theorem of Pythagoras

$$z6 = \arctan(z1 / z3)$$

### Input assistant

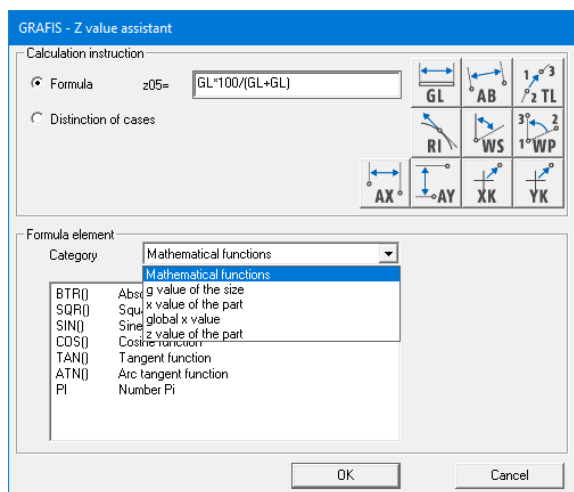
The input assistant facilitates the entry of calculation instructions for the z value. To open the input assistant, click on the button  in the upper menu (Picture 12-23).

The process data can be selected via the buttons. In the *Formula element* area, all other permitted operands such as mathematical functions, x values

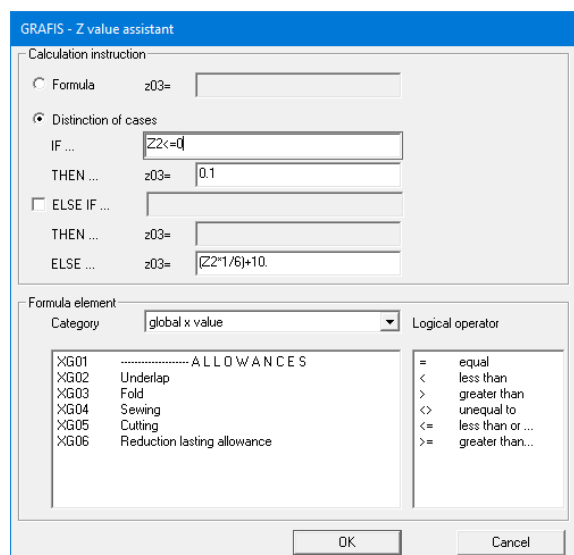
of the part, global x values or z values of the part can be selected. The selection is automatically transferred to the z value formula (Picture 12-24).

### Case differentiation (if-elseif-else)

Case differentiations are used if constructions are to behave differently under different conditions. Case differentiations are entered in the input assistant. For entry of the *Conditions*, the possible comparison operators are offered for selection (Picture 12-25).



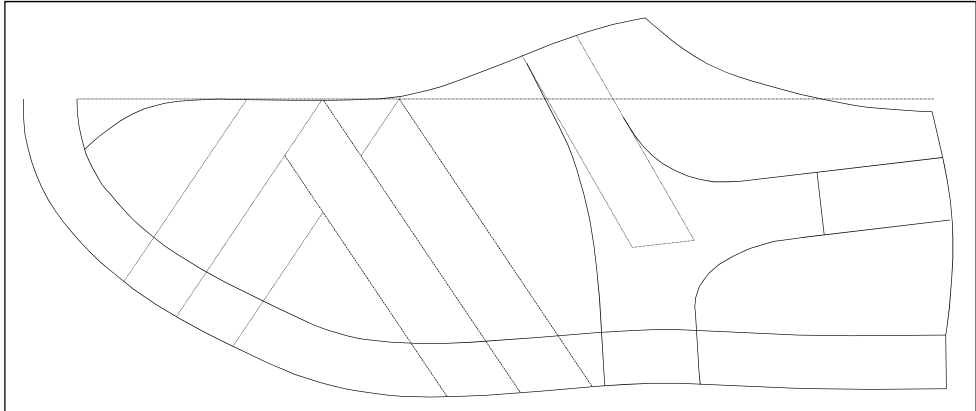
Picture 12-24



Picture 12-25

# Exercise

Open a new style, call *Last 10*, into a further part call *Insole 10* and into a third part



Picture 12-26

call *Basic Shoe 10*. Construct a sandal similar to Picture 12-26. The straps are to be attached at the correct position of the insole for all sizes. Thus, insert the strap lines and the sole edge of the sandal as well as the lines for the insole into a new part, see Picture 12-28. or simplification purposes, only the markings for the outer last are set. In preparation of determination of the z values, the sole edge is now separated at all positions to be marked.

Rstep	Formula	Text	Min	Max	Value
46	$z01=GL$	strap from heel line			78.8
<b>46</b>	<b><math>z02=GL+GL</math></b>	<b>strap width from heel line</b>			<b>108.8</b>
46	$z03=Z2+GL$	1st cross strap from heel line			122.5
46	$z04=GL+Z3$	width 1st cross strap from heel line			145.4
46	$z05=GL+Z4$	percentage position of centre line on insole			169.1
46	$z06=GL+Z5$	3rd cross strap from heel line			218.1
46	$z07=GL+Z6$	width 3rd cross strap from heel line			238.2
46	$z08=GL+Z7$	width 4th cross strap from heel line			258.2
90	$z09=$				

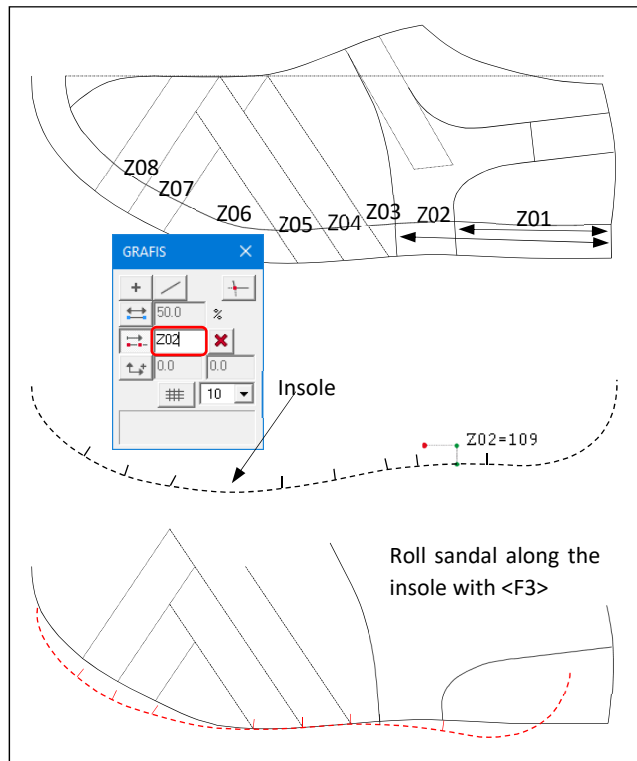
Picture 12-27

Start entering the z values according to Picture 12-27 and then, click the required section of the sole edge after confirmation. The z values obtain the length for the notch position, measured from the heel line. Construct the notches on the respective section of the insole as z values, see Picture 12-28.



After transferring the z values, the inserted lines of the sandal can be deleted, only the lines of the insole are required. Now, construct the notches on the insole line using the z values, see Picture 12-28 centre.

If a z value is altered subsequently, the system returns to the corresponding step of the record and the deleted lines become visible again. After quitting the z value interface, the record steps are calculated through to the end.

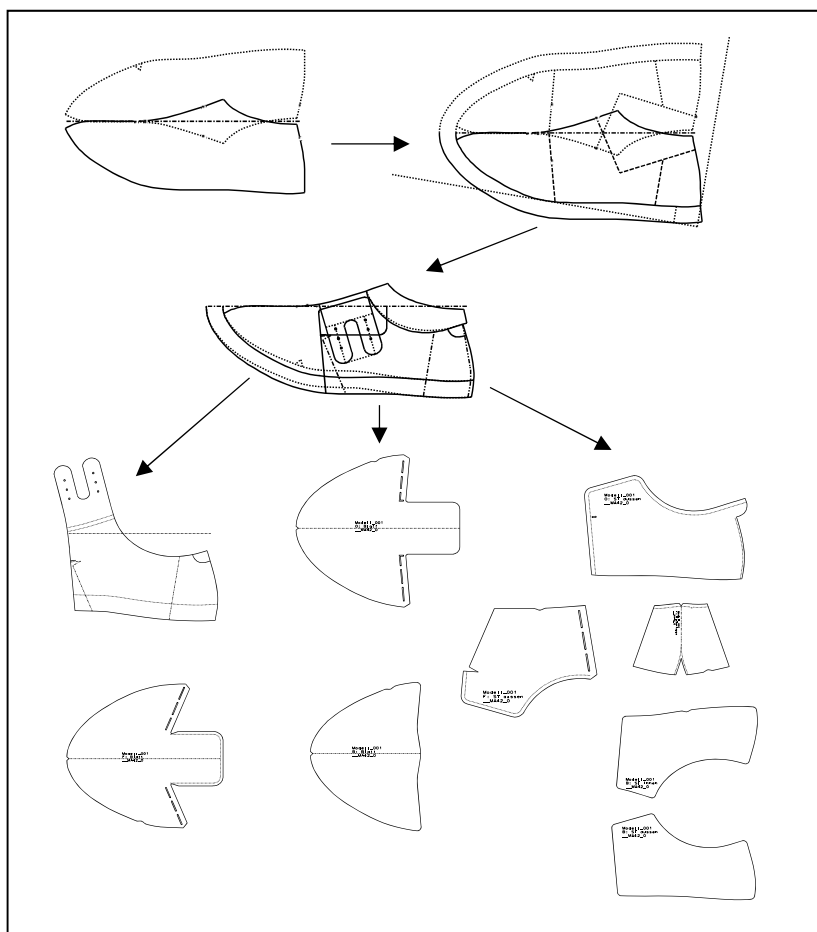


Picture 12-28



**Content**

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## 13.1 Hereditary automatic

### What does hereditary automatic mean?

The different parts of a style must fit together taking into account their interdependence. Grafis ensures this by building an automatic heredity. If, for example the vamp is to be extracted as a production pattern, the respective lines from the shoe style development are inserted into a part 'vamp', the shape is processed and then finished as a production pattern piece. When grading the style in different sizes the insertion of the lines is repeated automatically. We call this heredity of the lines to the part 'vamp'.

***Heredity is realised with the functions of the insert menu.***

***Inserting (heredity) always ensues into the active part out of parts with lower part number.***

***Grafis records the hereditary steps and displays the hereditary structure in the part organisation menu. The hereditary structure is arranged to generations.***

### The heredity

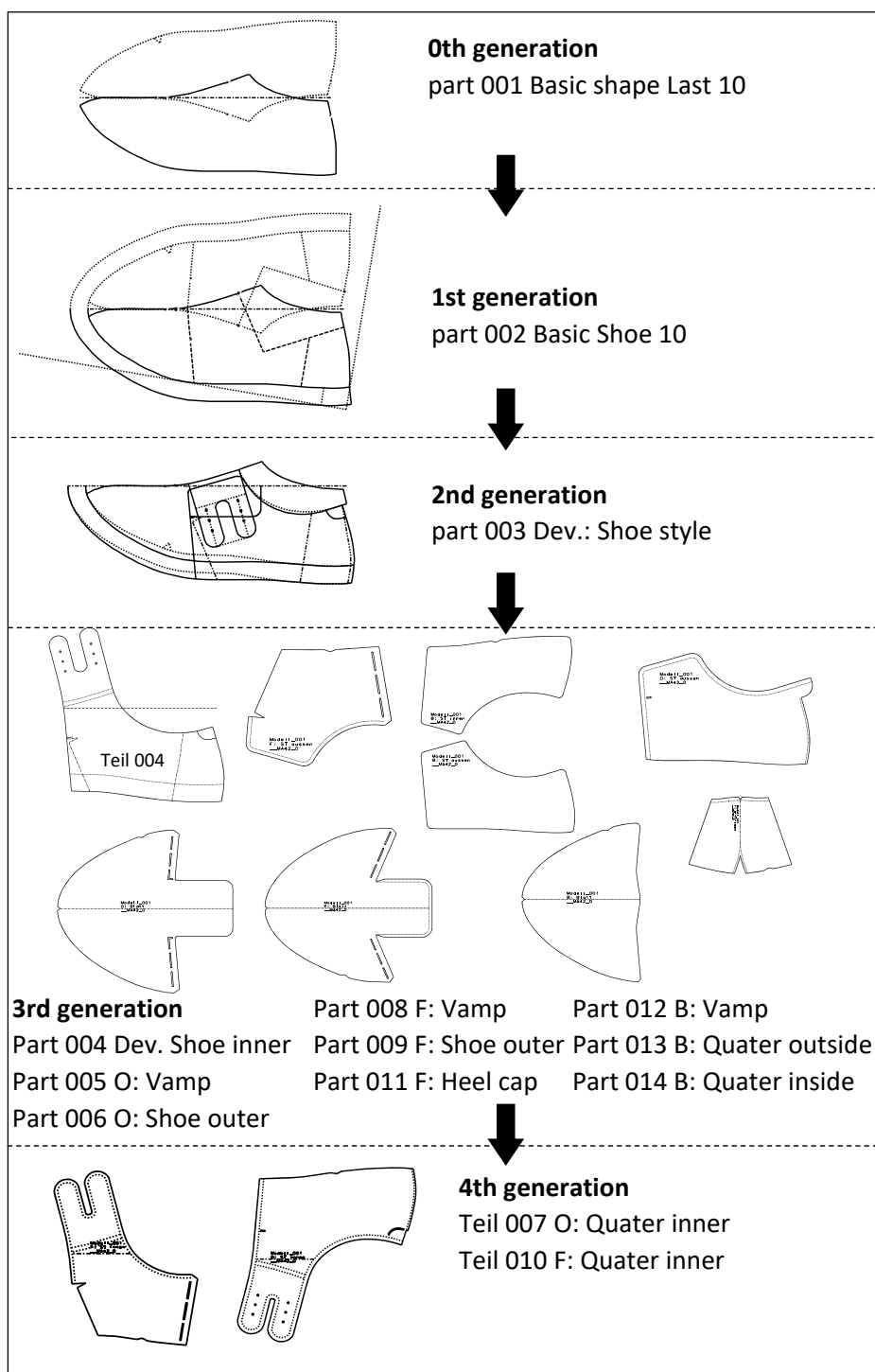
Picture 13-1 elucidates the principle of heredity using the style 'Style 000'.

Part 001 contains the basic construction *Last 10*, which has been adjusted interactively.

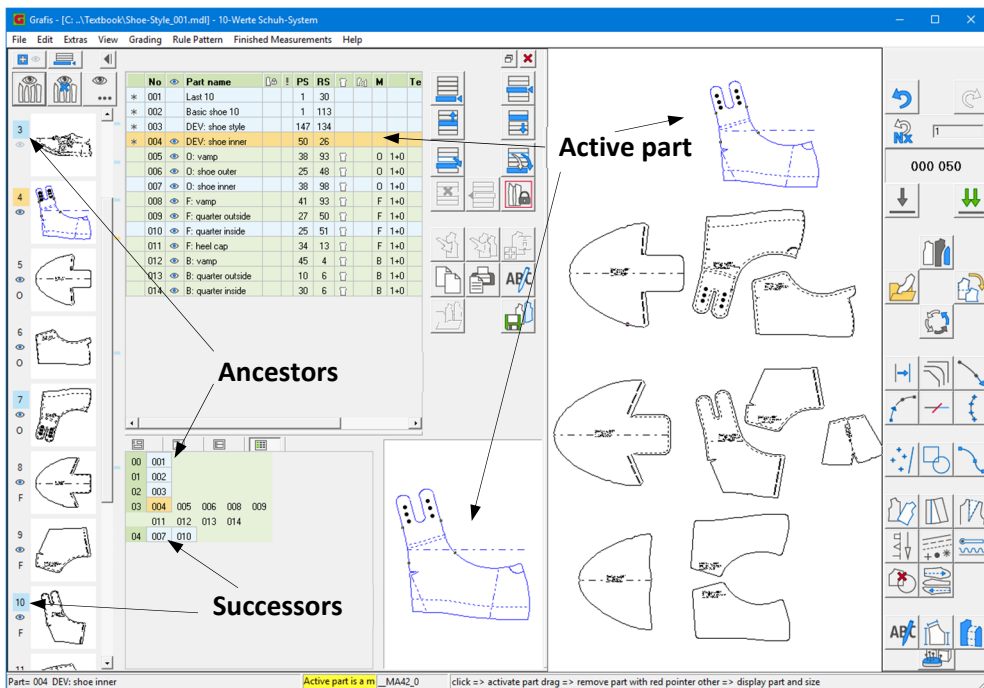
All lines and points of the basic block from part 001 have been inserted into part 002 by calling *Basic Shoe 10*. Thus, part 002 has become a part of the 1st generation; part 001 has become a ***mother part***. All lines from part 003 required for the style development have been inserted into part 003, making part 003 a part of the 2nd generation and a ***daughter part*** of part 002. Part 002 has become a ***mother part***. Alterations to part 001 are automatically transferred to part 002 and further onto part 003. Alterations to part 002 are transferred to part 003.

All lines and points of the inner shoe have been transferred to part 004 'dev: shoe inner' with *insert* and 'shoe inner' has been developed. Thus, part 003 is the mother part of part 004. Part 004 is the daughter part of part 003 and indirectly related to part 001 and part 002. Alterations to part 001 are initially transferred to part 002, then on to part 003 and further to part 004.

All other parts of the 3rd generation (Picture 13-1) were also derived by inserting lines and points from the style development in part 003.



Picture 13-1



Picture 13-2

Parts 007 and 010 have been derived from part 004 'Dev. Shoe inner', making part 004 into a **mother part**. Parts 007 and 010 are parts of the 4th generation. All alterations to part 001, part 002, part 003 and part 004 are transferred to parts of the 4th generation

***Hereditary information can only be passed on to parts with a higher part number.***

### The hereditary structure

For presentation of the hereditary structure the parts are divided into generations. The following applies:

***A daughter part automatically receives a generation number at least 1 up from the mother part.***

This rule ensures that a part of the 3rd generation can carry hereditary information of the 0th, 1st and 2nd generation, only.

Picture 13-2 shows the *part organisation* menu for the example 'Shoe-style\_001'. An overview of interdependencies between the parts, also called hereditary structure, appears on the file card in the lower window. All parts of a generation are combined in a part block. Part 001 belongs to the 0th generation (first part block). It is marked with generation number '00' in the list of parts. Part 002 belongs to the 1st generation with generation number '01' and so on.

In the hereditary structure the active part is high-lighted. Ancestors and successors are highlighted in grey. Parts without relation to the active part are not highlighted. Clicking a part number in the hereditary structure activates the part. Thus, the user gets a quick over-view of the hereditary structure of the parts.

### Grading a number of parts

The functions *test run* and *grading* in the basic menu apply to the active part, only. Grafis also offers the option to calculate (*test run*) or grade all parts of the style or the successors of the active part, only. These functions can be found in the *Grading* pull-down menu. In this menu you can choose between:

*Test Run Active Part*

*Test Run Successor Parts*

*Test Run All Parts*

and

*Grade Active Part*

*Grade Successor Parts*

*Grade All Parts*

## 13.2 Part organisation

The basics of part organisation were introduced already in section 5.1. In this chapter all information on part organisation is collated.

Clicking on a part in the part rack, a part number or a part text in the part list or clicking on a part number in the hereditary structure **activates this part**. It is highlighted with a yellow bar in the part list and marked in yellow in the part rack. The part can be processed after having quit *part organisation*. When activating a mother part (see Section 13.4) a warning message appears in the status bar.



### Part organisation menu

open new part ▪ insert part

move part up ▪ move part down

duplicate part ▪ duplicate part with daughter parts/successors


delete ▪ remove ▪ reduce part

show all ▪ hide all ▪ show parts...

insert connection ▪ update connection ▪ +/-part information

copy ▪ print part list ▪ Text

load module ▪ save part module

Clicking on **open part** or  in the part list creates a new part with the name 'NN' and the next highest number after the last part. The new part is active straight away.

Clicking on **insert part** generates a new part before the selected part.


**Duplicate** or **duplicate with successors** creates a copy of the active part and all daughter parts, see section 13.3.

After **delete** and a security question the record steps of the selected part are reset to 0. The last part in the list is reset and removed.

**Removes** an empty part (with 0 record steps) from the part list. The following parts move up in the list.

With **reduce** the active part is graded in the sizes of the size table and 'frozen' in this state. Having reduced a part, it no longer has any dependency to mother parts, has no x values and no record steps. Daughter parts remain unchanged. Uses **reduce** only after speaking with a Grafis expert.

With the function **hide all all parts** apart from the active selected part are removed to the background memory. Hidden parts are no longer visible on screen, but are not deleted. It is recommended that only parts required for work are visible on screen.

Individual parts can be called from the background memory to the screen by clicking in the  column. Clicking **show all** recalls all removed parts from the background onto the screen. Via the button **show parts...** pattern development parts, construction pattern pieces, mother parts of the active parts, daughter parts of the active part or parts of a selected material can be called.

With the functions **insert connection** and **update connection** parts from a different style are inserted, see section 13.3.

**Edit → Copy (clip board)** copies the part list to the clipboard.

Clicking **print** starts printing the part list, provided the printer is switched on.


Activating **text** and clicking a part in the list allows for editing the part text. After <ENTER> entry can continue with the next part text. A part text can be edited, also with double-click on the text. In this case, <ENTER> does not switch to the next part text. Take care of your part names. This makes your work easier and avoids mistakes


With the function **save part module**, the selected parts are saved as a module. When saving a part module, the system checks which parts must be saved in addition to ensure a correct hereditary structure when calling the module. Possible





'click' connections to mother parts are automatically reset. Modules saved in this way can be stored in the call list, see section 13.5, example 3.

With **call part module**, the modules can be called into new or existing styles.

 **piece parameter** opens the file card for piece parameters relevant for the layplan (see section 17.1).

 **text box** opens the file card in which comments on the selected part can be stored.

 **exchangeable parts** opens the file card for determination of permitted sizes in the part, see separate explanation in section 18.15.

 opens the overview of the **hereditary structure**.

***The number of parts per style is limited to 500. The active part is displayed in blue on a white background. Only this part can be edited. All other parts remain unchanged.***

### 13.3 Difference between the functions of the menus insert and duplicate/ connection part in the part organisation

#### The most important differences

**basic menu → insert** ... performs a hereditary step between two parts. Grafis automatically repeats this hereditary step when grading other sizes. The source part becomes a mother part and the target part becomes a daughter part.

**part organisation → duplicate**... creates a copy of a part in the same generation. Existing relations to mother parts remain intact. The part is gradeable in the same way as x and z values are also duplicated. The daughter parts are not duplicated! The part has no daughter parts after duplication. The **duplicate** function can be found in the **part organisation** menu.

**part organisation → insert connection part(s)**... transfers parts from another style. This function can also be found in the part organisation menu. When inserting a connection part, the switch **insert with complete record** decides whether or not the part is inserted with its complete construction record.

If this switch is set, at least the parts of the 0th generation can be graded unchanged, provided the global x values of source and target style have been aligned.


If the switch is not set, objects are only transferred in the existing sizes. Adding new record steps is not possible. These parts can be used for measuring, stacking and comparison.





Further information on connection parts can be found in the Textbook Chapter 18 ‘Layplanning II’, section 18.1.

### Part identifiers

The first column in the part list of the style contains an identification symbol with the following significance:

'*'	The part is a mother part, other parts depend on it.
' ' (without)	No other parts depend on this part. It can be a daughter part.

The indicators in the fifth column  of the part organisation have the following significance:

	This is a connection part.
	This is a connection part. The source style is no longer available.
	This is a connection part. The part in the source style has been changed.
	The part is reduced.

### When to use which function?

*Insert without transformation* is the most frequently used of the functions. It is always required when information from one part is to be passed onto another part. Use the alternative tools *Insert lines*, *Insert points* or *Insert part* if the following construction is to be released and saved in the call list at a later stage.

*Part organisation* → *Duplicate* is used to create a copy of a part. The copied part serves either as a starting point for a new development variation or simply as a comparison for further changes. Modifications to x values are clearly visible when original and copy are displayed and placed on top of one another. The duplicated part can easily be deleted or reset step-by-step in the record.

*Part organisation* → *Insert connection* is used if temporary templates are required or if company-specific standard pieces are to be loaded.

## 13.4 Modifying mother parts

### Organisation of the heredity

Each object (point, line, text) of a part has a Grafis internal name. When inserting objects into other parts Grafis relates to these internal names. When inserting a line out of part 003 into part 010 the internal Grafis record of part 010 reads for example: 'The 4th line out of part 003 is inserted.' A modification to the mother part 003 resulting in a changed or deleted 4th line can possibly lead to insertion of a completely different 4th line when running through the record of part 010. All record steps relating to this inserted object could now be faulty. Part 010 appears damaged on screen. In this case the only cure is resetting the construction record of part 003 to the state before the modification. Therefore, the following applies: ***Modifications in mother parts must not disturb the recorded hereditary steps.***

***As a rule, each construction step which does not delete objects can also be applied to mother parts. After the modification the recorded construction must still be executable in a meaningful manner.***

**The following functions can be used for modifications without problems:**

- x values
- modification of curve shapes, see section 7.5
- call
- attributes
- replace curve. After setting starting point and final point of the new curve, a green arrow appears. The curve to be replaced must be clicked in the direction of this arrow.

***Modifications with any other functions of the basic menu are to be applied with care as they can lead to errors.***

***After each modification in a mother part, daughter parts have to be tested thoroughly with test run and grading! If errors occur, the record must be reset by the modification steps!***

### Typical alterations to the mother part

The style 'Shoe-style\_001' from section 14.1 is altered as follows:

#### **Modify interactive construction**

The last length and height are altered on the interactive *Last 10* in part 001. The grade is to remain unchanged. After *test run successors* this modification has been transferred to all related parts.

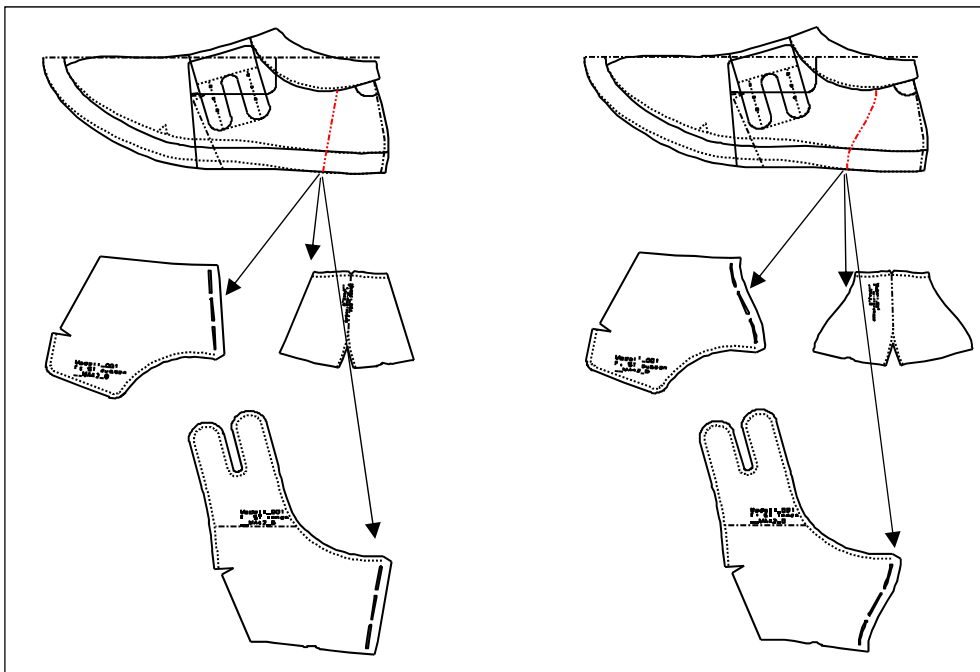
#### **Curve correction**

In the style development 'dev: shoe style' in part 003 the upper opening curve is activated via the F12 list and a new shape is adjusted.

After *Grading* → *Test Run Successors* the modified curve shape has been transferred to the production patterns.

#### **Replace curve**

Change the heel cap line from a straight line to a curve. In part 003 of the style development construct a new curve with replace curve, which is bound with *intersection point* to the heel cap line. Having constructed the starting point and final point of the new curve, a green arrow appears. **The currently straight heel cap line is to be clicked in the direction of the green arrow.** Shape the curve. After *Test Run Successors* this alteration has been transferred to the related parts. The result of the modification is shown in Picture 13-3.



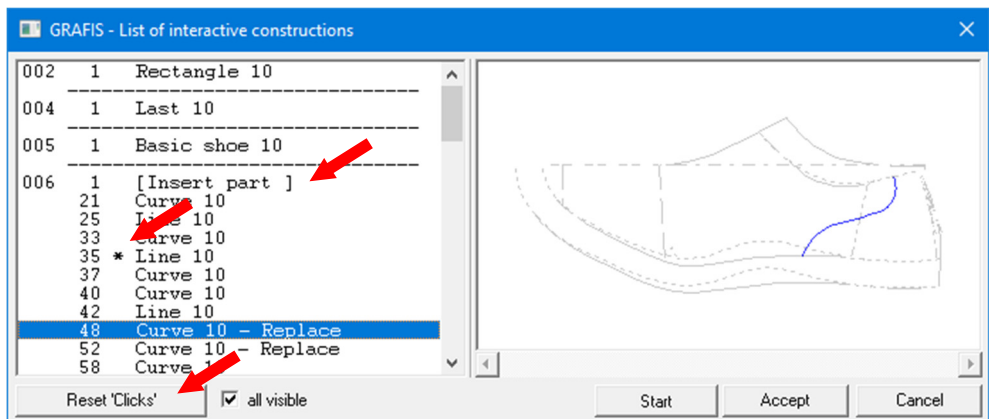
Picture 13-3

### 13.5 Reset 'Clicks'

All point, line and direction 'clicks' set within constructions from the call function can be reset and re-called. Binding the new 'clicks' ensues automatically during the next test run for the respective part.

The Reset 'Clicks' function can be found in the *List of interactive constructions* dialogue, accessible via the <F12> key or via the *Extras* pull-down menu, see Picture 13-4. The list in the window on the left contains all interactive constructions of the style and all non-interactive 'click' constructions. The non-interactive click constructions are indicated with [ ]. The constructions are organised according to part number in the first column and record step in the second column. In the right window, a preview of the construction selected on the left appears.

Select some constructions of the list, one after the other. The *Reset 'Clicks'* button is only active if the construction contains clicks. When calling the *Last 10*, no objects had to be clicked. Therefore, the *Reset 'Clicks'* button remains inactive for these constructions.



Picture 13-4

Select a construction for which *Reset 'Clicks'* is active and click on the *Reset 'Clicks'* button a number of times. With each click, the mark '\*' changes for this construction. The mark '\*' indicates that this construction is available for *Reset 'Clicks'*. The clicks of the selected construction are reset with the *Accept* button. The respective parts are bound again onto the construction after having pressed the *Cancel* button and subsequent test run.

# Applications

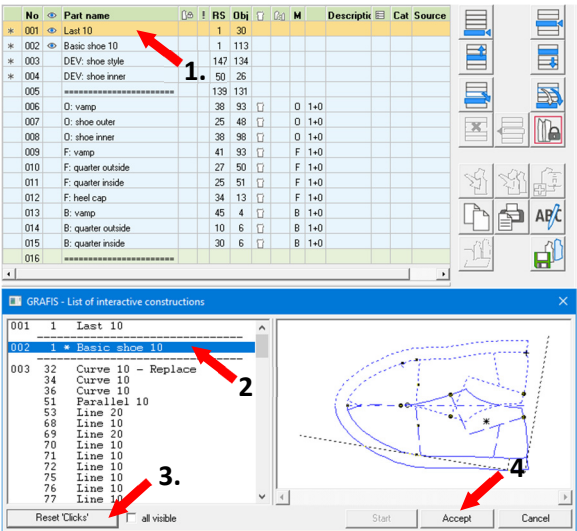
*Reset 'Clicks'* offers the following applications:

## Example 1: Bind 'click' construction to the style

Call *Last 10* into part 001 and *Basic Shoe 10* into part 002. Interactively adjust *Last 10* and *Basic Shoe 10*. With <F12> open the *List of interactive constructions* select *Basic Shoe 10*, click once on *Reset 'Clicks'* and then on *Accept* and *Close*. Open the *part organisation*. Part 001 is no longer the mother part of part 002 as the succession has been broken through resetting of 'clicks'. Activate part 002 and start a test run. After a security question, you can bind *Basic Shoe 10* onto *Last 10* again.

## Example 2: Bind 'click' constructions in the style onto another alternative part

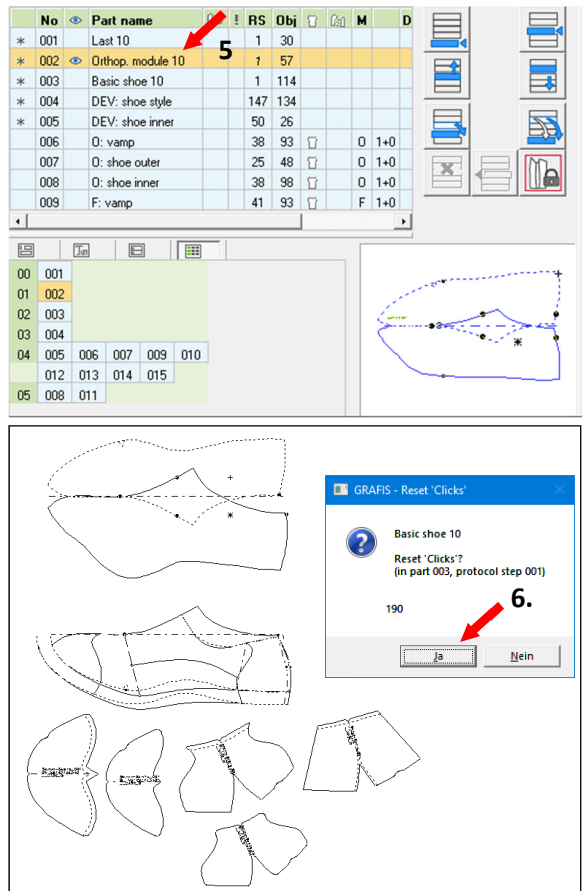
Call *Last 10* into part 001 and *Basic Shoe 10* into part 002. Insert all lines and points required for the style development into part 003 and develop the style. Generate the production pattern pieces in further parts of the part organisation. The style development and all pattern pieces are dependent on *Basic Shoe 10*. All modifications to the interactive adjustments of *Basic Shoe 10* are transferred to the production pieces after *test run all parts*.



Picture 13-5

The style development with all its production pieces is to be transferred to *Orthopaedic Module 10*. Insert a part above *Basic Shoe 10* in the part organisation and call *Orthopaedic Module 10* into this new part from the call list.

Open the <F12> list and select *Basic Shoe 10* (2). Click once on *Reset 'Clicks'* (3) and *Accept* (4). The *Basic Shoe 10* is now released from the last. Now, make the *Orthopaedic Module 10* visible in the part organisation (5.). Activate *Basic Shoe 10*. During test run of *Basic Shoe 10* you will be asked to bind *Basic Shoe 10* to a part (6.). Click the visible *Orthopaedic Module 10*. Now, *Basic Shoe 10*, the style development and all derived production pieces are dependent on *Orthopaedic Module 10*. All modifications made interactively to *Orthopaedic Module 10* are automatically transferred to all dependent parts after *test run all parts*.




Picture 13-6


### Example 3: Release and save a part module

Call *Last 10* into part 001 and *Basic Shoe 10* into part 002. Interactively adjust *Last 10* and *Basic Shoe 10*. Call *Shoe type 21* into the next part of the part organisation. Generate the production pattern pieces according to your specific processes.

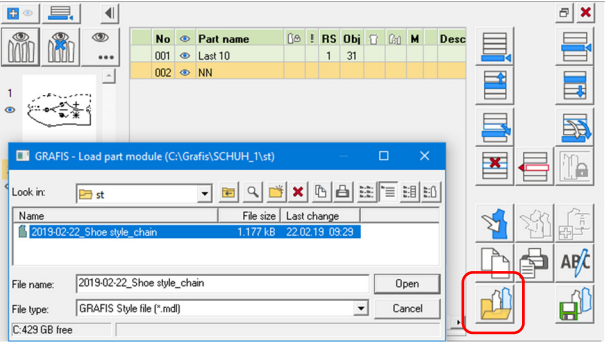
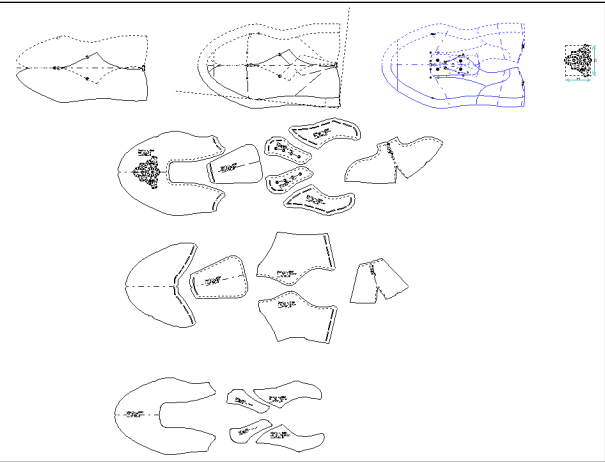
The production pattern pieces are required in another style. They are to be stored as a part module.

Select all parts belonging to the part module from the second column of the part list. Click on *Save part module*  and enter an appropriate name for the part module.

*Shoe type 21* has been released automatically from *Basic shoe 10* and indirectly so have all the pattern pieces. The pattern pieces are still connected with *Shoe type 21*.

**The saved part module can be loaded into another style via *Load module* .**

No	Part name	RS	Obj	M	Descript	Cat	Source
* 001	Last 10	1	30				
* 002	Basic shoe 10	1	113				
* 003	Shoe style	1	206				
* 004	shoe style - inset	15	24				
* 005	Peforation_013	60	354				
006	=====						
007	O: vamp	143	439				
008	O: tongue	15	49		O 1+0		
009	O: shoe outer	16	52		O 1+0		
010	O: shoe inner	21	52		O 1+0		
011	O: lacing outer	16	55		O 1+0		
012	O: lacing inner	24	55		O 1+0		
013	O: heel cap	40	16		O 1+0		
014	F: vamp	22	46		F 1+0		
015	F: tongue	19	50		F 1+0		
016	F: shoe outer	19	48		F 1+0		
017	F: shoe inner	21	48		F 1+0		
018	F: heel	36	13		F 1+0		
019	B: vamp	25	6		B 1+0		
020	B: shoe outer	12	5		B 1+0		
021	B: shoe inner	17	5		B 1+0		
022	B: lacing outer	11	4		B 1+0		
023	B: lacing inner	19	4		B 1+0		
024	B: heel cap	44	10		B 1+0		

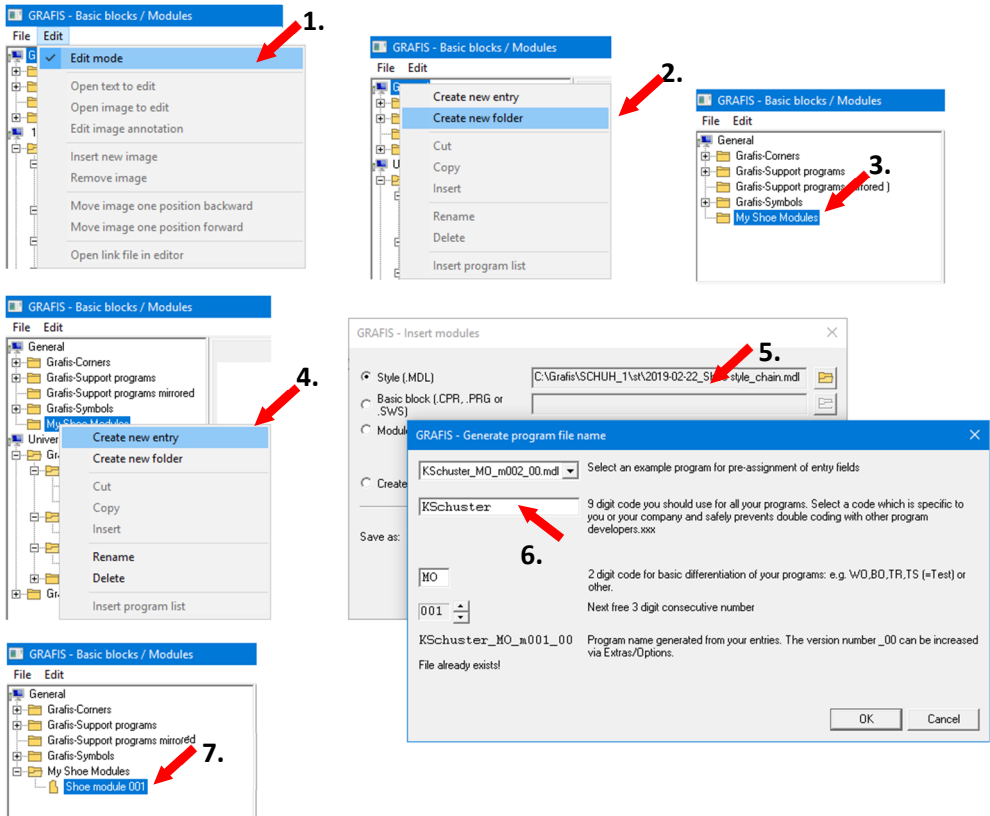


Picture 13-7



### Deposit module in the call list

Create a new style 'test' and open the *call list*. Activate the edit mode via *Edit* → *Edit mode* (1.). Click onto *General* with the right mouse button and then, onto *Create new folder* in the context menu (2.) and call the new folder 'My Shoe Modules' (3.).



Picture 13-8

Avoid special characters during naming. Click on the new folder 'My Shoe Modules' with the right mouse button and select *Create new entry* from the context menu (4.). The *Insert module* dialogue opens, see Picture 13-8. Activate *Style (.MDL)* (5.) and select the recently saved style module (5.). Assign a unique name according to the naming convention. We recommend a 9-digit abbreviation of your name or company name (6.). After having assigned the name, close the dialogue with *OK*. A copy of the style is saved in the central folder \Grafis\Prog. Also, assign a name for the style in the call list (7.).

**Example 4: Use of the *Insert* tool for development of construction sets**

A fastening is to be developed and saved in the call list.

Call *Last 10* into part 001 and *Basic Shoe 10* into part 002. Interactively adjust *Last 10* and *Basic Shoe 10*. Insert the lines and points required for the style development into part 003. Construct the upper opening and the heel curves with *curves*. With the *Insert lines* tool, insert all lines required for the development of the fastening into part 004.

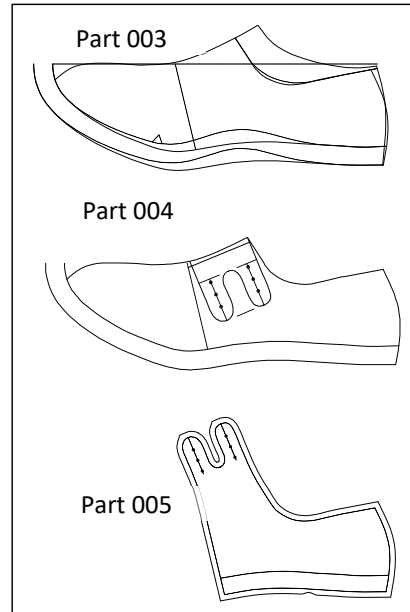
***When calling the insert lines tool, the click situation is photographed automatically, marked by a photo frame. Ensure that the required objects are visible within the frame. Zoom out if required. To enable subsequent release from the mother part, it is important***



***not to insert objects into this part***

***with the normal insert function, only with the insert tools***

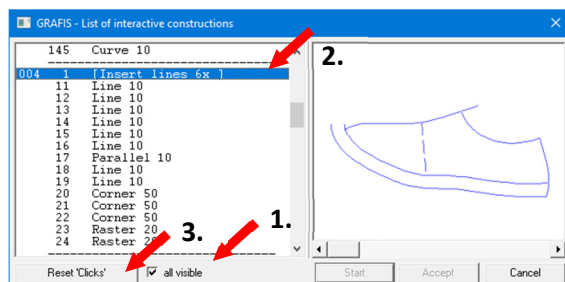
Picture 13-9



Construct the development part 'fastening' from the lines inserted into part 004 using the interactive tools. Insert the lines for the pattern piece from part 004 into part 005 and add seam allowances, attributes and symbols.

Open the <F12> list and set the tick at *all visible* (1.). Select *Insert lines* and click once on *Reset 'Clicks'* and *Accept* (Picture 13-10). The click connection to part 004 has been released.

Delete all parts above part 004 'dev fastening' and save the style as 'fastening module'. You can now save the module according to Example 3 in the call list.



Picture 13-10

## 13.6 Designing the call list

### Step-by-step guide

- ⇒ *call*; the dialogue *Grafis Basic blocks / Modules* opens.
- ⇒ Activate *Edit* → *Edit mode*
- ⇒ Create folders / subfolders
- ⇒ Enter construction as programming language program, styles, grade rule pattern or as an interactive construction in conjunction with a shape
- ⇒ Design the corresponding file card pictures and the text. The edit functions are opened respectively via the context menu.

### Create new folder / subfolder

Click on *General* with the right mouse button and select *Create new folder* and enter 'my modules'. **NB: Do not create a new folder with the name 'Grafis-...' and do not create entries or subfolders in these folders. Your data may be overwritten during a subsequent update.**

### Data types in the call list

The following can be entered in the call list:

- style (.MDL) = Grafis style with all parts
- program (.CPR) = Grafis programming language program of the new programming language, see Chapters 19 and 20. If this is an interactive construction, a shape can be assigned for calling.
- program (.PRG) = Grafis programming language program of the old programming language
- grade rule pattern (.SWS) = Grafis grade rule pattern saved as a template, see chapter 16.

### Insert entry as style

Entering styles into the call list is useful for basic types, which are frequently used as basis for style developments. Grafis transfers all parts of the style when called and inserts them into the edited styles.

Create a Grafis style with a number of parts and enter it into the call list, see section 13.5 example 2.

Entering grade rule patterns in the call list ensues in the same way.

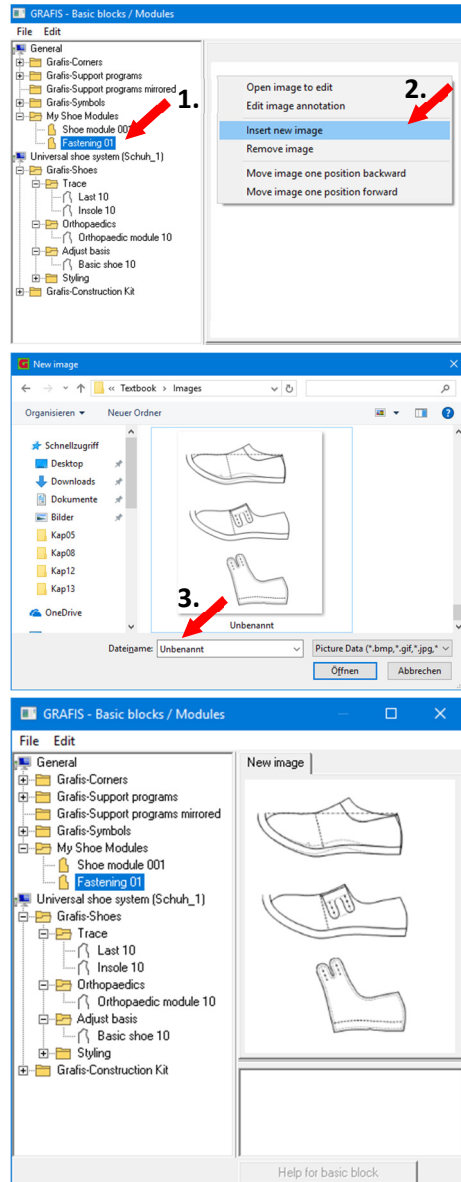
## Graphics and text for the list entry

In active *Edit mode*, graphics or texts can be opened for editing via the context menu. The graphic can be saved in bmp, gif, jpg, tif or png format. We recommend a size of 750x500 pixels.

A quick preview can be obtained by copying the screen to the clipboard. The function can be found in the menu under *Edit*. Insert the screen print into a program like Paint and save it in a desired format.

Activate the *Edit mode*. Select the entry for which you wish to insert an image (1). Open the context menu in the free area and select *Insert new image* (2). Select the previously saved image (3).

The text of the tab can equally be adjusted via the context menu. A new or modified graphic or text appear only after haven re-selected the list entry.



Picture 13-11

## Content

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### 14.1 Additional functions for adjusting interactive constructions


The adjustment of interactive constructions has already been explored in sections

2.4 'Adjust interactive construction' and 3.4 'Size-dependent adjustment of interactive constructions'. This section deals with additional functions in the menu for interactive constructions.

#### The value window

The value window (Picture 14-1) contains the x value settings for the active drag point. All activated break sizes in the active drag area are displayed and can be adjusted.

With the **left button**  **individual sizes** can be dragged. Changes made to one size are not applied to other sizes. The grade rules are altered.

With the **right button**  **sizes of a last type** can be adjusted simultaneously. Alterations are automatically applied to all sizes of the respective last type. The grade rules remain unchanged.

#### Menu for interactive constructions

load shape ▪ save shape

set break sizes

raster

+/-magnet ▪ +/-ruler

+/-comments ▪ +/-options ▪

+/-values

+/-measurements ▪ set measurements

+/-compare ▪ set compare

+/-stack ▪ set stack


alteration steps

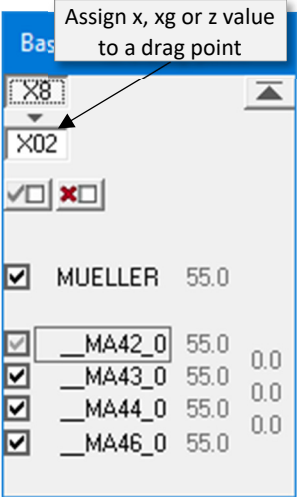
initial state ▪ undo alteration step ▪

redo alteration step

end ▪ abort





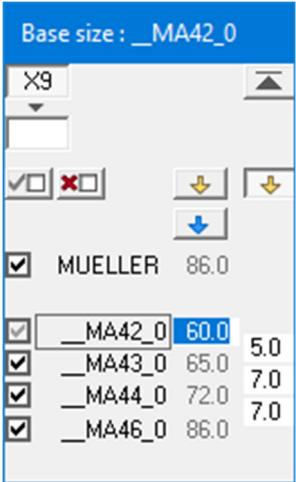
With the **button**  **all break sizes** can be altered simultaneously. Adjustments are automatically applied to all break sizes. The grade rules remain unchanged.



Picture 14-2






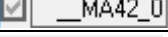
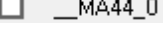
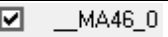
From Version 12 onward, **selected drag points can be assigned an x, xg or z value**. In this case, an additional input option appears, see Picture 14-2. If an x, xg or z value is entered, this drag point is connected with this value and can no longer be altered interactively. Removing the entry also removes the connection.

If a value is entered into the input window for x, xg or z values, the buttons  and  are hidden, see Picture 14-2. After having deleted the parameters from the input window, the buttons reappear.



Picture 14-1

The other elements of the value window have the following significance:

	With this drag point, a single x value is adjusted.
	With this drag point exactly two x values are adjusted, e.g. the x and y co-ordinate of a free moving point. The settings for only one x value are visible at a time.
	Minimise/maximise the window
	Show all sizes.
	Hide all sizes except the active size.
	Base size of the construction
	This size is hidden. Clicking on the tick box in front of the size shows the size again.
	The size is shown. Clicking the tick hides the size.

### Use of stack

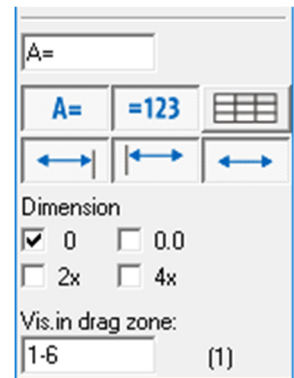
The *stack* function can be used for interactive adjustment of a graded nest. After clicking on *set stack* the stack point and then, optionally a direction point are determined. If no direction point is required, simply use the right mouse button after having set the stack point. Clicking on *+/-stack* activates or deactivates the nest. All drag points can be adjusted on a stacked nest. Grafis takes into account the shift caused by stacking.

### Dimensioning an interactive construction

A number of dimensions are already shown on an interactive construction. In practice however, other special company-specific dimensions are required. Therefore, Grafis offers the option of setting your own measurements which are altered immediately during interactive modification of the construction.

***With the dimensioning function you can set your own measurements which are altered immediately during dragging.***

Dimensioning ensues analogous to measuring, described in section 8.1. Additional options exist for each measurement, see Picture 14-3.



Picture 14-3

Display options:		
<input "="" type="text" value="A="/>		text for measurement
<input "="" type="button" value="A="/>		show/hide text
<input type="button" value="=123"/>		show/hide value
<input type="button" value="↔"/>		show/hide left auxiliary line
<input type="button" value="↔ "/>		show/hide right auxiliary line
<input type="button" value="↔"/>		show/hide measurement line
<input type="button" value="Table icon"/>		clicking turns measurement into <b>ID measurement</b> . ID measurements are saved with the shape.
Vis.in drag zone: <input type="text" value="1-6"/> (1)		In which drag areas are the measurements to be shown

The **ID measurement** button ensures that a measurement is automatically entered into the comments of the construction and saved as a measurement table when saving the shape. This table appears in the preview window when loading a shape. The **ID measurement** button remains inactive if the measurement has been

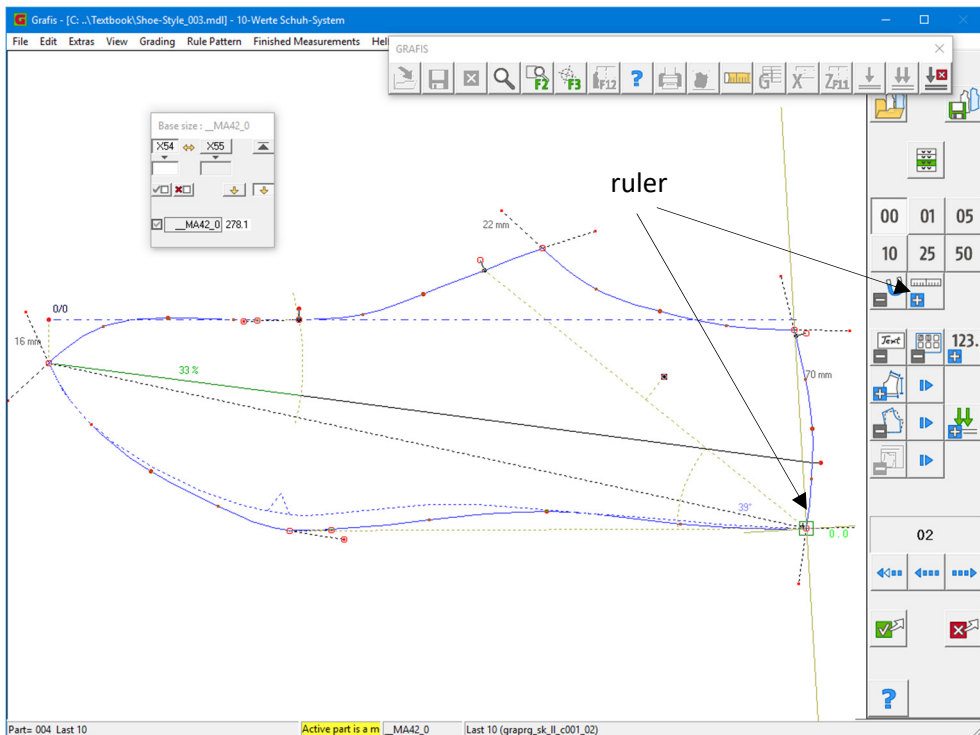
attached to points which are not part of the interactive construction. These measurements disappear, leaving the interactive interface.

Measurements can also be set for a comparison part. For example, if you want to make a modification during which a measurement is not to be altered, proceed as follows: first, set a comparison and switch to *+compare*. Position the comparison part suitably with <F3> and <F5>. Set measurements for the comparison part and the original part. Carry out the modifications. Measurements for the comparison part are reset when quitting the interactive interface.

Measurements can be printed via *Edit* → *Copy* to the clipboard.



### Use of rule

Toggle to *+ruler* displays the ruler. It consists of two lines at a right angle, one line is very long and the other considerably shorter.




Picture 14-4

Clicking with pressed left mouse button ...

- at the short line moves  the ruler,
- at the long line rotates  the ruler.



When moving and rotating the ruler it is automatically attracted by neighbouring lines and points. You can set the ruler onto a point and adjust it along a line.

**Free moving drag points**  **can only be moved in the direction of the ruler with active ruler.**

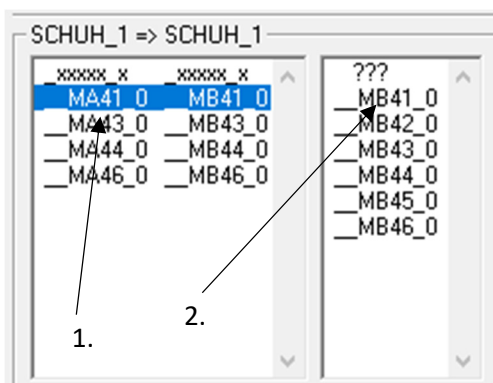
In Picture 14-4 the ruler was set onto the intersection heel/ sole edge and adjusted. The drag point can now only be moved along the rule.

### Load and save shapes

The adjustments of an interactive construction are saved in the corresponding x value list. This list is invisible for the user, it is updated automatically by Grafis. Clicking on *save shape* saves this x value list together with a preview, the comments and the previously explained ID measurements. The name of the shape is created from the date, the time as well as the computer and user names. They are saved as single XWF files under \Grafis\Forms\[name of construction].

Clicking on *load shape* opens the list of available shapes of the construction. All shapes stored as XWF files under \Grafis\Forms\[name of construction] are offered. Clicking onto a shape with the right mouse button opens the context menu with the functions **rename** and **delete**. Use the rename function in particular to organise your list of shapes.

Shapes can be loaded for other break sizes and also into styles of other shoe systems. The **break sizes of the shape may have to be re-assigned**. If you want to load a shape, which has originally been adjusted for sizes \_MA41\_0 etc. the break sizes can be re-assigned, see Picture 14-5. The construction is graded in the sizes \_MB41\_0 to \_MB46\_0 as originally in the sizes \_MA41\_0 to \_MA46\_0.





Picture 14-5

**ID measurements** set with *dimensioning* as well as **comments** are saved with the shape. The field for entry of notes opens by switching to *+comments* in the menu on the right hand side.

**For new developments, first load the basic construction and then, one of your prepared shapes. This combination of interactive construction and new shape can be entered into the call list, see section 13.6.**

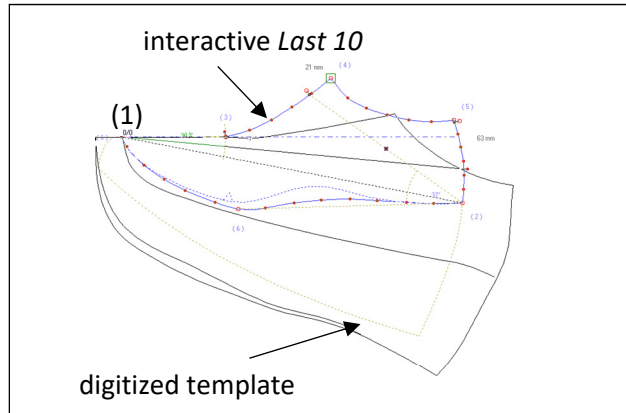
## 14.2 Reconstruct a digitized template pattern with an interactive construction

### Step-by-step guide

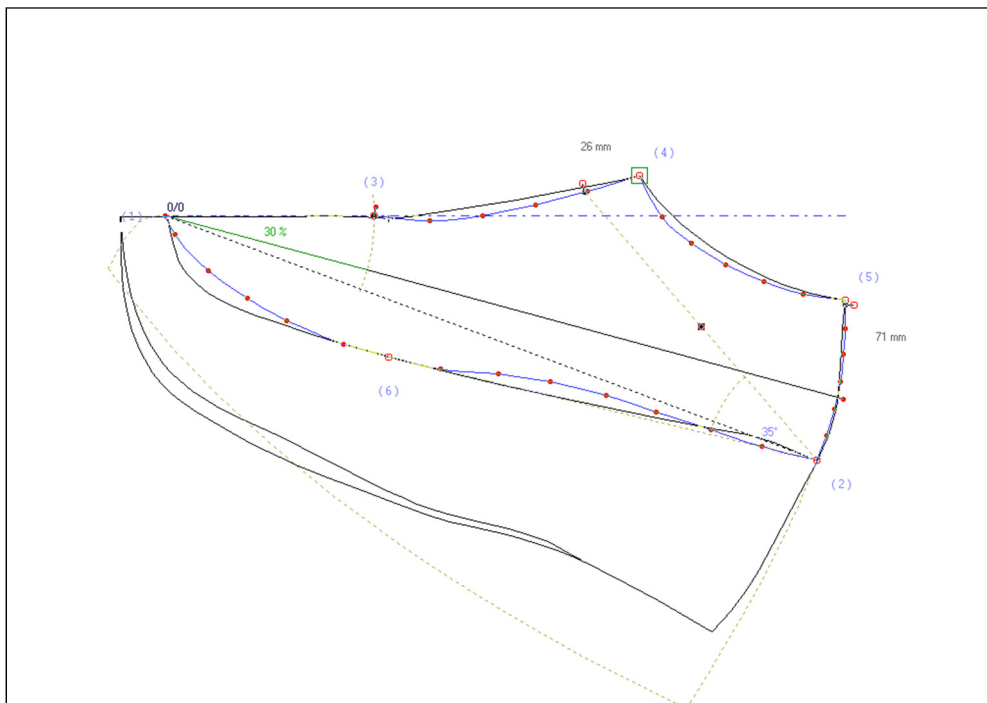
- ⇒ Open the digitised template pattern
- ⇒ Call the interactive *Last 10* into a further part
- ⇒ Position the parts to one another with <F3>, e.g. at the zero point of the interactive construction
- ⇒ Activate the interactive construction *Last 10*
- ⇒ Adjust the most important options
- ⇒ Adjust the drag areas of *Last 10* according to the numbering
- ⇒ Call *Basic shoe 10* into a further part
- ⇒ Activate the interactive interface of *Basic shoe 10*
- ⇒ Adjust the most important options
- ⇒ Roughly adjust the most important drag areas.  
Start with the symmetrically movable drag points.
- ⇒ Carry out the fine adjustment systematically and step-by-step.  
Save significant stages as shapes and rename the shape if required. Click on  or  in the menu on the right to undo or redo alteration steps.
- ⇒ Possibly call *Shoe type 11* or *21* into a further part
- ⇒ Activate the interactive construction
- ⇒ Adjust the most important options
- ⇒ Recreation of the template pattern with the help of different drag points.

### Reconstruction of a digitized last copy


Open the digitised last and call *Last 10* into the next part in the part organisation. Position the template with <F3> so that the point of the last is placed exactly on point (1) of the interactive construction (Picture 14-6). Adjust the respective options, here: *Cork line yes* and *trace last folded*. Now drag the corner points onto the template in numerical order (Picture 14-7).



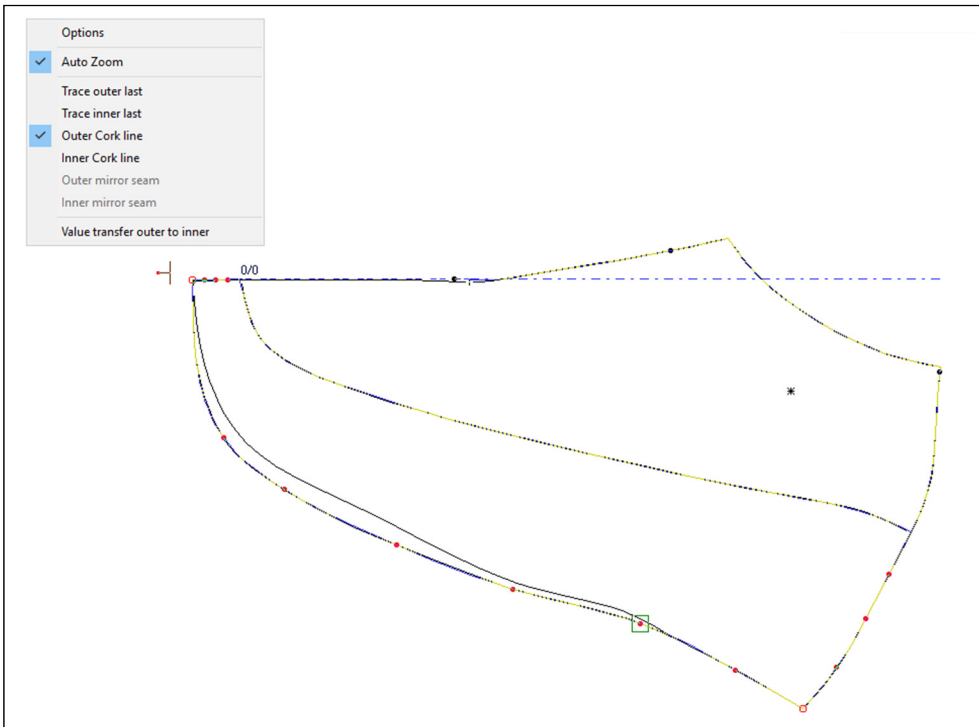
Picture 14-6



Picture 14-7

Use the **magnet function** by switching onto *+magnet* . The magnet function is useful to move points which are then bound onto existing lines and points of the construction behind. The magnet function is not useful for angle and percentage alterations.

Switch to the drag area *Outer Cork line* and recreate the template, also using the magnet function (Picture 14-8).



Picture 14-8

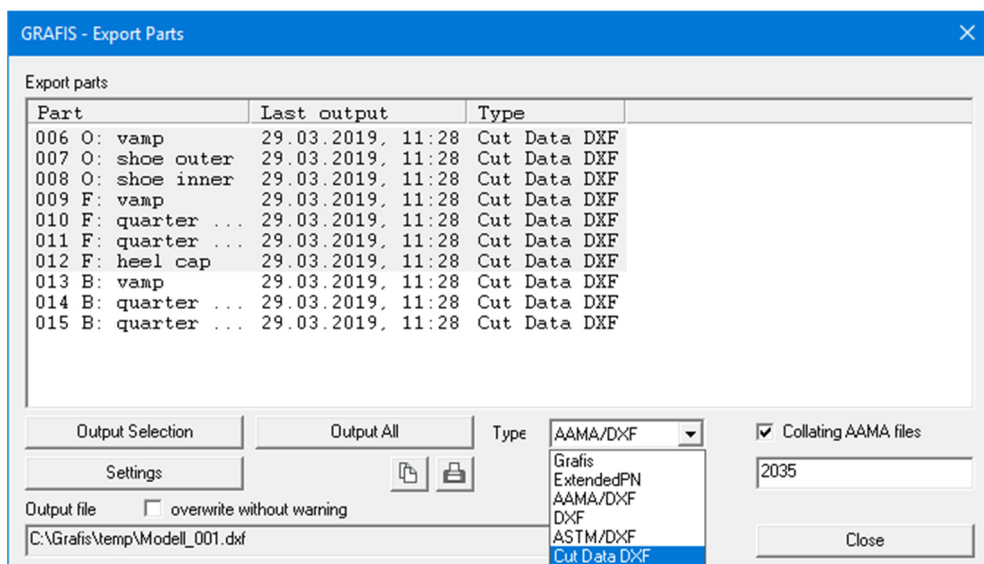
Note that after having adjusted the base size, the grading in the break sizes may have to be transferred from the template.

***An interactive construction can be entered into the call list together with a new shape, see section 13.6.***

## Content

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All Grafis users who deal with production abroad or provide pattern services for companies will have to deal with export and import. As a rule, during data exchange between CAD systems a loss of information occurs as the patterns are reduced to an agreed data format.



Picture 15-1

During export, the interactively adjustable patterns in Grafis are converted to a contour with grade rules plus additional information on grain line, notches, text and symbols. The exported patterns contain no information on x values and piece interdependency.

Patterns from other CAD systems can be imported into Grafis only as grade rule patterns. Grade rule patterns consist of a pattern perimeter with grade points. Each grade point is assigned a grade rule table with size dependant point movement in x and y direction, see Chapter 16.

## 15.1 Preparation for export in the Grafis Patternmaking program

### Step-by-step-guide

- ⇒ Generate production patterns with closed perimeter
- ⇒ Set grain line as symbol or as attribute line
- ⇒ Set piece parameter *production piece* for all production pieces
- ⇒ Enter all sizes to be exported in the size table and grade all pieces.

### Construct production pieces with closed perimeter

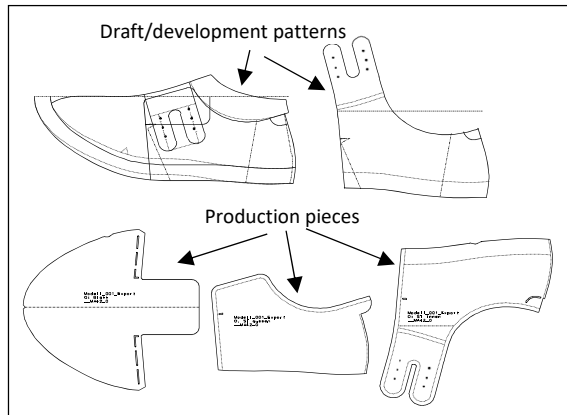
During pattern development draft patterns are created from which the actual production patterns are derived, see Chapter 13 Part organisation. Only pieces with closed perimeter can be exported.

### Set grain line

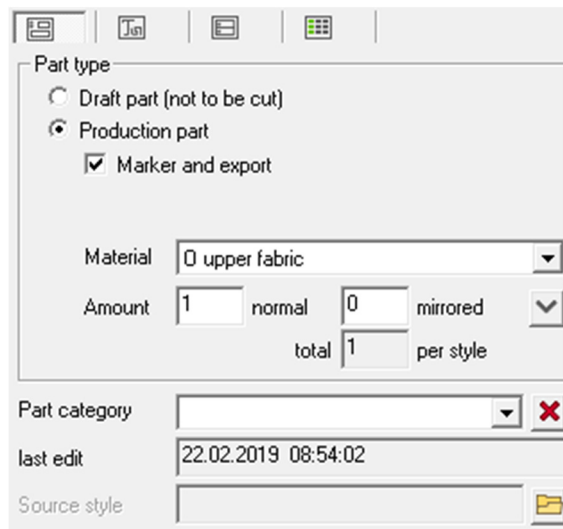
The Grafis symbol *grain line* or the interactive *Grain line 10* should be set in the pattern pieces. Alternatively, an internal line can be declared as *grain line* in the *attributes* menu. If no grain line has been set, the negative y direction (direction downwards) is assumed as the grain direction as standard.

### Assign piece parameter


In the *part organisation* dialogue open the file card *Piece parameter*, Picture 15-3. For export, all production pattern pieces must be declared as *Production piece*. Only these pieces are captured during automatic export. Draft pieces are exported, only if this has been activated in the export dialogue.



Picture 15-2



Picture 15-3

With the button  the piece parameters of the selected piece are transferred to the next piece. This relates to the attribute *Production piece*, the material type and the amount per style in normal/ mirrored position. These parameters are required for marker making, see Chapter 17.

If you have entered one size for left and right shoe in the size table and activated *orthopaedic shoe style*, see section 3.5, *right-left mirrored shoe piece* is

activated automatically in the assignment of the part parameters and only the number for normal is to be entered, see Picture 15-4.

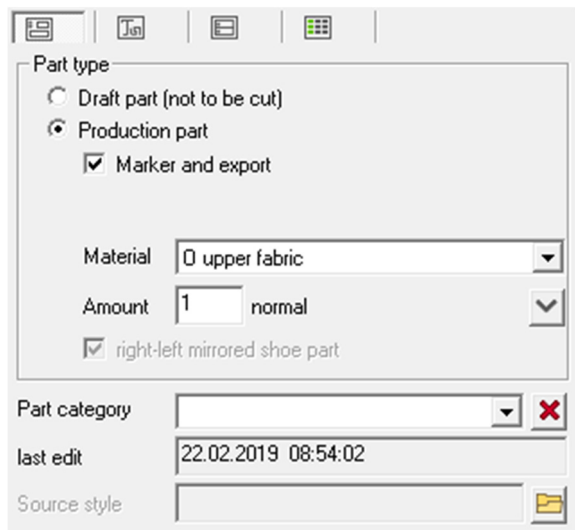
Grafis checks for closed perimeter of the pieces when setting the piece parameter *Production piece* and again during export. If Grafis finds gaps (>0.5mm) in the perimeter or protruding lines, an error message appears. Gaps can usually be found at corners, joints of lines or at symbols. Line symbols such as notches are ignored during checking of the perimeter (Picture 15-5). In this case, a corner treatment has been applied from the perimeter to the notch, thus the system detects a gap.

**To avoid problems, the slit notch should be used.**

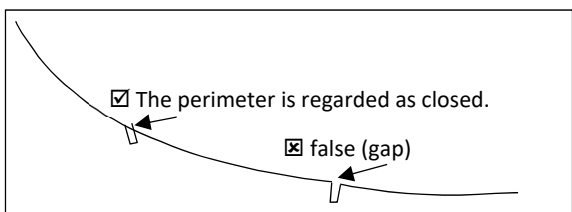
To learn about the export function, prepare a simple style with pattern pieces, see Picture 15-2.

### Grade production pieces

All sizes to be exported must be entered in the size table. One entry per size is sufficient. Grade all production patterns with *Grade all Parts*.



Picture 15-4



Picture 15-5

## 15.2 Export formats and their particularities

Grafis can export in the following formats:

1. AAMA/DXF
2. ASTM/DXF
3. ExtendedPN
4. Grafis export format
5. DXF
6. Cut Data DXF

With the exception of the Grafis and DXF export formats, during export, all pattern stacks are reduced to a base size with grade rules. As all sizes are constructed individually in Grafis, this leads to a loss of information. The target system calculates the contours of the different sizes from these reduced data with its own mathematical algorithms. Therefore, the shape can differ from the original shape in Grafis, particularly in extreme sizes.

Formats 1 to 4 are predominantly relevant for clothing construction and thus not explained in detail.

***NB: Data exchange with other Grafis users should ensue via: Grafis styles, Grafis styles with reduced pieces, Grafis production styles, Grafis grade rule patterns or Grafis layplans!***

### DXF

The DXF format is used for export of data to engineering CAD e.g. AutoCAD or drawing programs e.g. Corel Draw. The DXF format exported by Grafis uses a small amount of the standardized data types only. Thus, the exported data will be readable in many systems. The single sizes are exported to consecutive layers.

### Cut Data DXF

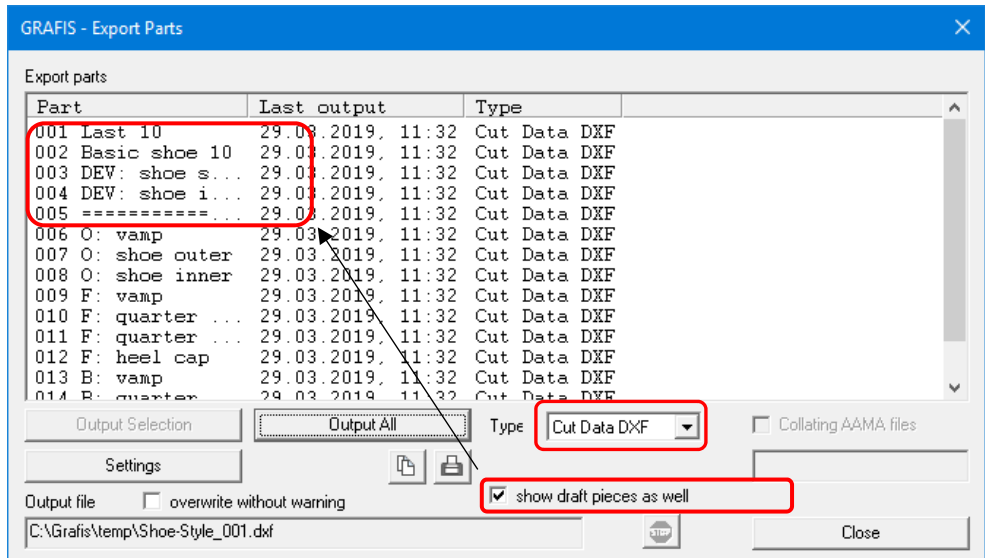
This is the format many Shoe CAD programmes can use. Here, the development pattern pieces can be displayed via a switch. For output to cutters, the assignment of DXF layers for specific objects can be selected in the settings for the export configuration.



### 15.3 The Export dialogues

#### The Export parts dialogue

The *Grafis-Export Parts* dialogue (Picture 15-6) opens via *File* → *Export parts*. This dialogue controls which parts, in which data format and with which specific settings are to be exported.



Picture 15-6

**Settings** opens the *Export parameter* dialogue with the selection of *Export configuration*, among others. Check in this dialogue whether the parameters for the envisaged export are set correctly.

The switch **Hide seam allowances** can temporarily hide seam allowances of the patterns. The prerequisite is that the net perimeter of the pattern has been assigned the attribute *seam line*. Having quit the export function, the seam allowances are reinstated.

With the switch **display development pattern pieces**, draft/development pattern pieces can be output also.

**Output selection** initiates the export of all currently selected parts. *Output all* starts the export of all parts in the list. If the switch *overwrite without warning* is set, existing files with the same name will be overwritten without notification.

With the buttons **Copy** and **Print** the list of export parts with details of export type and time of last export is copied to the clipboard or printed directly. The **output file** field indicates the name of the export file during the export process.

### The Export parameter dialogue

The *Grafis - Export parameter* dialogue (Picture 15-7) opens via the button *Settings* in the *Grafis-Export parts* dialogue.

#### Lines for output

The section *lines for output* controls which lines are to be written into the export file. You can select the line attributes *grain line*, *annotation line*, *cut internal line*, *split line* and *seam lines*, which have been assigned with the *attribute* function. The

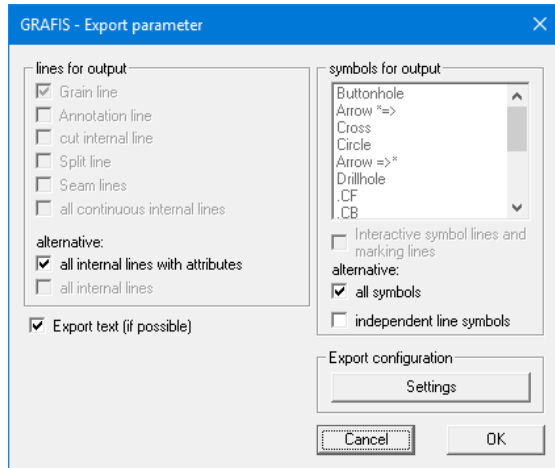
selection *all continuous internal lines* captures all lines without any particular line attribute. Alternatively, you can use the global switches *all internal lines with attribute* for all lines with special attribute or *all internal lines*. If one of the global switches is set, specific line types can no longer be selected.

#### Output text

Text output depends on the target system and the further configuration settings. If this option is active, the annotation texts are exported along with the pattern pieces as long as the selected target systems and the selected settings allow.

#### Symbols for output

The section *symbols for output* controls which symbols are to be written into the export file. This section captures all point and line symbols which have been set with the *symbols* function. The grain line and line symbols are not captured, here. Symbols which are known in the target data format, such as the drillhole, are written as symbols into the export file. All other symbols are transferred as continuous lines. If the switch *all symbols* is set, all point symbols are exported. Alternatively, the symbols to be exported can be selected individually in the list. The switch *interactive symbol lines and marking lines* controls the export of the interactive seam symbols.



Picture 15-7

### The Cut-Data DXF Settings dialogue

For export in the DXF cut data format, an additional *Cut-Data DXF Settings* dialogue is available. In this dialogue DXF layers can be assigned to specific objects, see Picture 15-8. For certain object types such as text or drillholes, output can be activated or deactivated. If the option *Export drillholes as CIRCLE objects* is not active, the drillhole will be output as a simple point.

### Additional settings

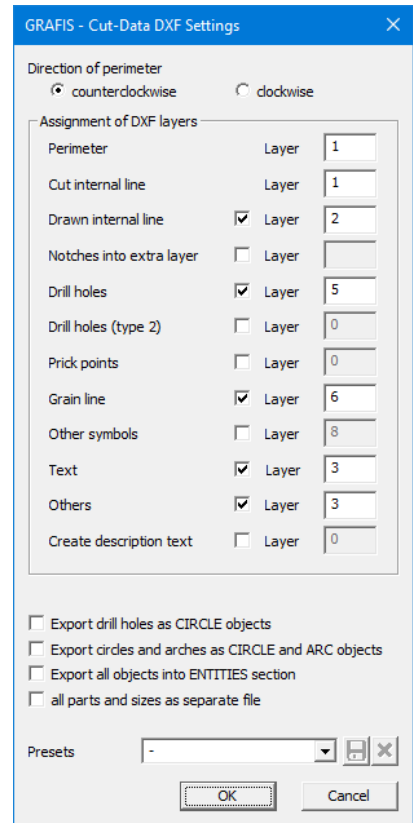
Experienced users can further control the export with the following switches of the *Grafis.ini*, section [INTERFACE]:

DXFEXP\_NAMEMODE controls the allocation of the file name for Autocad-DXF files.

DXFEXP\_STARTLAYER determines start layer for output in Autocad-DXF. The layers for the specific sizes are then counted upward by 1.

With OPTNSALWY=1 the *Export parameter* dialogue automatically opens for each export.

AAMASAVEAS permits saving DXF files with the 'Save as...' dialogue.



Picture 15-8

### Step-by-step guide for export in DXF and CUT-Data-DXF formats

This step sequence applies to export in DXF and in CUT-Data-DXF format.

1. Every part of the style to be exported need to be marked as *Production piece* at the file card *Part parameter*. It is possible that more parts are marked as production pieces as the parts will be chosen for export, later.
2. The parts must be available and graded in all sizes to be exported. Select all sizes to be exported in the *Size table* and then start *Grade All Parts* or *Grade Production Pieces*.
3. Open the export dialogue via *File* → *Export pattern pieces*. All productions pieces will be automatically prepared and displayed in all available sizes, see Picture 15-6.
4. Choose export type *Cut Data DXF* or in exceptional cases *DXF* or *Grafis*. Please take note of the information on export data formats in section 15.2.

5. Optional: activate the switch *display development pattern pieces* and */or hide seam allowances*.
6. Clicking on the *Settings* button opens the *Export parameter* dialogue, see Picture 15-7. Depending on the selected format Cut Data DXF/DXF/Grafis this dialogue differs only in the export configurations available. You must test which export configuration is suitable for which CAD system. Choose lines and symbols for output Picture 15-7.
7. The *Settings* button below export configuration opens the dialogue for the cut data export settings, see Picture 15-8.
8. In the dialogue *Grafis Export parts* choose the parts to be exported in the list of parts. Mark an area of parts by clicking the part at the end of the required area with pressed <Shift> key. Pressing the <Ctrl> key marks or unmarks single parts.
9. Then all selected parts will be exported with *Output Selection*. According to the settings under *Export Parameter* the grain line, the symbols and the inner lines are included, also. Alternatively all parts can be exported with *Output All*.
10. The *Save as...* dialogue opens. If *overwrite without warning* is active, the file of the same name is overwritten.

***File names must not be changed after export as they are synchronised!***

## 15.4 Special settings and errors during export

### Grade points

Grafis interprets each start and end point of a line as a grade point. These points will appear correctly in the target systems throughout the graded size range. Therefore, it is important that the perimeter of the Grafis pattern is separated at all significant corner points and base points. Internal objects which contain corners or kinks should also be separated at these points. The only exceptions are points with attached notches. All base points of notches are automatically translated into grade points so that their position can be described accurately.

### Perimeter

In addition to the separated points mentioned above, the perimeter of the piece must be properly closed. The export function tolerates gaps or overlaps of a max of 0.5mm. Therefore, it is recommended to close all corners properly with the corners function before export. ***But the perimeter should not be linked completely!*** More difficult to find are areas with blunt overlaps. Such sources of error should be avoided during pattern development if possible. They are difficult to rectify using

construction methods at a later date. Especially in the graded sizes, blunt overlaps can arise after *link single* and *parallel* or after *transformation* and *parallel*.

### Curves

At *Export pattern pieces* Grafis automatically inserts additional grade points onto the curves so that the curve shapes in all sizes appear largely unchanged in the other systems. It is not necessary to separate the curve manually like in earlier Grafis versions.

### Notches and drillholes

During export there is a differentiation between two types of symbols, line symbols and point symbols. Line symbols as for instance the notch are considered in connection with the perimeter or with another base line. Point symbols, however, can be placed in any position inside a pattern piece. The drillhole is an example for a point symbol. Point symbols are divided into directional symbols (grain line, centre back, arrows etc.) and non-directional symbols (drillholes).

Of the different notch types the slit notch is most suitable for export. It can be located accurately on the perimeter as the base point is part of the notch line. It can also be used as cutting line for separating curves. When using point symbols it should be considered that not all symbols are supported in the individual data formats.

### Text

Free text is directly supported by ASTM und Cut Data DXF format, only, exceptionally also in the AAMA, ExtendedPN and Grafis format. In general, only the transfer of part name and style name can be controlled. In addition, the size designation is usually transferred. However, the size does not have to be identical with the original Grafis size designation. Grafis uses the Grafis style name and the part text to determine these designations. Therefore, these designations should have a connection to the designation to be used later in the target system.

### Possible sources for errors

For export of individual sizes there are no further sources for errors other than the points mentioned above.

For exporting graded nests the fact that most target systems expect a clear succession of grade points and notches within the perimeter is to be considered in addition to the points mentioned above. It is not acceptable for a notch to be placed exactly on a grade point in one size and slightly off to the side of the grade point in another size. Also, the succession of the points in the perimeter must always be identical. ***A notch must not move across a grade point throughout the size range!***

Such errors are reported in Grafis during export (Error 404) and the process is aborted.

Another possible source for errors are points positioned too closely. Gerber cutters often encounter problems if notches are placed closer together than the minimum distance allows. In other cases the import only succeeds if the base points of the perimeter have a minimum distance. If the distance falls below the minimum required relevant messages will appear during export. The limits should be tested before going into production.

### 15.5 Import of grade rule patterns

All patterns prepared in one of the export formats listed below can be imported into Grafis. They are imported as grade rule patterns into Grafis. Working with grade rule patterns forms the content of Chapter 16.

Overview of the import data formats:

	File extension	Comment
<b>Data formats with grading information</b>		
AAMA	DXF and RUL or DXF without RUL	DXF without RUL: with all sizes in the DXF file
ASTM		as AAMA
ExtendedPN	EPN	from CAD system Gerber
IBA/VET	IBA and VET	from CAD system Lectra
Grafis	001, 002, 003 etc.	
Cut Data DXF	DXF without RUL	
	File extension	Comment
<b>Data formats with grading information specially for CAD systems for shoes</b>		
SVG	SVG	from CAD system Procam (V4 and V5)
<b>Data formats without grading information</b>		
DXF (AutoCAD-DXF)	DXF without RUL	
HPGL	PLO, PLT, HGL and others	
ISO	CUT, ISO and others	

Data can be imported into Grafis Patternmaking and into Grafis Marker making. As opposed to Grafis Patternmaking, in Grafis Marker making the size range cannot not be rebuilt. Only contours contained complete in the file are displayed in Grafis Marker making.

***Therefore, import from data formats with grading information must always ensue into the Grafis Patternmaking program first. Import into the Grafis Marker making program can only serve as a control measure. One exception is 'DXF without RUL with all sizes in the DXF file'.***

Unfortunately, a completely automatic import is not possible. The main reason is that the definition of the AAMA format is not clear and is interpreted differently by different CAD suppliers, see more detailed explanation in section 15.2. In addition, in Grafis the size range must be checked during import.

#### Step-by-step guide

- ⇒ Create a new style as the size table is usually altered during import
- ⇒ Pull-down menu *File* → *Import grade rule pattern*
- ⇒ Select file to be imported
- ⇒ A size table appears in which you can assign the sizes in the file with the usual standard sizes in Grafis.
- ⇒ During import of DXF files, a further dialogue appears with the option to select *AAMA-DXF* or *AutoCAD DXF* as well as other options. Select *AutoCAD-DXF* for files, that do not exist in AAMA or in ASTM format, or don't come from a clothing CAD system. For your first import attempt leave the options in the dialogue unchanged.
- ⇒ Grade and check the imported patterns.

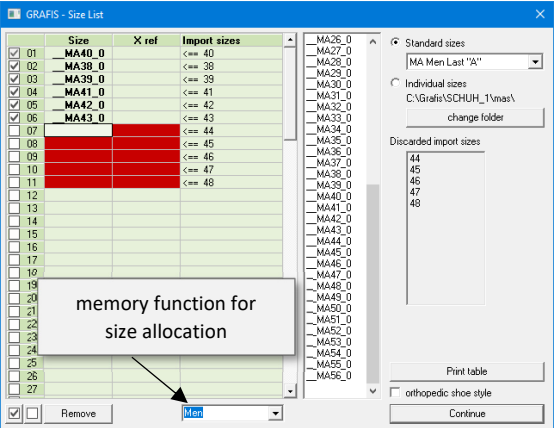
If some discrepancies occurs, repeat import with changed options. Import again into an empty style or import with *File* → *Import (reduced)*. *Import (reduced)* does not transform the data into a gradeable pattern but shows exactly the content of the file.

Import of HPGL and ISO data ensues always into the first size. The size table remains unaltered. In case of DXF files sizes can be choosed if the option 'BLOCKS->sizes' is selected.

### Check size range

To ensure that the imported pattern can be graded in Grafis as a grade rule pattern, the sizes in the file must be assigned to the Grafis standard sizes of a last type.

A dialogue according to Picture 15-9 opens. A suitable base size must be entered into the first position of the size table. Enter all other sizes in the desired order. The section *Discarded import sizes* contains the sizes existent in the import file but not assigned with a size. If you continue import with *Continue*, the *Discarded import sizes* are not imported.



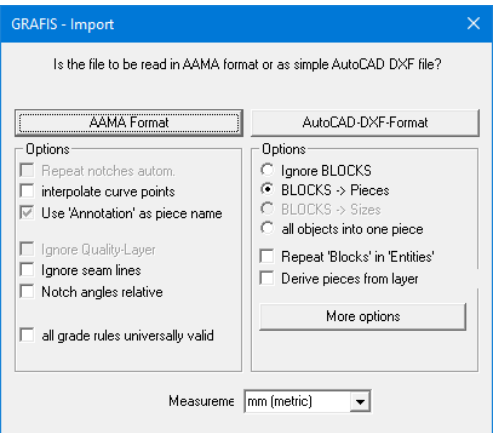
Picture 15-9

Individual sizes can also be entered into the size table. In this case, a correct reference size must be entered in the *X reference* column as the grade rules are associated with these reference sizes. A shift of the size run during import also is possible, see Picture 15-10.

	Size	X ref	Import sizes
<input checked="" type="checkbox"/>	01	42	MA42_0 <== 42
<input checked="" type="checkbox"/>	02	38	MA38_0 <== 38
<input checked="" type="checkbox"/>	03	39	MA39_0 <== 39
<input checked="" type="checkbox"/>	04	40	MA40_0 <== 40
<input checked="" type="checkbox"/>	05		<== 41
<input checked="" type="checkbox"/>	06		<== 43
<input type="checkbox"/>	07		
<input type="checkbox"/>	08		
<input type="checkbox"/>	09		
<input type="checkbox"/>	10		

Picture 15-10

The memory function for size allocation in Picture 15-9 is only visible if this option has been activated at the index card *Options for experts* in the Setup. Before quitting the size table with *Continue* you can enter a suitable name for this allocation, e.g. 'women' or 'men'. You can then select one of the memorised allocations for your next import.

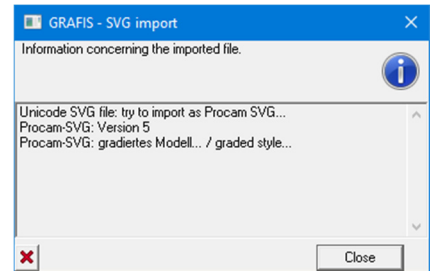


Picture 15-11



### The Grafis Import dialogue for files with DXF format

In the *Grafis-Import* dialogue (Picture 15-11) only the import of an AutoCAD-DXF format is selectable. The button *AAMA-Format* is greyed out. Simultaneous with the *Grafis-Import* dialogue, the *Grafis DXF/AAMA/ASTM import* information window appears, containing information from the file, Picture 15-12.



Picture 15-12

Before starting the import process, you can select different options. For a first import attempt, leave the options unchanged as Grafis has already preset them based on information from the file.

### Measurement unit

Depending on the CAD system, *metric* could be interpreted in millimetres, centimetres or metres. Therefore, the *Measurement unit* is preset based on information in the file. The user can alter these settings. Entry of a user-defined unit in millimetres is possible. For metres, the value 1000. should be entered.

### Ignore BLOCKS etc.

In DXF files, lines and points are combined to BLOCKS. Furthermore, there is an ENTITIES area in which the individual BLOCKS areas are activated and other objects may be stored. This organisation is not always clear in other DXF files. Therefore, the following option for this import are available:

- *Ignore BLOCKS* hides everything defined in BLOCKS and shows only the objects from the ENTITIES area.
- *BLOCKS → parts* imports each BLOCK into a separate part. The ENTITIES area is also imported into a separate part.
- *BLOCKS → sizes* imports everything into one part but stores the different BLOCK areas in different sizes.
- *All objects into one piece* ignores the organisation into BLOCKS or ENTITIES and saves all lines and points in one part.

If you are unsure how the different BLOCKS are interpreted, first select *all objects into one piece*. This shows everything contained in the file. Then, test the AutoCAD DXF import with all other options one after the other and check with which option all information appears in the desired order.

***All grade rules universally valid***

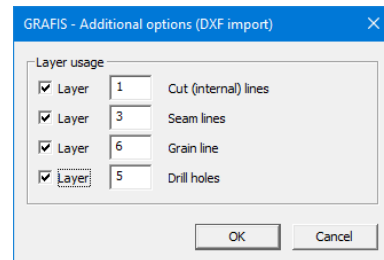
If the perimeter or internal lines of the piece in an import file are not continuous lines, different grade rules may be calculated at points of contact with the perimeter during conversion to a grade rule pattern. During grading, gaps may therefore appear in the perimeter. In this case, the option *all grade rules universally valid* may assist. It ensures that one grade rule only is permitted for each position. On the other hand, new problems may occur if internal lines touch the perimeter but are to be graded differently from the perimeter.

***Further options***

Here, layers can be assigned for different objects, see Picture 15-13. The assignment should be verified. If the first attempt does not deliver the desired result, try out a different assignment.

**Direct import of data**

From version 11 onwards, importable files can be opened with double-click in Grafis. The file extension DXF is linked with the Grafis.exe. Double-clicking on a DXF file starts Grafis, requests the desired shoe system and begins direct import of the file.



Picture 15-13

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**Construction patterns** as well as **grade rule patterns** (Rule Patterns) can be used for pattern development. If the tick for *orthopaedic shoe style* is set in the size table, this style cannot be graded via grade rules.

Construction patterns are generated on the basis of finished measurements. Grade rules are not required for grading.

A grade rule pattern consists of a pattern perimeter with grade points. Each grade point is linked to a grade rule table with size-related point movement in X and Y direction.

Grade rule patterns can be accepted into the record to form the basis of style development just like construction patterns. As opposed to construction patterns, grade rule patterns cannot be graded made-to-measure.

## 16.1 Digitizing the pattern perimeter

For many years, paper patterns could only be digitized with the help of a digitizer tablet. A digitizer tablet with a 16-button digitizer mouse and a Win-Tab driver matching the operating system were required. The new, alternative method is digitizing of photographed pattern pieces within Grafis without a digitizer tablet. Pattern pieces are photographed with a standard digital camera, processed with an add-on software and then loaded into Grafis as a background image and digitized or traced.

**Digitizing with a digitizer tablet** has a theoretical accuracy of 1 mm and is only dependent on the waviness of the template. However, a digitizer requires a lot of space, has high investment cost and is heavy and bulky. Big problems occur when switching to a new operating system, as normally a new driver for the digitizer tablet is required from the manufacturer.

When **digitizing scanned pattern pieces** in Grafis, the accuracy depends entirely on the quality of the scan process. Two reference lines at right angles on the template enable verification of the scan process, at least at the beginning.



Picture 16-1

When **digitizing photographed pattern pieces** the accuracy depends on how the photo was taken and how well it was reworked. First, the pattern pieces are placed on a rectangle of known measurements. The pattern pieces are photographed with a digital camera with a good lens. Reworking the photo with the add-on programme is necessary to subtract out the lens distortion through the camera lens and the perspective and to enter the correct dpi value for the pixel image. For shoe construction, scanned templates should be used.

### Prerequisites for digitizing with a digitizer tablet



Prerequisite for digitizing 'with tablet' is a **digitizer with a 16-button mouse, connected and switched on**. The **respective Windows driver** must be installed. If these conditions are fulfilled, the test programme \Grafis\Hilfen\Tabtest.exe displays the current pixel position of the digitizer cursor in x and y direction when moving the digitizer mouse across the active area.

Have the overview of the **digitizer key assignment** and the **menu template** for the digitizer ready. Both can be found in the appendix to the Grafis help.

Position the **menu template** at any position within the active area of the digitizer tablet. The position must be determined only at the beginning or after each change of position as follows: start the set up in the **digitizing** menu with the <TAB> key. Then, points P1 and P2 must be digitized.

### Prerequisites for digitizing scanned or reworked photographed pattern pieces



Prerequisite for digitizing pattern pieces on screen, hereafter referred to as 'with mouse', is an image template, ideally with reference lines. This image is loaded into Grafis as a background image, see also section 2.2.

### Preparation of pattern pieces


Digitizing is easier if the required **grade points** are **marked** on the pattern. This could be done by hand, also


With *Rule Pattern* → *Digitize Grade Rule Pattern* digitizing ensues into an **empty part**. Therefore, activate a part with '0' record steps. The digitized pattern can be inserted into the record or the call list or can be saved as a template, later.

With *Rule Pattern* → *Edit Grade Rule Pattern* **subsequent digitizing of points, lines or grade rules** into non-edited or edited grade rule patterns or even into constructed patterns is possible. This option is not explained in detail.

Before digitizing, Grafis is to be told the size of the pattern to be digitized. The **base size** is to be entered into the first position of the size table.

After these preparations, continue with *Rule Pattern* → *Digitize Grade Rule Pattern*. The menu for editing grade rule patterns is opened.

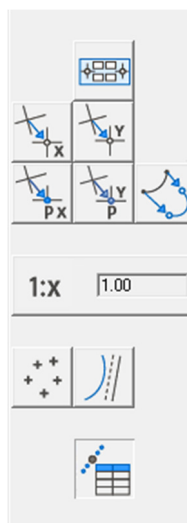
To **digitize scanned or photographed pattern pieces** click on the menu item *digitizing background image* . The displayed dialogue *Digitize* opens with all necessary functions (Picture 16-2). The often used functions of the first two rows are available as shortcuts on the keyboard key <1> to <8>.

To **digitize with digitizer tablet** click on the menu item *digitize with digitizer* . The displayed *digitizing* menu opens. You cannot click inside this menu.

The control ensues exclusively via the menu template on the digitizer tablet. In the digitizing menu, the current state is displayed. The top four rows from Picture 16-2 are situated on the 16-key digitizer mouse. All other functions can be found on the digitizer template to be positioned in a corner of the active area of the digitizer tablet. The digitizer mouse key configuration and the digitizer template can be found in the appendix to the Grafis Help.



Picture 16-2



### Digitize menu

[with tablet]

[adjust pad/ menu template](#)

Entry transformio:

$P+Px \Rightarrow (0,0)$      $P+Py \Rightarrow (0,0)$

$P+Px \Rightarrow P$      $P+Py \Rightarrow P$      $P+P \Rightarrow P+P$




$P+P \Rightarrow P+P$

[scale factor](#)

[points](#)    [lines/curves](#)

[increments](#)

### Step-by-step guide for digitizing

- ⇒ Prepare the pattern to be digitized, mark missing notches etc., decide whether to digitize with or without seam allowance
- ⇒ [with tablet] prepare the digitizer and place the pattern pieces onto the digitizer
- ⇒ [with mouse] place the pattern pieces inside the reference rectangle and photograph
- ⇒ [with mouse] process the photos
- ⇒ [with mouse] load the processed photos into Grafis as a background image, see section 2.2, align the image and check or adjust the image size.
- ⇒ Activate and annotate an empty part in the part list (possibly prepare the part list with annotations for all parts to be digitized)
- ⇒ Enter the base size of the pattern to be digitized into the first position in the size table
- ⇒ *Rule pattern* → *Digitize grade rule pattern*
- ⇒ click *Digitize rule pattern*  [with tablet] or  [with mouse].
- ⇒ [with tablet and at the beginning only] Set up menu pad
- ⇒ [with tablet] Determine entry transformation and define scale  $F_a = \dots$  (e.g. 2 for patterns in half scale)
- ⇒ Digitize lines and points
- ⇒ possibly: Save digitized patterns and digitize another pattern
- ⇒ Terminate with [*Quit digitizing*]
- ⇒ Edit (subsequent digitize / replace) and save the grade rule pattern (see sections 16.4 and 16.5)
- ⇒ Quit with 

### Entry transformation [only: with tablet]

For **digitizing with digitizer tablet** five ***input transformations*** are available for the data transfer digitizer tablet → Grafis.

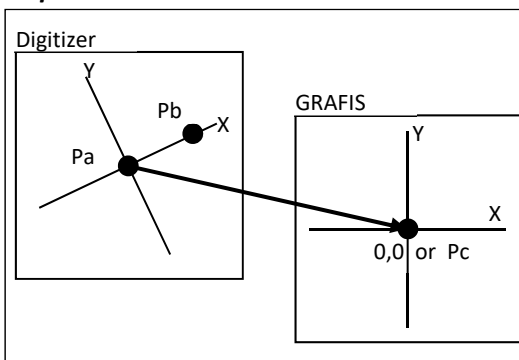
$P+P_x$	$\Rightarrow$	0,0	$P+P_y$	$\Rightarrow$	0,0	$P+P$	$\Rightarrow$	$P+P$
$P+P_x$	$\Rightarrow$	P	$P+P_y$	$\Rightarrow$	P			

The entry transformation determines the data transfer digitizer → Grafis. It is to be updated after repositioning the pattern on the digitizer. The entry transformations are called via the menu template. They have the following significance.

**Transformations  $p+px \Rightarrow 0,0$  and  $p+px \Rightarrow p$** 

These transformations align the pattern horizontally. With  $p+px \Rightarrow 0,0$  the first digitizer point Pa is set onto the zero point in Grafis. The second digitizer point Pb defines the x axis of the digitizer template (Picture 16-3).

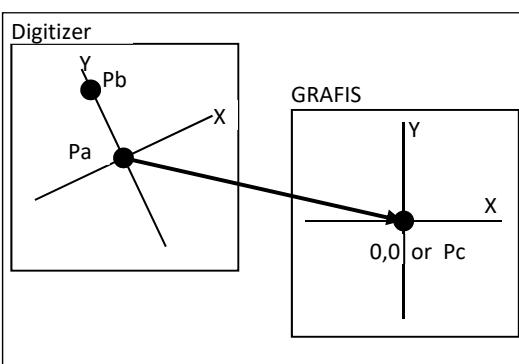
As opposed to  $p+px \Rightarrow 0,0$  the first digitizer point Pa is positioned on a point to be constructed in Grafis with  $p+px \Rightarrow p$ .



Picture 16-3

**Transformations  $p+py \Rightarrow 0,0$  and  $p+py \Rightarrow p$** 

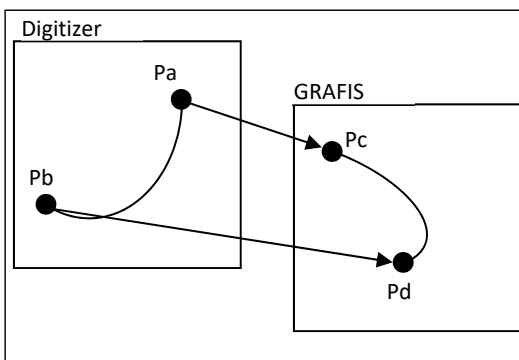
These transformations align the pattern vertically. They differ from  $p+px \Rightarrow 0,0$  and  $p+px \Rightarrow p$  only in the second digitizer point Pb defining the y axis of the digitizer template (Picture 16-4).



Picture 16-4

**Transformation  $p+p \Rightarrow p+p$** 

The first digitizer point Pa is set on position Pc in Grafis. The second point Pb is set on Pd in Grafis. The scale and co-ordinate rotation is calculated according to these settings (Picture 16-5). Use this transformation for inserting/replacing curves for example.



Picture 16-5

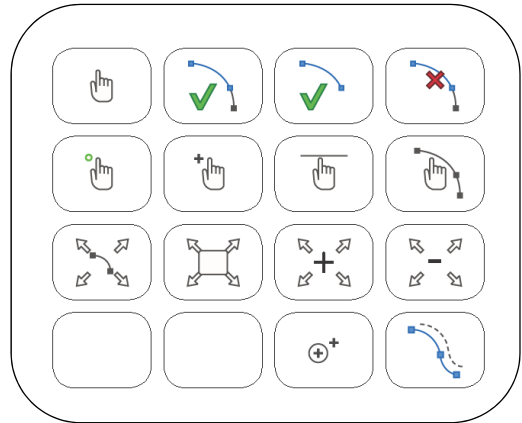


### Scale factor

For all transformations other than  $p+p \Rightarrow p+p$  the **scale factor** is to be set. The digitized point co-ordinates are multiplied with this factor. A pattern with scale 1:2, digitized with scale factor 2.00 appears full size in Grafis.

### The digitizer mouse key functions [with tablet]

For digitizing, a 16-button mouse is required. The keys are assigned the following functions Picture 16-3. All other functions can be found on the digitizing template, which is found in the appendix of Grafis Help.



Picture 16-3

### The digitizer functions [with mouse]

For digitizing from background image, these functions can be found in the *Digitize* dialogue. The displayed dialogue *Digitize* opens with all necessary functions (Picture 16-2)

#### 1: <digitize>

Set digi point.

#### 2: <deposit+continue>

The active line/curve (red) or active points (black, round) are deposited. The next line/curve is linked, directly. Starting point of the next line/curve is identical to the final point of the last line/curve. It is not digitized again.

**3: <deposit+start>**

The active line/curve or active points are deposited. A new object with a new starting point is digitized.

**4: <delete nearest digi point>**

The point closest to the cursor and active (digi point or grade point) is deleted.

**5: <digitize with grade point>**

A digi point is digitized as a grade point.

**6: <select p>**

Set digi point onto a point.

**7: <select l>**

Set digi point onto a line/curve.

**8: <select pl>**

Set digi point onto the fulcrum of a line/curve.

**9: <zoom digi area>**

The screen display is zoomed so that it contains all active digi objects not yet deposited.

**10:<zoom all>**

The screen display is zoomed so that it contains all screen objects; as the function 'centre picture' with <F6>.

**11:<zoom +>**

Increase screen display.

**12:<zoom ->**

Reduce screen display.

**15:<move points>**

Move grade points.

**16:<re-digitize lines/curves>**

Replace lines/curves. The starting and final point of the line/curve cannot be changed.

The functions <move points> and <re-digitize lines/curves> are particularly useful for editing grade rule patterns which are already incorporated in style developments.

## Overview of digitizer functions

### Digitizer mouse functions



**1: <digitize>**

Set digi point.

**2: <deposit+continue>**

The active line/curve (red) or active points (black, round) are deposited. The next line/curve is linked, directly. Starting point of the next line/curve is identical to the final point of the last line/curve. It is not digitized again.

**3: <deposit+start>**

The active line/curve or active points are deposited. A new object with a new starting point is digitized.

**4: <delete nearest digi point>**

The point closest to the cursor and active (digi point or grade point) is deleted.



**5: <digitize with grade point>**

A digi point is digitized as a grade point.

**6: <select p>**

Set digi point onto a point.

**7: <select l>**

Set digi point onto a line/curve.

**8: <select pl>**

Set digi point onto the fulcrum of a line/curve.

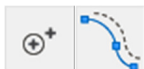


**<zoom digi area>**

The screen display is zoomed so that it contains all active digi objects not yet deposited.

**<zoom all>**

The screen display is zoomed so that it contains all screen objects; as the function 'centre picture' with <F6>.



**<move points>**

Move grade points

**<re-digitize lines/curves>**

Replace lines/curves. The starting and final point of the line/curve cannot be changed.

**The shortcuts for the functions 1 to 8 of the mouse key are the respective keys of the keyboard <1> bis <8>.**

## Menu pad functions



**<points>** Digitize single points (applies to all active digi points).

**<lines/curves>** Digitize line/curve (applies to all active digi points). For a line select <line/curve>, digitize the starting and final point and deposit the object.

**<grade rules ON/OFF>**

Start/end digitizing grade rules from a graded nest, see section 16.6.



**<set attributes>** Set attributes for the active type of object <points> or <line/curve> Click the required attribute number 1, 2 or 3.

**<delete objects>** Delete points with <delete points> or lines with <delete lines>. Quit deleting with <delete objects OFF>.



**<save to part>** Save the digitized patterns to an empty part to be selected from the part list.



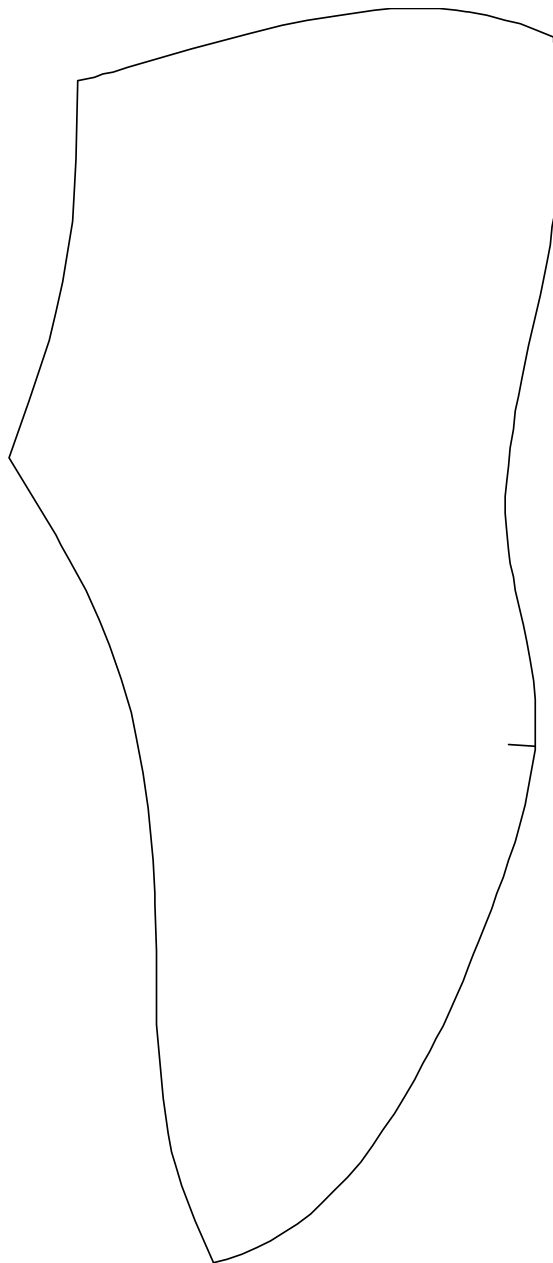
**<part up↑> <part down↓>** Scroll in the list of parts.



**<save> or <abort>** Confirm selection in the part list or abort saving.



**<quit digitizing>** Quit digitize mode.



Picture 16-7

### Digitizing points and lines/curves

In the digitizing mode all deposited lines appear in blue and all active lines in red. Active points are round and red filled. Deposited points are black crosses. Switching between [*points*] and [*line/curve*] (on the menu template) effects all active objects. Each digitized line or point sequence must be deposited with *<deposit+continue>* or *<deposit+start>*. Starting and final point of a line/curve are automatically converted into grade points. It is resumed with a new object.

Check before each deposit that the digitized contour equals the template with *<zoom digi area>*.

#### Step-by-step guide

⇒ Select object type [*points*] or [*line/curve*]

⇒ if [*line/curve*]; at the beginning and after *<deposit+start>*:

- digitize starting point of the line,

Option 1 ***'form with intermediate points'***:

- digitize final point of the line,
- *<zoom digi area>*,
- digitize intermediate points

Option 2 ***'digitize in sequence'***:

- digitize line in sequence,
- *<zoom digi area>*,

⇒ if *<points>*:

- digitize all points

⇒ Correction with *<delete nearest digi point>*

⇒ Deposit the digitized line or points with

- *<deposit+continue>*, if the final point of the digitized object is to be the starting point of the next object or
- *<deposit+start>*, if the next object starts at a new position.

⇒ Correction with *<move points>* and *<re-digitize line/curve>*

Digitize the objects of the template. The perimeter should have no gaps. It can be closed by binding the final point of the last line onto the existing objects with *<select p>*, *<select l>* or *<select pl>*.

Points on lines (e.g. notch positions) should be bound onto previously digitized lines with *<select l>*.

**Exercise**

Digitizing is explained using the last (Picture 16-8). Note that the smaller the scale of the template, the less accurate the digitized pattern.

Fix a copy of the last to the digitizer. Activate an empty part in the part list, annotate the part and set the base size (here: \_\_FA39\_0) onto position 01 in the size table. The following steps relate to Picture 16-8.

*Rule pattern* → *Digitize Grade Rule Pattern*

*digitize*

<TAB> digitize points P1 and P2 of the menu template

*p+py=>0,0* click point 11 and then point 10

*Fa=2* for templates in scale 1:2

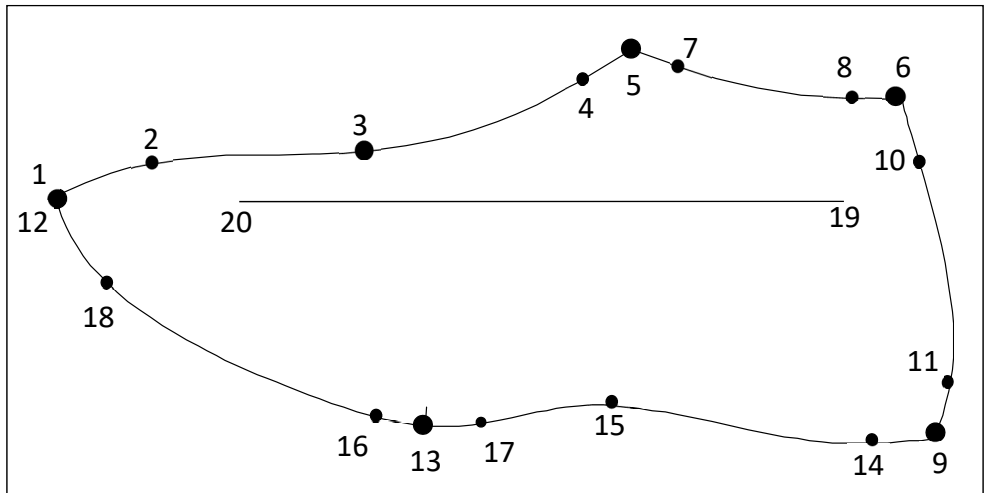
[*line/curve*]

P1 with <*digitize*>

P2 with <*digitize*>

P3 with <*digitize with grade point*>

<*zoom digi area*>



Picture 16-8

***This curve was digitized 'in sequence'. The other option follows when digitizing the last upper edge.***

Before deposit, shape the curve with points P2 and P4.

P4 with <*digitize*>

Should P4 not be at the required position delete

P4 with *<delete nearest digi point>*

P4 with *<digitize>*

P5 with *<digitize>*

*<deposit + continue>*

***Now, the second option follows. First, the final point is digitized and then, the intermediate points. We recommend this option as the rule ‘the less points the smoother the curve’ applies to digitizing, also.***

P6 with *<digitize>*

*<zoom digi area>*

P7 with *<digitize>*

P8 with *<digitize>*

possibly additional intermediate points

*<deposit + continue>*

Heel line:

P9 with *<digitize>*

*<zoom digi area>*

P10 with *<digitize>*

P11 with *<digitize>*

possibly additional intermediate points

*<deposit + continue>*

Insole edge:

P12 with *<select l>* and *<shift>* key

*<zoom digi area>*

P13 with *<digitize>*

The function *<digitize with grade point>* is not used here, as digitizing points is to be covered.

P14 with *<digitize>*

P15 with *<digitize>*

P16 with *<digitize>*

P17 with *<digitize>*

P18 with *<digitize>*

*<deposit + continue>*

Digitize the notch position P13 as grade point.

*[points]*

P13 with *<select l>*

*<deposit + start>*



Digitize the grain line also.

[line/curve]

<zoom all>

P19 with <digitize>

P20 with <digitize>

<deposit + start>

The contour is closed. The notch position is marked with grade point.

The pattern is digitized in base size \_\_\_\_FA39\_0. Carry out a final check. The function keys <F2> (zoom with digitizer mouse) and <F6> works in digitizer mode, also.

**Deleting objects** is possible in the *Rule Pattern → Digitize Grade Rule Pattern* mode, only, not in the *Rule Pattern → Edit Grade Rule Pattern* mode. To delete points select [delete points] from the menu template; to delete lines/curves select [delete lines/curves] (echo → right menu strip). Delete all respective objects with the digitizer mouse. Deleting is terminated with [delete objects OFF].

**Replacing objects** is possible in the *Rule Pattern → Edit Grade Rule Pattern* mode, also. Thus, grade rule patterns which are the basis for style developments can be altered, subsequently. To move a point click on it with the digitizer mouse key <move points> and digitize it again. With <re-digitize line/curve> you can replace a line/curve. Starting and final point of the line/curve remain unchanged. <deposit+start> deposits the new line/curve.

Should grade rules be digitized from a graded nest continue according to section 16.6. Otherwise, you can choose between

- digitizing all patterns and apply grade rules, later or
- entering the grade rules for the pattern, directly and then, digitizing the pattern.

The function [save to part] of the menu pad allows for saving the digitized pattern in the record. Grafis opens a window for display of part numbers and names. Select an empty part with the template functions [↑] and [↓] and save with [YES]. This saving from the digitizing mode allows for digitizing of a number of patterns without having to change between digitizer mouse and keyboard.

**Terminate digitizing** with [quit digitizing] from the menu template. If you do not wish to continue to proceed with the next section of this chapter, immediately deposit the digitized pattern into the active part with *save => in record*. It can be processed further via *Rule Pattern → Edit Grade Rule Pattern*.

### The functions of the menu pad

The menu pad is to be positioned on the active area of the digitizer. The position of the menu pad is defined with <Tab> and digitizing points P1 and P2. The fields of the menu pad can, then, be activated by clicking. They have the following significance:

**[ $p+px \Rightarrow 0,0$ ]** only with tablet

**[ $p+px \Rightarrow p$ ]** only with tablet

**[ $p+py \Rightarrow 0,0$ ]** only with tablet

**[ $p+py \Rightarrow p$ ]** only with tablet

**[ $p+p \Rightarrow p+p$ ]** only with tablet

Activate one of the five described entry transformations.

**[ $Fa= \dots$ ]** only with tablet

Enter the scale factor (except for  $p+p \Rightarrow p+p$ ).

**[points]**

Digitize single points (applies to all active digi points).

**[line/curve]**

Digitize line/curve (applies to all active digi points). For a line select **[line/curve]**, digitize the starting and final point and deposit the object.

**[grade rules ON/OFF]**

Start/end digitizing grade rules from a graded nest, see section 16.6.

**[set attribute]**

Set attributes for the active type of object **[points]** or **[line/curve]**. Click the required attribute number 1, 2 or 3. As an echo, the new attribute number appears in brackets in the menu strip on the right behind the object type, e.g.:  
Lin/Kur (3) means the digitized line/curve is given line attribute No. 3.

**[delete objects]**

Delete points with **[delete points]** or lines with **[delete lines]**. Quit deleting with **[delete objects OFF]**.

**[save to part]**

Save the digitized patterns to an empty part to be selected from the part list. With **[↑]** or **[↓]** you can scroll in the part list. The selection is to be confirmed with **[YES]**.

[↑] or [↓]

Scroll in the part list.

[*save*] or [*abort*]

Confirm selection in the part list or abort saving.

[*quit digitizing*]

Quit digitize mode. The dialogue resumes at the computer.

The following functions were not used in the Exercise:

- *delete objects*
- *set attributes and*
- *saving from the digitizing mode.*

## 16.2 Overview of assigning grade rules

Grade rules should be assigned to break sizes, only. All other sizes are calculated by Grafis by interpolation or extrapolation analogous to calculation of x values.

### Overview of options for grade rule assignment

- The option ***enter absolute grade rules*** (section 16.3) is the most common way of assignment. Grade rules can be entered in mm or 1/10mm.
- The option ***enter grade rule differences*** (section 16.3) is also used.
- The option ***digitize grade rules*** (section 16.6) is required if grade rules are not available as numeric values but indirect as graded nest or sets of sizes.
- The option ***transfer grade rules with copy or proportional*** (section 16.5) is used for additional grade points for example.
- With the option ***drag grade rules*** (section 16.5) grade rules can be altered 'by eye' or with raster values.
- The option ***apply grade rule library*** (section 16.9) is interesting for companies who have many years of experience of grading and work with their own libraries.
- For the option ***transfer grade rules from a template pattern*** (section 16.7) proven gradeable templates have to be saved for the respective style types. Digitized first patterns without grading information can transfer grade rules from these templates.
- The ***import of grade rule patterns*** from other CAD systems has already been explored in Chapter 15.

### 16.3 Edit grade rules

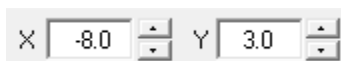
Grade points are marked with a red or green circle. A red circle indicates that the grade point has not been assigned a grade rule.


The different options for assigning grade rules were mentioned briefly in section 16.2. Topic of this section is editing grade rules in the options normal and difference display.

In Grafis, grade rules are saved in grade rule tables. The window for editing grade rule tables (Picture 16-9) opens after having clicked on a grade point. A red arrow indicates the grade point for which the grade rule table is displayed. The most important elements of this window are explained in Picture 16-9.

#### View

Display the grade rules in millimetres or 1/10 millimetre. The active option is indicated with a tick. In the industry, the display option 1/10 mm is common.



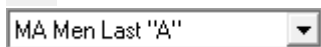
Enter values in the line highlighted with a bar. The interpretation of the values in x and y direction depends on the display option selected under *View*. The values are accepted with  or <ENTER>.



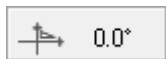
accepts values in fields 'X' and 'Y'. The marked size becomes break sizes.



deletes marked size as break size. The values for this size are interpolated.



Selection of a different last type

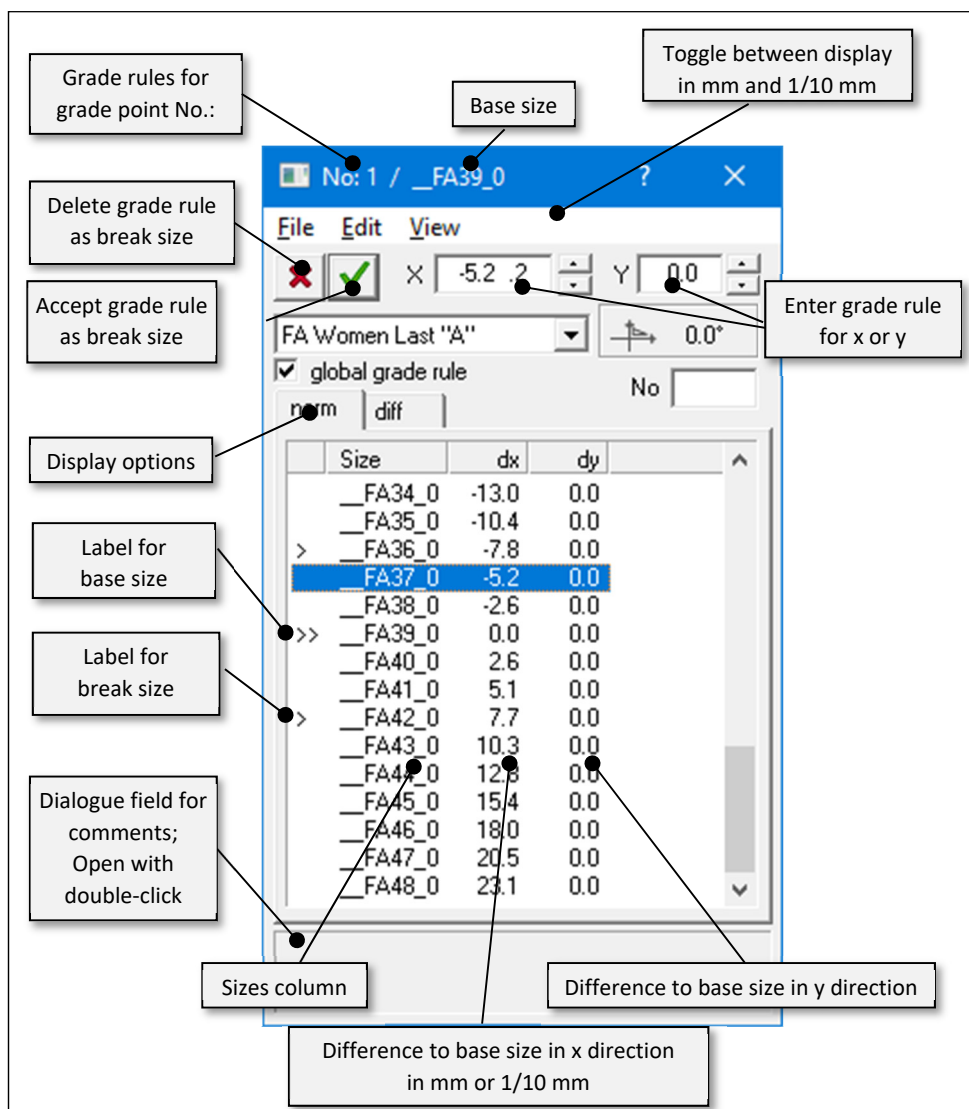


Display of the current rotation angle for grade rules. Rotation of grade rules is activated via *Edit → Rotate/mirror grade rules permitted*

☒ global grade rule Further explanation follows in the text.

No  Entry of own number for grade rule (0 to 999), see also section 16.9.

The cards *norm* and *diff* contain different view options for the current grade rule table (Pictures 16-9 and 16-10). Changes to the view alter the contents of the other displays, also.



Picture 16-9

***grey edit window at the lower window edge***

In this edit field you can enter your own comments on the grade rule. It is opened with a double-click, clicking another function closes the field. Grafis automatically enters information on source of the rule and dragging the grade point into this field.

***Topic of the following exercise is entry of grade rules in the normal view. Then, explanations on the display option 'diff' follow.***

**Exercise: Enter grade rules for a last**

For the last copying digitized in section 16.1, grade rules are to be entered for grading in a size range from FA36 to FA42. The following grade rules belong to the grade points numbered according to Picture 16-8 (values in mm). They may not correspond with common grade rules. Practice entry of grade rules. Later, you can determine your own values.

Point 05:

__FA36__0	-7.8	.0
* __FA39__0	.0	.0
__FA42__0	7.7	.0

Point 06:

__FA36__0	-15.4	.0
* __FA39__0	.0	.0
__FA42__0	15.4	.0

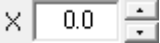

Point 09:

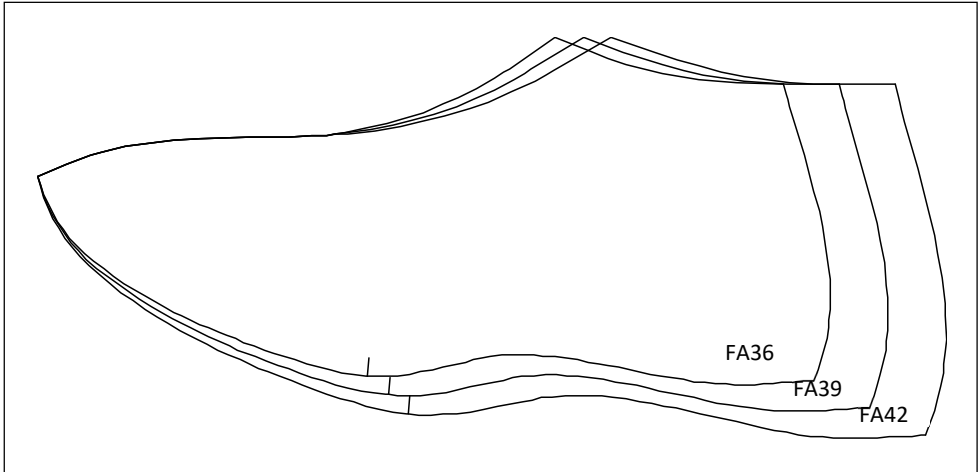
__FA36__0	-15.4	7.7
* __FA39__0	.0	.0
__FA42__0	.15.4	-7.7

Point 13:

__FA36__0	-5.7	5.3
* __FA39__0	.0	.0
__FA42__0	5.7	-5.3

If you have quit the *Grade Rule Pattern* menu in the exercise in section 16.1 and deposited the contour with *save => in record* you have to activate the respective part, first and, then, re-open the menu via *Rule Pattern → Edit Grade Rule Pattern*.

Click on Point 05. The grade rule table analogous to Picture 16-9 opens. The grade rules are assigned with '0' originally. Set the display to mm by selecting *Display* → *mm*. Mark size \_\_FA36\_0 and enter the values  $-7.8$  into the 'X' edit field  and the value 0 into the 'Y' edit field. ***Toggle between the two fields with the <Tab> key.*** Accept the values with  or <ENTER>.



Picture 16-10

Continue with the values for size \_\_FA42\_0 by marking this size and entering 7.7 into the 'X' edit field and 0 into the 'Y' edit field and accept. The grade rule table is assigned in the normal view according to Picture 16-9.

Open the grade rule table for grade point 02 by clicking this point. Enter the grade rules and continue with the other grade points. Test the grading directly from the *Grade Rule Pattern* menu with *grading* with the result shown in Picture 16-10.

### Normal view 'norm'

The normal view of grade point 05 from Picture 16-8 is shown in Picture 16-11.


The columns of this view contain:

- 1: **indication of base and break sizes.** The sign >> indicates the base size to which the grade rules relate. > indicates the break sizes.
- 2: the **size name**,
- 3: the **grade rule of the size in X direction**, as difference to the base size. Display is in mm or 1/10 mm depending on the setting in *Display*.
- 4: the **grade rule of the size in Y direction**.

For all non-break sizes the grade rules are interpolated or extrapolated from adjacent break sizes.

Size	dx	dy
FA34_0	-13.0	0.0
FA35_0	-10.4	0.0
> FA36_0	-7.8	0.0
FA37_0	-5.2	0.0
FA38_0	-2.6	0.0
>> FA39_0	0.0	0.0
FA40_0	2.6	0.0
FA41_0	5.1	0.0
> FA42_0	7.7	0.0
FA43_0	10.3	0.0
FA44_0	12.8	0.0
FA45_0	15.4	0.0
FA46_0	18.0	0.0
FA47_0	20.5	0.0
FA48_0	23.1	0.0

Picture 16-11

A size becomes a break size by marking the size, editing the setting if required and accepting with .

### Difference view 'diff'

Regard the grade rule for point 05 in the difference view (Picture 16-12).


In this view, in addition to the **values of the break sizes, the difference per size** is displayed and can be edited. In Picture 16-12 these are sizes FA36, FA39 and FA42. The base size FA39 is marked with >>. The line with the size name in the second column contains the grade rule for this size as difference to the base size. The respectively following line with a value in the *ddx* or *ddy* column indicates the difference value per size. Difference values should be edited in the difference view *diff*.


Size	dx	dy	ddx	ddy
> FA36_0	-7.8	0.0		
FA37_0	-5.2	0.0	2.6	0.0
FA38_0	-2.6	0.0	2.6	0.0
>> FA39_0	0.0	0.0	2.6	0.0
FA40_0	2.6	0.0	2.6	0.0
FA41_0	5.1	0.0	2.6	0.0
> FA42_0	7.7	0.0		

Picture 16-12



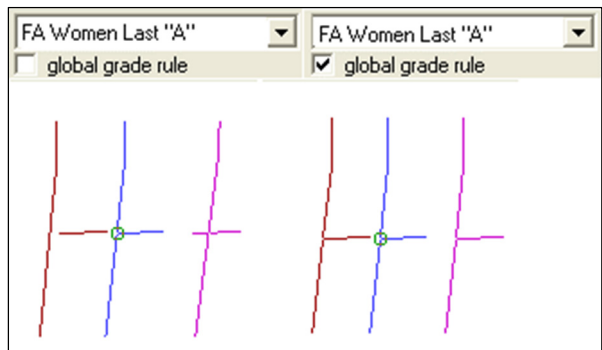
If you have the difference values per size proceed as follows with entry of grade rules:

- ⇒ Mark all break sizes in the normal view by marking the respective size and accepting the value with .
- ⇒ *View → Show break sizes only*
- ⇒ Then, change to difference view diff and enter the grade rule differences in X and Y.

Note: If the increments are identical for all sizes accept one size larger than the base size as a break size. If size FA39 is the base size accept size FA40 with  and enter the grade rule for size FA40 in the difference or normal view.

### Global grade rule

If the switch *Global grade rule* is set, this grade rule applies to all lines within the search environment. If two lines meet in a corner, this switch must be set. The switch must not be set if a grade rule is to apply to one line/one point only. If for example the grain line touches the contour by



Picture 16-13

accident in the base size, the grade rule at the grain line must not be a general grade rule. Otherwise, the contour 'hangs on' the grain line for grading.

A grade rule for a slit notch must be a *global grade rule* as the notch is otherwise detached from the base line, see Picture 16-13.

***If the switch 'global grade rule' is removed, Grafis expects the user to click the base line for the grade rule.***

### Additional Functions

The functions in the grade rule window in Picture 16-9 have the following significance:

*File → Save in Library...*


saves the grade rule table in a library, provided a library is available (section 16.9).

*File → Delete from Library...*

deletes the grade rule table from the library (section 16.9).

*File → Print*

prints the single grade rule table in the active display option. An overview of all grade rule tables can be output via the *print* menu function.

*File → Close* or 

closes the window.

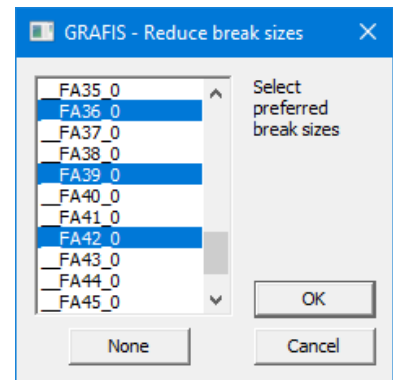
*Edit → Grade point becomes new stack point*

changes the marked grade point into the new stack point of the grade rule pattern.

*Edit → Reduce break sizes (all grade points)*

automatically removes the mark for break sizes from all sizes which can be calculated by interpolation from adjacent sizes without alteration. In an interim step, the user can mark the preferred break sizes, see Picture 16-14.

The selected sizes remain break sizes if the grades are constant. Only break sizes actually not required for grading are deleted. Grading remains unchanged after calling this function.



Picture 16-14

*Edit → Reduce break sizes (this grade point)*

as before but for the marked grade point, only.

*Edit → Set x and y to 0*

deletes all grade rule settings. After calling this function the grade point is not graded, it remains unchanged during grading.

*Edit → Set x or y to 0*

deletes the x or y component of the grade rule. After calling this function the grade point is graded with one component, only.

*Edit → Rotate/mirror grade rules permitted*

If this option is ticked grade rules of the marked point can be mirrored and rotated. A crosshair appears with the functions analogous <F3>. Rotate and mirror grade rules should be used by experienced users, only. The rotation angle and mirror are indicated in the grade rule table. The grade of the pattern is changed.

*Edit → Rotate/mirror complete grade rule pattern permitted*

If this option is checked, the pattern can be rotated. The grade rule tables are updated, so that the grade of the pattern remains unchanged.

*Edit → Move grade one size up*

The base size and the grades move one size up. The contour of the larger size becomes the basis for the grade point calculation. The graded stack changes for uneven grade runs.

*View → mm or View → 1/10mm*

Display of values in mm or tenth of a millimetre.

*View → Show break sizes only*

Only the break sizes are displayed.

*View → Show individual sizes*

The individual sizes entered in the size table are displayed in the position of their corresponding standard size.

**16.4 Save Grade Rule Pattern**

Before quitting the *Grade Rule Pattern* menu the grade rule pattern is to be saved. The following three options are available.

**Save in record**

The grade rule pattern is accepted into the active part. Thus, depositing this pattern is a construction step in the part and corresponds to *call* grade rule construction. Select this option if you digitize a number of new patterns. In this case, open a new style in Grafis, prepare the part list with the names of the pattern pieces to be digitized at the beginning and then, digitize the patterns. This way all pattern pieces are saved in one Grafis style. After testing each part can be saved as a template or in the call list via *Rule Pattern → Edit Grade Rule Pattern*.

If more than one grade rule pattern has been called into a part, a list of buttons appears at the bottom of the menu. Clicking these buttons switches between the grade rule patterns in the part.

### Save as template

The grade rule pattern is saved in the directory for template patterns \Grafis\[*current shoe system*]\SWERT or in another directory. Grade rule pattern files have the extension \*.SWS. The grade rules of these template patterns can be transferred to other grade rule patterns (see section 16.7).

Save the last from section 16.3 as a template under \Grafis\[*current shoe system*]\SWERT\LAST.SWS.

### Save in call list

The grade rule pattern is saved as a grade rule construction in the call list.

***Save a pattern in the call list, only after is has been tested and released.***

### Step-by-step guide



















⇒ Open the *Grade Rule Pattern* menu for the grade rule pattern to be saved via *Rule Pattern* → *Edit Grade Rule Pattern* for example

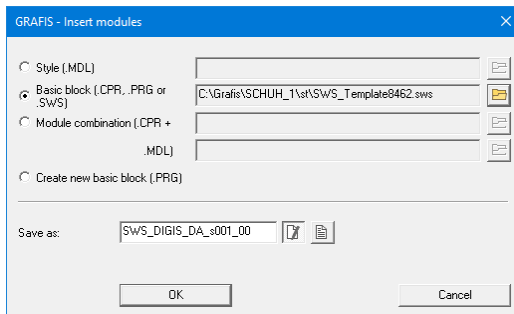
⇒ *save in call list*

⇒ Click on  or  and enter a suitable name



⇒ later: edit the call list, design a graphic for the construction and store text information

Save the last from section 16.3 in the call list. After having clicked *save in call list* the dialogue *Insert modules* opens (Picture 16-15).

	Grade rule pattern menu
	digitize with tablet ▀
	digitize with mouse ▀ extract
	grade points...
	place ▀ drag ▀ group
	
	+/-display numbers
	grade rule...:
	edit ▀ transfer ▀ drag
	+/-measurement ▀
	set measurement
	delete ▀ print
	
	save:
	in call list ▀ as template ▀ in
	record
	test run ▀ grading ▀ stack
	
	



Picture 16-15

For entry of a name for the grade rule pattern file click on  and you can enter the file name in the *Save as* field. Alternatively, a prepared mask can be called by clicking . This interface is explained in more detail in section 13.5.

After *OK* the file is created in the directory `\Grafis\[directory of shoe`

`system]\Prog`. In the call list you can find a 'New entry' in the area of constructions of the shoe system. The entry can be renamed and designed.

## 16.5 Edit grade rule patterns, Drag and transfer grade rules

The *Grade Rule Pattern* menu (see previous page) opens for *Rule Pattern* →

*Edit Grade Rule Pattern*

*Extract Grade Rule Pattern*

*Digitize Grade Rule Pattern*

Depending on the selection certain functions are greyed out. The individual menu functions have the following significance.

### Digitize and extract

Depending on the selection one or more of these functions are available. **Digitize** starts digitizing of contours or grade rules, see sections 16.1 or 16.6.

**Extract** starts extracting a grade rule pattern from the active part. The active part can be

- a constructed pattern based on finished measurements or
- a grade rule pattern with or without modifications.

The possibilities of this function are topic of section 16.8.

## Gradierpunkte

The *grade points* section contains all functions for editing grade points.


**Place grade points** opens the depicted menu.

With **automatical** grade points are set automatically. Existing grade points are not overwritten or deleted.

With **constructive** individual grade points can be set with the known point construction functions.

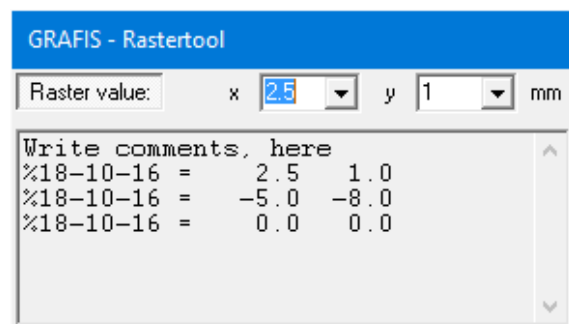
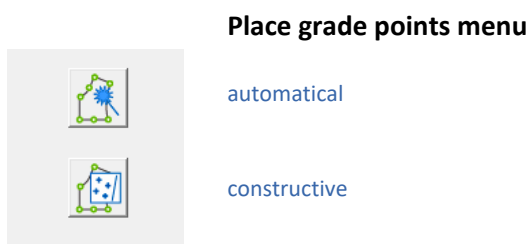
The new grade points are marked in red as their grade rule tables are still empty. With the functions under *grade rule...* grade rules can be assigned to grade points. Setzen Sie zusätzliche Gradierpunkte insbesondere auf Kurven, wenn die Kurvenform noch nicht wie gewünscht gradiert wird.

With **drag grade points** the contour of the base size can be altered. Activate *drag*. The *Grafis Raster tool* window opens (Picture 16-16). If the *Raster value* button is pushed in, the grade points are dragged in the set raster steps. Activate *Raster value* and drag a grade point with left mouse button pushed down.

You are altering the shape 'by eye'. Grafis displays the movement of the grade point in x and y direction in the *Grafis-Raster tool* window. Terminate dragging with . Only after having confirmed the security question are the alterations accepted. For your information, Grafis registers the move values in the dialogue window of the grade rule table with code % and the alteration date, see Picture 16-16

With **group grade points** grade associations can be formed. This special grading option is topic of section 16.10.

Switch to **+display** to show the grade point number. The screen image can be output via *Edit → Copy (Clipboard)* or with the functions of the *print* menu.



Picture 16-16

## Grade rules

**Edit grade rules** opens the menu for editing grade rule tables with the following options:


With edit grade rules and clicking a grade point its grade rule table opens, see section 16.3.

**Copy** allows for transfer of grade rules from one or two grade points to another grade point with the options:

- $1 \Rightarrow 1$ ,
- [special] and
- $2 \Rightarrow 1$ .

The options ' $1 \Rightarrow 1$ ' differ as follows:

$1 \Rightarrow 1$ (XY)	the complete grade rule table is copied
$1 \Rightarrow 1$ (X)	only the x component value is copied
$1 \Rightarrow 1$ (Y)	only the y component value is copied

For ' $1 \Rightarrow 1$ '-copying activate one of the three copy options and click the grade point from which grade rules are to be copied. Move the cursor. An arrow appears with which you define onto which grade point the grade rules are to be copied. Quit copying with .

With the options '[special]' grade rules are copied from one grade point to another. When copying, the x component can be mirrored for example ([Xspg Y]). In the other case the grade rules are not overwritten but added. Double-click on *set special* allows for selection of other special options which should be used by experienced operators, only.

### Edit grade rules menu

grade rules...

edit ▀ drag

copy grade rules...

$1 \Rightarrow 1$  (XY) ▀  $1 \Rightarrow 1$  (X) ▀  $1 \Rightarrow 1$  (Y)

[special 1] ▀ set special 1

[special 2] ▀ set special 2


copy grade rules...

$2 \Rightarrow 2$  (linear) ▀  $2 \Rightarrow 2$  (curved)



The options '2=>1' transfer the grade rules of two points onto a third. They differ as follows:


2=>1 (lin)	The new grade rules are calculated linear in relation to the direct connection between the two points. Use this option when the points lie on a long (imaginary) connecting line.
2=>1 (cur)	The new grade rules are calculated as components. Use this option when the points lie on a shaped (imaginary) line.

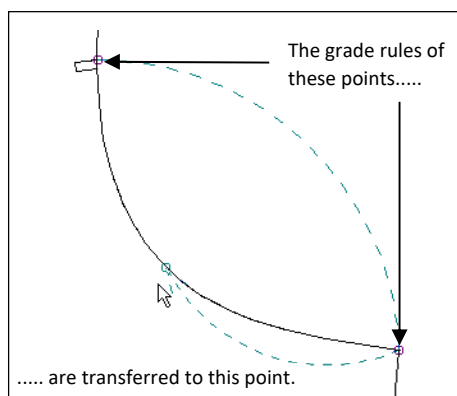
For '2=>1' -copying activate one of the two copy options and click the grade points from which the grade rules are to be copied. Define the grade points to obtain new grade rules with the arrow (Picture 16-17). Quit with .

Note the exercise in this section.

**Transfer grade rules** opens the menu for transferring grade rules from template patterns, see section 16.7.

**Drag grade rules** and clicking on a grade point opens the *Grafis-Raster tool*

window. At the same time, all sizes in the size table are graded. The contour of the different sizes can now be dragged directly with or without raster. **NB: These alterations are directly transferred to the grade rule table of the active grade point!** A different grade point can be activated at any point by clicking. Dragging grade rules can be quit with .



Picture 16-17

### Set measurements

With **set measurements** you can include specific measurements on a grade rule pattern. When dragging grade points or dragging grade rules, the measurements are altered immediately. Setting measurements ensues in the same way as temporary measuring in section 8.1. The switch *+/-measurements* shows or hides the measurements.



## Delete

**Delete** opens a sub-menu. It allows for deletion of single or all points or lines of the contour. Grade points are deleted individually with *single grade points* or *all grade points*.

Deleting points and lines of the contour during alteration of a grade rule is not permitted as subsequent construction steps could relate to these objects.

### Delete menu

single lines ▪ single points ▪  
all points and lines

single grade points ▪ all grade points



## Print

**Print** opens the sub-menu with the following functions:

**Print grade rule table** starts output of the grade rule table for all grade points. The table contains the grade point numbers and their absolute grade rules in the break sizes.

**Copy grade rule table** copies the table to the clipboard. For a formatted view select a proportion typeface, e.g. CourierNew.

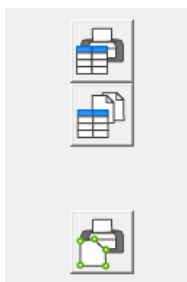
**Print grade rule pattern** starts output of the grade rule pattern with marked grade points. Should the grade point numbers be visible (*Grade Rule Pattern* menu: *+display numbers*) these are plotted, also.

### Print menu

print grade rule table

copy grade rule table

print grade rule pattern

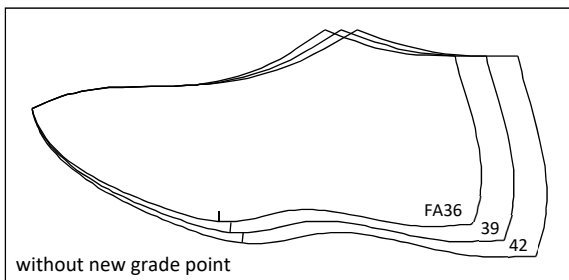


## Test run / Grading / stack / save

These functions are already known. *Grading* in this menu starts grading with grade rules. Saving was topic in section 16.4.

### Exercise


Activate the gradeable last from section 16.3 in the part organisation, see Picture 16-18. Set an additional grade point onto the insole edge at 75% between heel and notch. Copy the grade rules of the adjacent grade points with '2=>1'-copy onto the new grade point (Picture 16-17).




Picture 16-18


Rule pattern → Edit Grade Rule Pattern

place grade point 

place grade point with point construction 


place grade point onto the insole edge

edit grade rules 

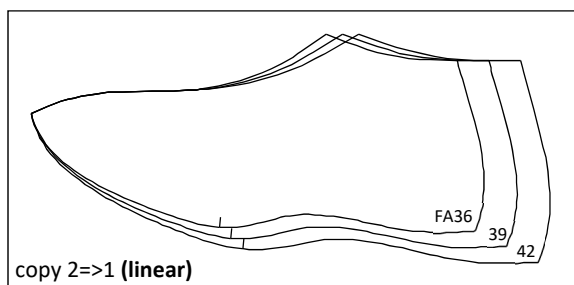
copy 2=>1 (**linear**) 

Assign grade rules according to Picture 16-17.

First click on the grade point of the notch, then on the grade point at the heel and then the new grade point.


 terminates copying


grade



Picture 16-19

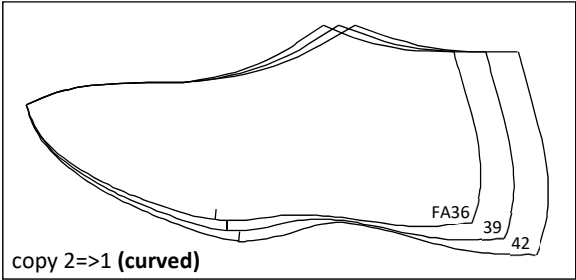
The grade is shown in the nest in Picture 16-19. The curve shape is slightly flatter.

edit grade rules 

copy 2=>1 (**curved**) 

steps as above.

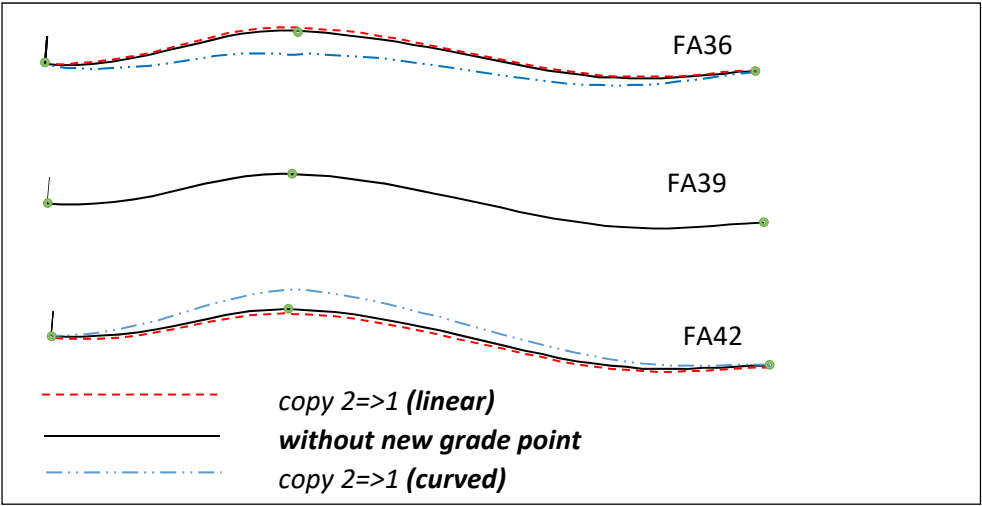
*grade*



Picture 16-20

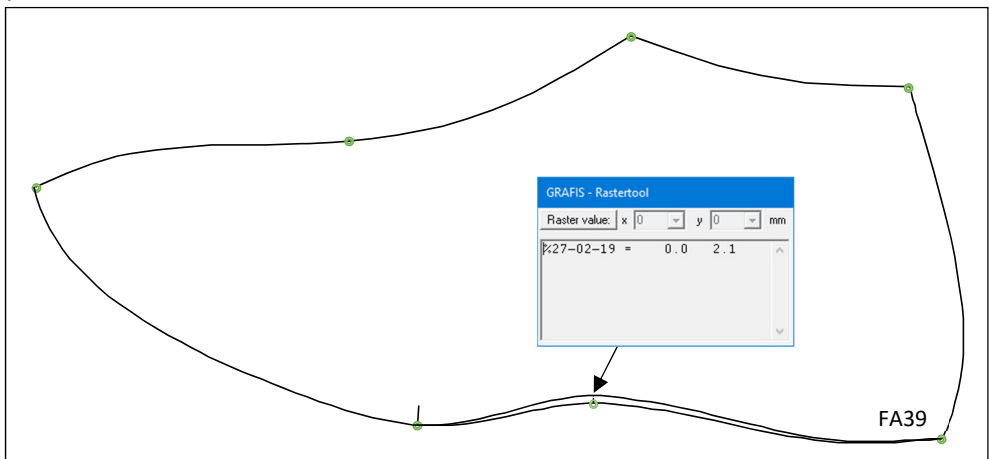
The grade is shown in the nest in Picture 16-20. The curve shape is slightly rounder. Picture 16-21 shows the alteration of the curve comparatively.

■ terminates copying.




Picture 16-21

**Drag the grade point in the base size FA39** by approx. 2mm 'upwards', i.e. 2mm in positive Y-direction (Picture 16-22).

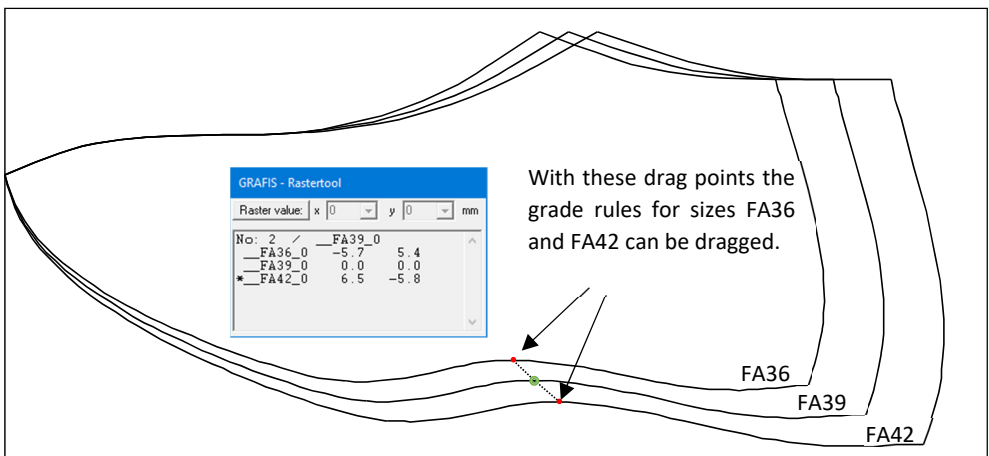


Picture 16-22


**Drag grade point** : Drag the grade point with pressed left mouse button. The move amount is shown in the dialogue window.

By dragging the grade point you have altered the contour of the pattern in the base size. Grafis registered the move values of the grade point in the dialogue window of the grade rule table with code % and date of alteration.

**Drag the grade rules** of this grade point. Note! These alterations are accepted without confirmation.



Picture 16-23


**Drag grade rule** : Click on the grade point of which you want to drag the grade rule. Drag the pointer according to Picture 16-23 with pressed left mouse button. The move value is indicated in the dialogue window.

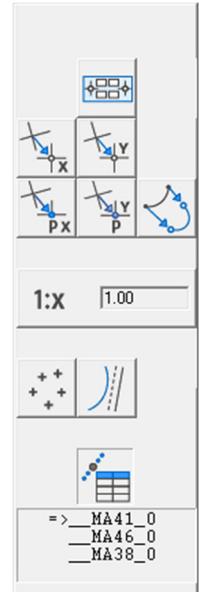
## 16.6 Digitize grade rules

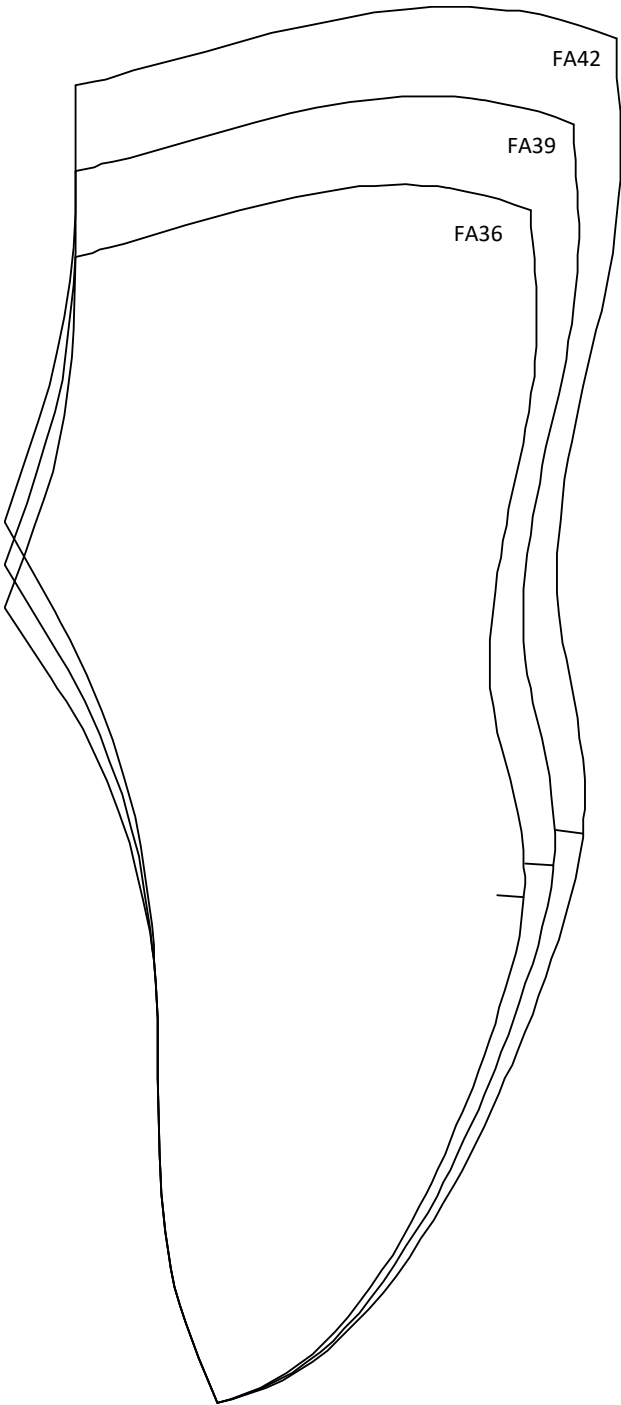
If the pattern is available as a **graded nest**, i.e. all required sizes stacked, the grade rules can be digitized.

***The nest has to contain the base size and the break sizes, only. Further sizes do not have to be digitized, they are interpolated by Grafis, automatically. Why work harder than necessary!***

Step-by-step guide

- ⇒ Digitize the pattern perimeter of the base size (see section 16.1)
- ⇒ Open the size table via *Extras* → *Size table* and enter and activate the sizes of the nest in systematically order. The size in position 01 is the size of the digitized contour. The grade rules of all further activated sizes are digitized in this order
- ⇒ if the *Grade Rule Pattern* menu had been quit:
  - *Rule Pattern* → *Edit Grade Rule Pattern*
  - *Digitize*
  - Determine entry transformation and scale factor
- ⇒ Click [*Grade Rules ON/OFF*] on the menu template
- ⇒ Digitize the grade rules of all grade points, respectively with:
  - Click grade point, possibly adjust on screen; it is sufficient to click near the point.
  - Digitize position of the point in other sizes; the size to be digitized is displayed on the menu strip. The displayed order is to be followed, exactly.
  - After having digitized the last size the computer gives an acoustic signal.
- ⇒ Quit with [*Grade Rules ON/OFF*] on the menu template
- ⇒ possibly: re-digitize lines, points or grade rules
- ⇒ Quit with [*Quit digitizing*] on the template or 
- ⇒ Edit the grade rule pattern
- ⇒ Save the grade rule pattern in the record, as a template or in the call list.





Picture 16-24

After having quit the digitize mode test the state or work with *test run* and *grading* from the *Grade Rule Pattern* menu. Should errors occur lines, points and grade rules can be re-digitized.

### Exercise

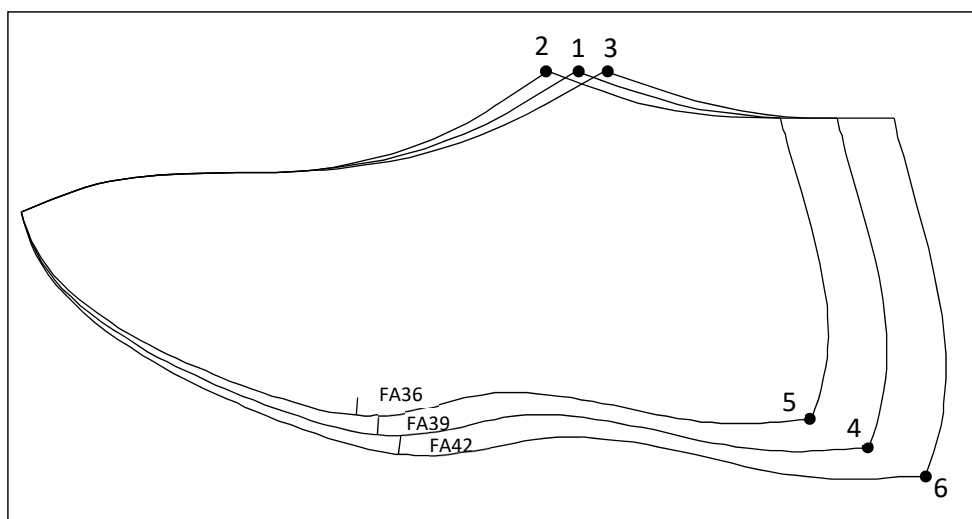
Picture 16-24 shows a graded nest of the blazer side panel (Exercise in section 16.1) in sizes FA36, FA39 and FA42. The grade rules of the last are to be digitized.

Fix a copy of the nest to the digitizer tablet. First, digitize the contour in size FA39, see section 16.1. After having digitized the contour the grade rules are to be digitized.

The following steps relate to Picture 16-25.

<toomen all>

[Grade Rules ON/OFF]



Picture 16-25

Sizes FA39, FA36 and FA42 appear below *Grade Rules* in the menu. If other sizes or a different order appear, the entries in the size table have to be altered. In this case, quit the digitizing mode but not the *Grade Rule Pattern* menu and edit the size table via *Extras* → *Size Table*. After digitize you are back in the digitize mode. If the pattern on the digitizer table was not changed resume digitizing the grade rules, immediately.

Point P1 in size FA39 corresponds with point P2 in size FA36 and P3 in size FA42. The grade rules for this point are digitized as follows:

P1 with <digitize> digitize approximately

P2 with <digitize> digitize exact

P3 with <digitize> digitize exact

After P3 the computer gave an acoustic signal. It means: grade rule digitizing for this point is completed. The grade point is now marked in green and assigned with a grade rule.

You can resume with another grade point. Continue with grade point P4, still marked in red.

P4 with <digitize> digitize approximately

P5 with <digitize> digitize exact



P6 with <digitize> digitize exact

***If an error occurs during those steps continue digitizing to the signal (or press digitizer mouse button no. 4) and digitize the grade rule again.***

Digitize the grade rules for the grade points until all points are marked in green. Quit the digitizing mode with [Quit Digitizing] on the menu template and test the grade with *test run* and *grading*.

If grade rules were digitized incorrectly the graded nest can look bad. First, analyse which points were not graded correctly. If necessary deactivate size FA42 in the size table so that sizes FA36 and FA39 are displayed, only. Re-digitize the grade rules. During digitizing grade rules, sizes FA36, FA39 and must be active, again.

In the next step the curve shape in the graded sizes is to be checked. The shape of the insole edge in size FA42 is not yet identical with the template. ***To correct curve shapes set one or more additional grade points and digitize the relevant grade rules.***

- place grade point 
- place grade point with point construction  and place additional grade points P1 to P4 onto the insole edge (Picture 16-25)

Mark the additional grade points on the template in the sizes of the nest, also.

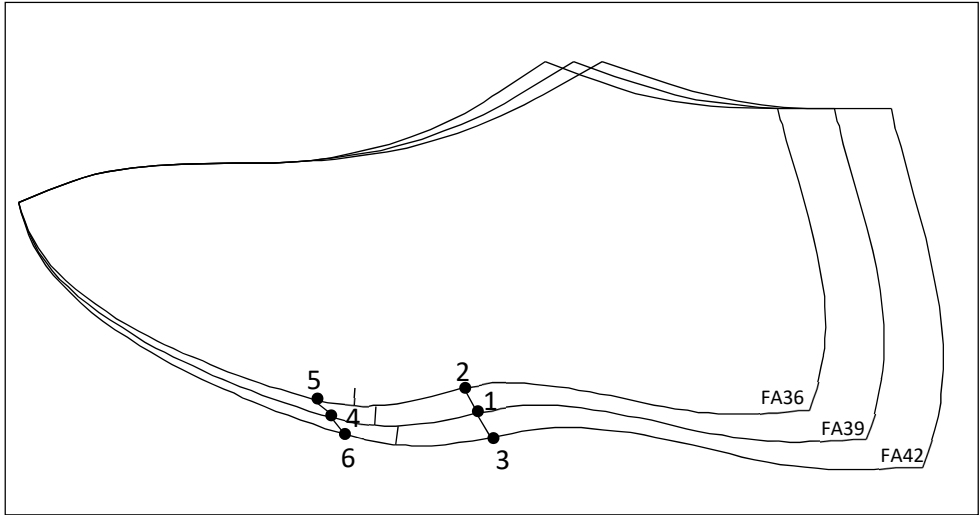


Digitize the grade rules of the new grade points.

P1 with <digitize> digitize approximately

P2 with <digitize> digitize exact

P3 with <digitize> digitize exact



Picture 16-26

After P3 the computer gives an acoustic signal. Continue with P4, then, quit the digitizing mode with [*Quit Digitizing*] on the menu template and test again.

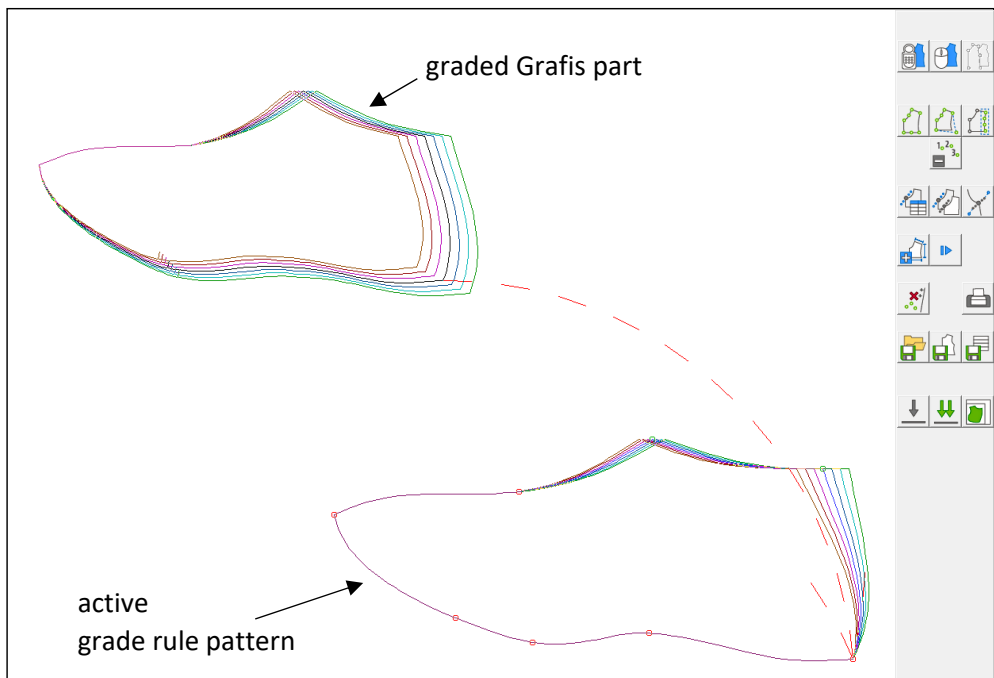
Set additional grade points until you agree with the grade result and then, deposit the grade rule pattern (see section 16.4).

## 16.7 Transfer grade rules

### Transfer grade rules from another Grafis part

Grade rules can be transferred from another part of the Grafis style onto the active grade rule pattern in a very user-friendly manner. The required part must be graded and visible in the background, see Picture 16-27.

In the *grade rule pattern* menu directly, move the cursor over the graded Grafis part. The grade rules are visualised in form of small points. Click on a point or a line in the graded Grafis part and then move the cursor to the active grade rule pattern. Click the corresponding grade point in the active grade rule pattern. The grade rules are now assigned to this grade point. Visualise the current state with *grading* in the menu.



Picture 16-27

### Transfer grade rules from a saved template pattern

With the function *transfer grade rules* in the *Grade Rule Pattern* menu grade rules can be transferred from a saved template pattern. Use this option when a pattern is available in the base size, only. Digitize the pattern in the base size and then, transfer the grade rules from an available tested grade rule pattern.

After Installation of Grafis no template patterns are available. Template patterns are generated via *save as template* from the *Grade Rule Pattern* menu. Saving a grade rule pattern as a template is possible via *Rule Pattern* → *Edit Grade Rule Pattern* or *Rule Pattern* → *Extract Grade Rule Pattern* (see section 16.8).

Clicking on transfer in the *Grade Rule Pattern* menu opens the sub-menu shown on the right with the following functions.

**Edit grade rules** opens the grade rule table of a grade point to be clicked, see section 16.3.

## Function group *template*

The functions below **template** help with preparation of the template for transferring grade rules.

First, **call** the template. Select a tested grade rule pattern saved as a template (\*.SWS). The template appears with dashed lines. At the same time, Grafis asks you to *co-ordinate* both patterns to one another. *Co-ordinate* (explained in the following) is already active.

To call another template you have to **hide** the active template, first. Then, a new template can be called. It is possible to transfer grade rules from more than one template.

With **co-ordinate** you define which grade points have identical grade rules. First, the point of the template is to be defined then, the point in the active grade rule pattern.

**Move** allows for the template to be moved, rotated or mirrored. Functionality corresponds to the <F3> function. **During rotation or mirror of the template the grade rules are updated, also.** Therefore, rotate and mirror before copying the grade rules. The rotation angle of the template is displayed in the menu. For very small rotation drag further away from the centre of the circle. Moving the template does not affect the grade rules.

After having adjusted and positioned the template, effectively copying grade rules begins with the functions below **copy grade rules**.

### Transfer grade rules menu

edit grade rules

template...

call ▀ hide ▀ coordinate

move

turn angle

copy grade rules...

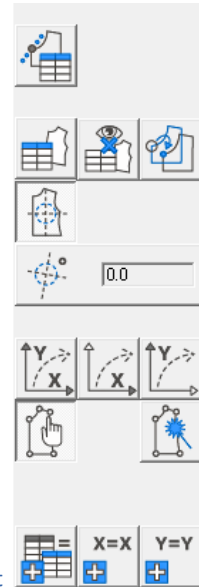
1=>1(XY) ▀ 1=>1(X) ▀ 1=>1(Y)

single ▀ guided

grade rules...


+/-display identical ▀

+/-x component ▀ +/-y component



**Function group *copy***

With the functions below ***copy*** transferring grade rules from the template and copying onto the active grade rule pattern begins.

The copy options were explained in section 16.5, already. For the copy option '***1=>1***' copying can ensue either ***single*** or ***guided***. With ***guided*** the grade points of the active grade rule pattern one after the other are the beginning of a thread which is to be connected with the corresponding grade point of the template. The grade points are processed in order of their numbers. Assigning can be skipped with . Activating ***single*** terminates guided transferring.

**Display options**

In the option ***+display identical*** grade points with identical grade rules are connected with dashed lines. The following are connected:

+x components and +y components:

identical grade rule tables

+x components and -y components:

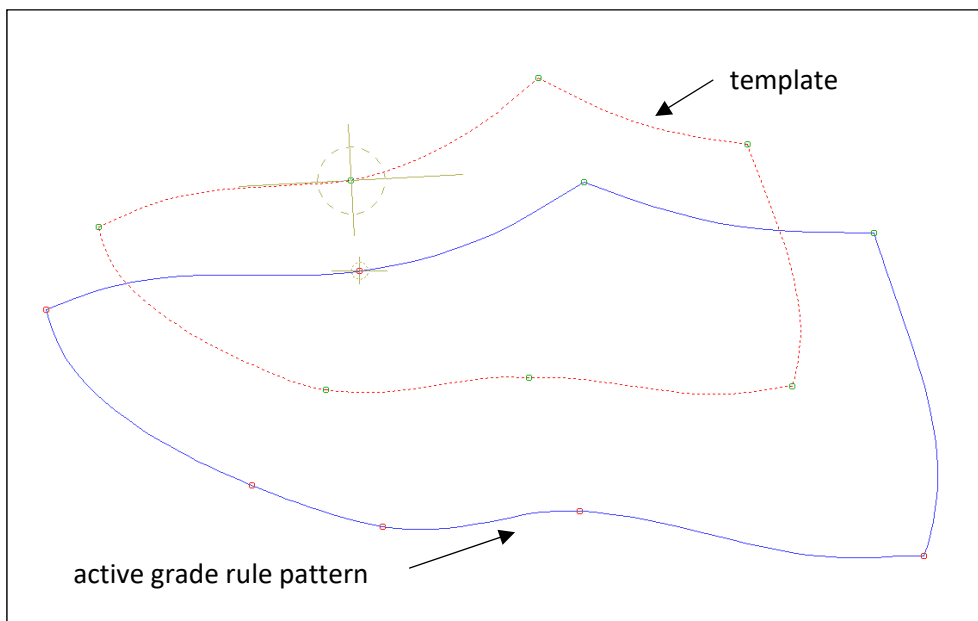
grade rule tables with identical x components

-x components and +y components:

grade rule tables with identical y components

**Exercise**

Generate a last part similar to Picture 16-28, for example by drawing and digitizing the contour. Transfer the grade rules from the template saved in section 16.4 as Last.SWS.



Picture 16-28

Edit the digitized pattern with the *Grade Rule Pattern* menu as follows.

*transfer grade rules*

*call*

open Last.SWS

The prepared last contour appears dashed.

*coordinate*


click the ball points in both patterns

*move*

move and rotate the template; reset rotation to 0

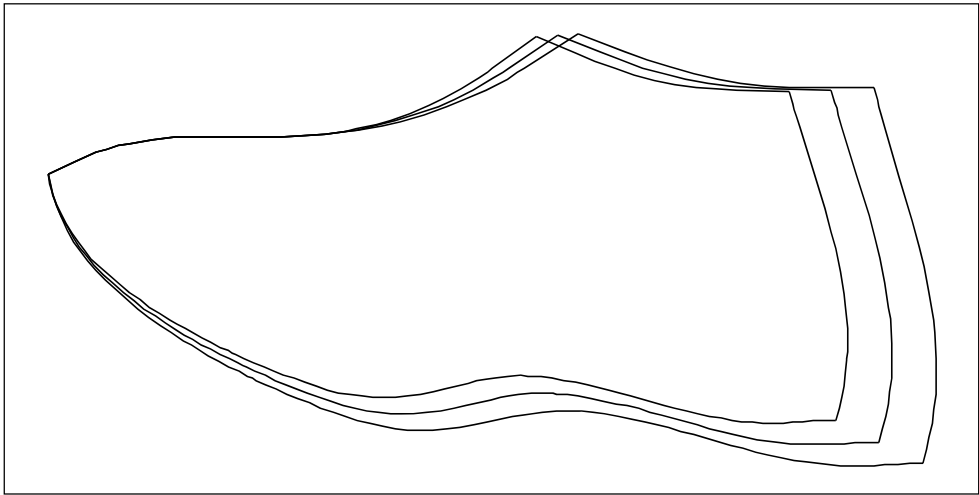
*guided*

*copy 1=>1 (XY)*

transfer all grade points guided; if necessary skip a point with  and re-process with *single*

*grade*

The grade corresponds with the nest in Picture 16-29 (sizes FA36, FA39 and FA42).



Picture 16-29

If a grade point is graded incorrectly select *Grade Rule: transfer* again. The settings for transfer remain existent when quitting the *Grade Rule Pattern* menu. If necessary the pattern can be edited further with the functions explained in section 16.5.

### 16.8 Extract grade rule pattern


Each Grafis part can be extracted to a grade rule pattern. This applies to pure construction patterns as well as grade rule patterns which were edited with the Grafis construction functions.

Changing a part into a grade rule pattern or 'extracting' a grade rule pattern is interesting for example for:

- releasing one or more parts form a hereditary line for use in a different style or
- transferring a tested, constructed grade onto a pattern available in the base size, only.

#### Step-by-step guide

- ⇒ Activate the part to be changed into a grade rule pattern;
- ⇒ Enter the base size into position 01 in the size table; in the following positions of the size table enter and activate all sizes from which you want to extract the grade rules;
- ⇒ *Rule Pattern* → *Extract Grade Rule Pattern*
- ⇒ *extract*, First, set the grade points automatically. Grafis takes off the grade rules for these grade points for all sizes active in the size table.

- ⇒ *grading*, the pattern is now graded as a grade rule pattern. The pattern must be identical with the original construction pattern. Especially on curves differences occur which can be rectified by setting additional grade points with *place grade point* and repeated *extract*. The grade points do not have to be set again. Click alternately on *extract grade rules* and *grading*. When no differences are visible the grade rule pattern can be saved.
- ⇒ Possibly, edit the grade rule pattern according to section 16.5
- ⇒ Save the pattern according to section 16.4
- ⇒ Quit with .

Test extracting by saving production patterns or certain development stages of a style as grade rule patterns. Convert a constructed graded pattern into a grade rule pattern via *extract*. Grade. The nest of the constructed pattern and the extracted pattern are displayed on top of one another. If there are differences set additional grade points with *place grade points*. After repeating *extract* the nests of the constructed pattern and the grade rule pattern are identical.

Prior to extracting, check if notches or other symbols should be replaced by points. A notch for example consists of two grade points. The base size and all break sizes must be entered in the size table and must be active. Proceed according to the step-by-step guide and save the patterns in the call list and as template grade rule patterns.

## 16.9 Create, use and edit a grade rule library

A grade rule library is a collection of grade rule tables. Use of a number of libraries is possible. The individual grade rule tables can obtain their own designation. A library is saved in the grade rule pattern data format (\*.SWS).


This section is divided in the topics:

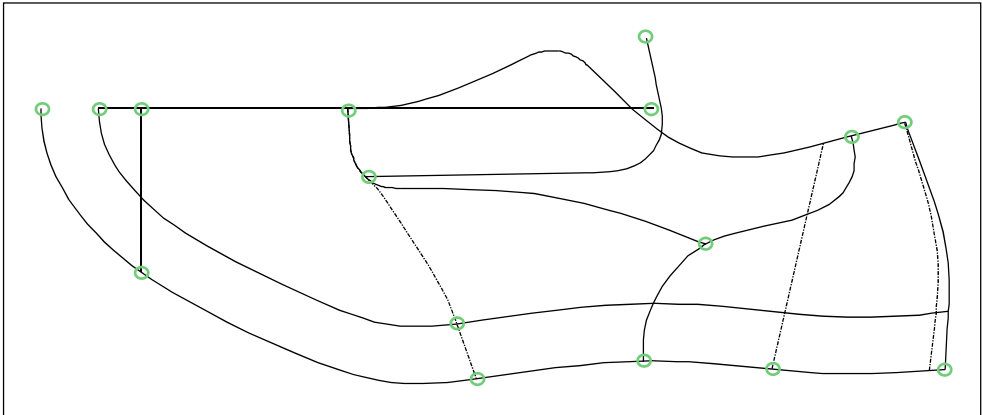
- create a grade rule library
- assign grade rules from the library and
- edit a grade rule library.

### Create a grade rule library



A grade rule library can be extracted from existing patterns or created by entering the values. The former option is explained, first.

### Step-by-step guide

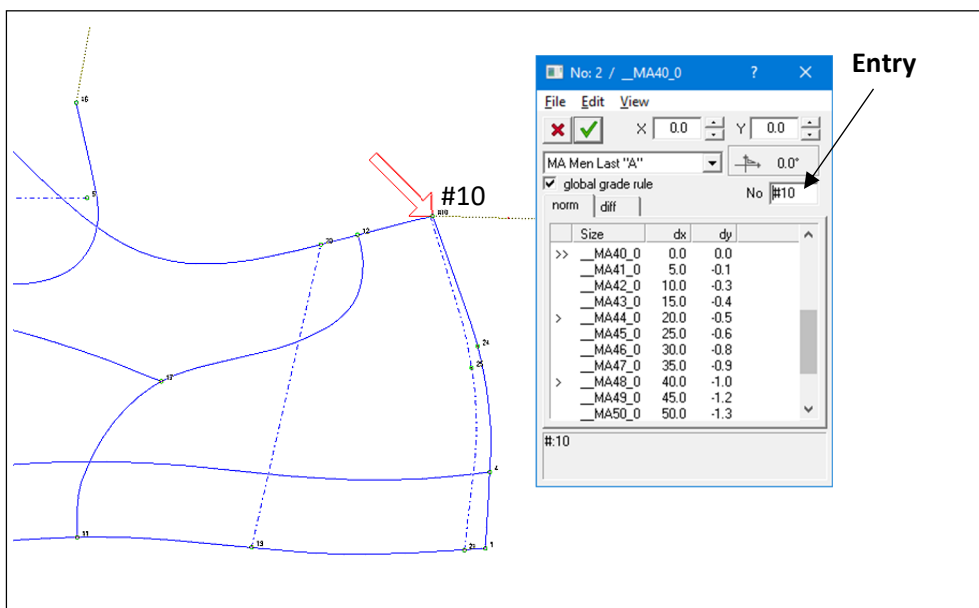
- ⇒ Prepare a pattern with all gradeable pattern pieces,
- ⇒ Enter and activate the break sizes in the size table,
- ⇒ *Rule Pattern* → *Extract Grade Rule Pattern*
- ⇒ Place grade points from which grade rule tables are to be inserted into the library, manually
- ⇒ *extract*
- ⇒ Possibly, set further grade points and *extract*
- ⇒ With  return to the *Grade Rule Pattern* menu
- ⇒ Label the grade rule table with a number between 1 and 999 in the *No.* edit field. This number subsequently appears in the library.
- ⇒ Save grade rule pattern with *save as template* under \Grafis\[shoe system]\SWERT\ LIBRARY\[library name].SWS.



Picture 16-30

Generate a Grafis pattern with all corresponding pattern pieces (see Picture 16-30). Activate the break sizes in the size table (here: MA39, MA36, MA42) and start *Grading* → *Grade All Parts*. Then, open the Grade Rule Pattern menu via *Rule Pattern* → *Extract Grade Rule Pattern* and set the grade points **from which grade rules are to be inserted into the library** with *place grade point* . Not all grade points have to be set! Then, click on *extract* . The grade rule tables for the grade points were calculated.









Picture 16-31

Click on a grade point. The grade rule table window opens (Picture 16-31). Double-click on the dialogue window at the lower edge of the table. Enter a number between 0 and 999 into the *No.* field as a name for the grade rule. This number appears marked with '#' as a number at the point (with *+display*), in the comment window and later in the grade rule library. Introduce your own system when naming the grade rules. Note that the grade rules are listed in alphabetical order. Enter a name for each grade point. Then, save the grade rule pattern with *save as template* under \Grafis\ [shoe system]\SWERT\LIBRARY\ShoeBasic.SWS. The grade rule library is created.

If you require an empty grade rule library in which grade rules are to be saved, later the following step-by-step guide applies:

Step-by-step guide for an empty library

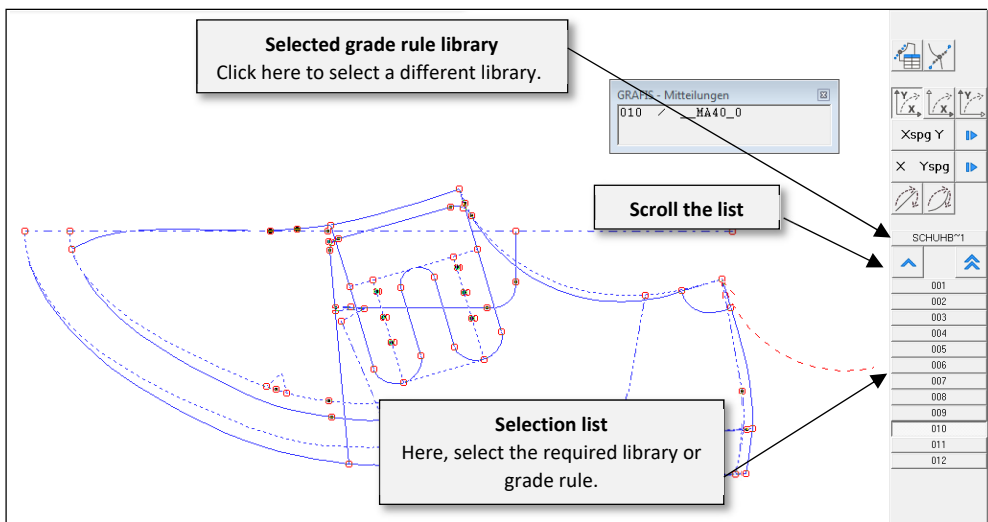
- ⇒ Activate an empty part,
- ⇒ Enter the base size into the size table,
- ⇒ *Rule Pattern* → *Digitize Grade Rule Pattern*
- ⇒ *place grade points* 
- ⇒ *place further grade points with point construction* 
- ⇒ *p on x&y with x=y=0*
- ⇒ with  return to *Grade Rule Pattern* menu
- ⇒ Save grade rule pattern with *save as template*  under \Grafis\[shoe system]\SWERT\LIBRARY\[library name].SWS

### Use grade rule library

Grade rule libraries are opened from the *Grade Rule Pattern* menu via *edit grade rules* and used as follows.

Step-by-step guide

- ⇒ Click *edit grade rules* in the *Grade Rule Pattern* menu
- ⇒ Select required grade rule library (Picture 16-32),
- ⇒ click required grade rule once and then, click the grade point to which the grade rule is to be assigned;



Picture 16-32



Digitize a pattern without grade rules. Edit the pattern in the *Grade Rule Pattern* menu (possibly: *Rule Pattern* → *Edit Grade Rule Pattern*). Open the *Edit Grade Rule* menu (Picture 16-32). All functions introduced in section 16.5 are available. Select the required grade rule library under drag by clicking this field and selecting one of the available libraries from the list below. The selected library is entered into the field below *drag*. The list below the field with the name of the library now contains the grade rules. Scroll in this list. Click on the first grade rule and move the cursor to the pattern without pressed mouse button. For your support an arrow to the respective nearest grade point appears. Click on the grade point to which you want to assign this grade rule.

Assigning can ensue with the three copy options  $1=>1$  where  $1=>1$  (xy) is the default.

### Edit grade rule library

Grade rules can be added to an open grade rule library as follows.

#### Step-by-step guide

- ⇒ Click *edit grade rules* in the *Grade Rule Pattern* menu
- ⇒ Select the required grade rule library
- ⇒ Edit a grade rule: double-click on the grade rule in the right menu strip, edit the grade rule and quit with 
- ⇒ Add a grade rule: activate *edit* and double-click on a similar grade rule in the right menu, edit the grade rule, label it in the *No.* field and save it in the library with *File* → *Save to library*. Close the grade rule table with  without accepting the alteration again, as otherwise the grade rule selected as template is overwritten.
- ⇒ Delete a grade rule: double-click on the grade rule in the right menu strip and *File* → *Delete from Library*.

Edit the library according to the step-by-step guide. The alterations are saved in the library, immediately.

## 16.10 Group grade points

Grouping grade points is a powerful and sophisticated function. It is explained briefly in this section using a simple example. It can be used far more extensively than described, here.

With the function *group* **a grade point can be graded in relation to another grade point**. The grade rule tables discussed so far relate to the pattern contour in the base size. With *group* and *assign* this relation is released and grading can be related to a grade point.

***A grade point can be assigned with a number of grade points. The grade point which has grade points assigned to it is marked with a dashed circle.***

***A grade point which already has grade points assigned to it can be associated with another grade point (chain of grade associations).***

### Group grade points menu

edit grade rules

grade point...

assign neutral

release neutral



### The options Group neutral or additive

Grade points can be grouped neutral or additive:

In the case of **grade point neutral** the grade rules of the grade point are calculated so that it continues to be graded as before without alteration.

In the case of **grade point additive** the grade rule table remains unchanged. The target to which the grade rule refers is changed. This option is originally not visible as it is rarely required. The option *additive* can be made available in the Grafis.ini under [OPTIONS] with the switch GRD\_GRP\_ADD=1.

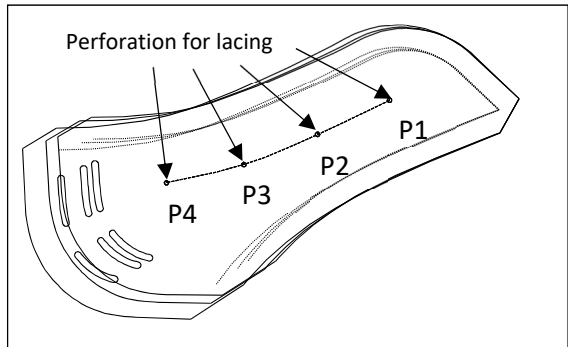
*Assign grade point neutral* and subsequent *Release grade point neutral* restores the original state. The same applies to the *additive* option.

The option **grade point neutral** should be used if a grade point has already been graded correctly and now, its grading is to be checked/ adjusted in relation to another point. See also the following example with Picture 16-33.

The option **grade point additive** should be used if a grade rule is to be adjusted for a new point in relation to an existing point.

### Example

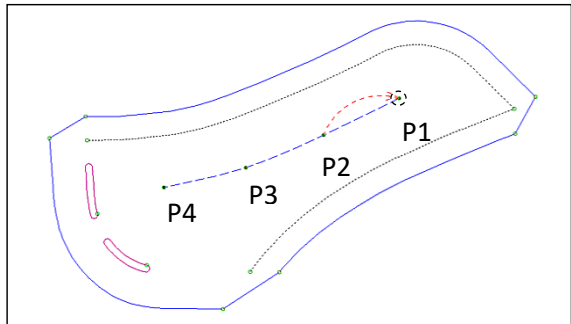
Picture 16-33 shows a lacing part with drill holes for the lacing. The drill holes have the same distances for all sizes. The nest in 16-33 is stacked at P1. The grade points P2, P3 and P4 are associated with the following steps with grade point P1 and graded in relation to P1.



Picture 16-33

### Step-by-step guide

- ⇒ Rule pattern → Edit rule pattern
- ⇒ Group grade points
- ⇒ Assign grade points **neutral**
- ⇒ P2, P3 and P4 are to be allocated to P1 according to Picture 16-34.
- ⇒ Edit



Picture 16-34

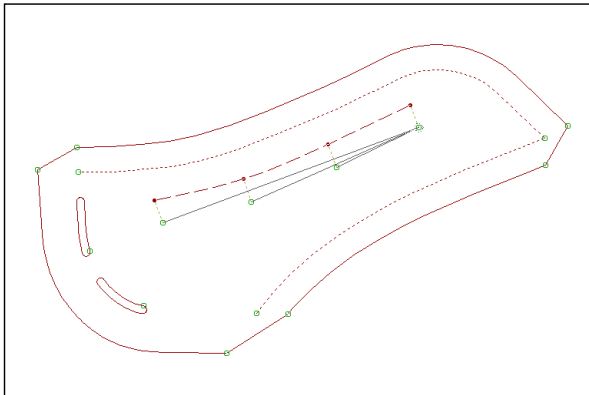
The grade rule table for P2 after allocation is shown in Picture 16-35. The position of P2 in relation to P1 does not change in all sizes. All grade rules are zero.

Now the grade rules for the drillholes P2, P3 and P4 are to be altered, so that the distances of the drillholes change from size to size. The grade rule table of P2 is to be altered according to Picture 16-37. The grade rules of P3 and P4 must be altered analogously.

Now the drillholes can be dragged as a group at P1 with *drag grade point*, Picture 16-36.

Size	dx	dy
MA36_0	0.0	0.0
MA37_0	0.0	0.0
MA38_0	0.0	0.0
MA39_0	0.0	0.0
MA40_0	0.0	0.0
MA41_0	0.0	0.0
MA42_0	0.0	0.0
MA43_0	0.0	0.0
MA44_0	0.0	0.0
MA45_0	0.0	0.0
MA46_0	0.0	0.0
MA47_0	0.0	0.0
MA48_0	0.0	0.0
MA49_0	0.0	0.0
MA50_0	0.0	0.0

Picture 16-35



Picture 16-36

Now, remove the grade association with

⇒ *Grade rule pattern* → *edit grade rules*

⇒ *Group grade points*

⇒ *Release grade point neutral*

⇒ To remove click the point to which another point was assigned; in this case click P2.

⇒ Edit

The grade rule table was calculated for the relation to the pattern contour, Picture 16-37. The grade of the pattern does not change.

Size	dx	dy
MA37_0	3.2	1.6
MA38_0	1.6	0.8
MA39_0	0.0	0.0
MA40_0	-1.6	-0.8
MA41_0	-2.3	-1.1
MA42_0	-3.1	-1.4
MA43_0	-3.8	-1.7
MA44_0	-4.6	-2.0
MA45_0	-5.4	-2.3
MA46_0	-6.1	-2.6
MA47_0	-6.8	-2.9
MA48_0	-7.6	-3.2
MA49_0	-8.4	-3.5
MA50_0	-9.1	-3.8
MA51_0	-9.9	-4.1

Picture 16-37

## Content

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Content of this chapter are the basic functions for creating a marker from one or more styles. All other application options follow in Chapter 18.



Picture 17-1

## 17.1 Preparations in Grafis Patternmaking

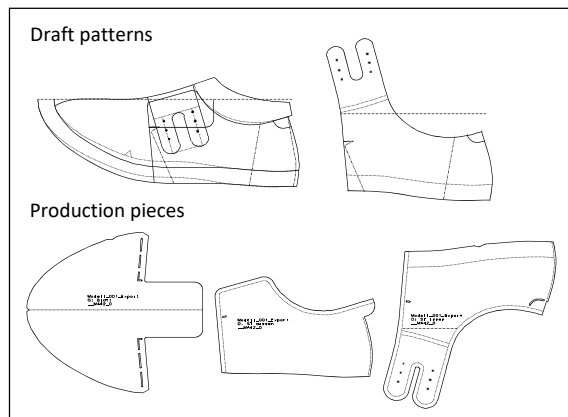
For industrial application, the marker making software offers an abundance of planning and organisational options which have to be entered before the actual marker making process. Not every user, however, requires all options. Therefore, the steps for minimum requirement are to be explained, first.

### Steps in Grafis Patternmaking

- ⇒ Create the production pieces with closed perimeter, if necessary set the grain line
- ⇒ Set part parameter; minimum: Attribute *production piece*, material type (e.g. 'O upper fabric'), number of pieces per style (e.g. 1x normal, 1x mirrored)
- ⇒ Enter all sizes to be layed into the size table and grade all parts.
- ⇒ Save the style
- ⇒ Start marker making via *File* → *Start Marker making* or via the 'Marker making' icon on the desktop.

### Construct production pieces with closed perimeter

During pattern development draft patterns are created from which the actual production patterns are derived, see Chapter 13. Pieces can only be layed in the marker if they have a closed perimeter. The perimeter corresponds with the cutting line on the fabric. It can be adjusted to the fabric by entering shrinkage values and buffer within the marker.



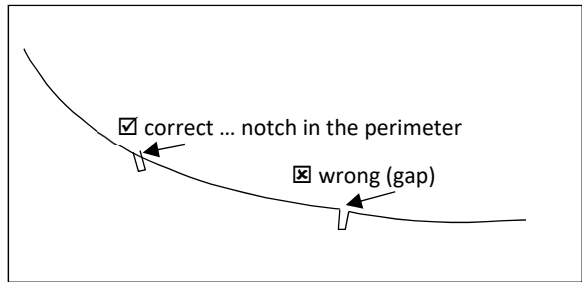
Picture 17-2

Grafis checks whether the perimeter is closed when setting the part parameter *Production piece* (in the part organisation dialogue) and again when transferring all sizes into the marker. If Grafis finds gaps (>0.5mm) in the perimeter or protruding lines, an error message appears. Gaps can usually be found at corners, joints of lines or at symbols.

This control ensues only in the base size within Grafis Construction, unless otherwise defined in the Setup. In the layplan, all sizes are checked.



Line symbols such as notches are ignored during checking of the perimeter, see Picture 17-3. The shape of the symbols must not be modified, for example through corner treatment. For the first steps in the marker, please prepare a simple style with production pieces, see Picture 17-2.



Picture 17-3

### Set grain line

**In the production pieces the Grafis symbol 'grain line' should be set at least.** If no grain line is set, the negative y axis (direction downwards) is utilised as the direction of the grain, however, this can be changed subsequently (see 18.11). Also, an internal line can be declared as the grain line (see 18.12).

The following symbols and attributes must already be set in the style if they are required in the marker:

- grain line
- annotation line (see 18.12)
- split line (see 18.12)
- internal line to be cut (see 18.12)

### Assign piece parameter

After having finished the production patterns the piece parameter for the production pieces should be assigned, already on the file card *Piece Parameter* in the *Part organization* menu, see Picture 17-4. These are:

- ⇒ Set piece type to *Production piece*
- ⇒ Determine the *Material* for the production pieces; If the required material type is not listed, it has to be entered in the file

Picture 17-4


\Grafis\MATERIAL.DAT. This file contains the code for the material type in the first column. Each code can be assigned only once. For the code one capital

letter or one number can be used. Use of special characters or umlaut is not permitted. The material name follows from the third column onwards.

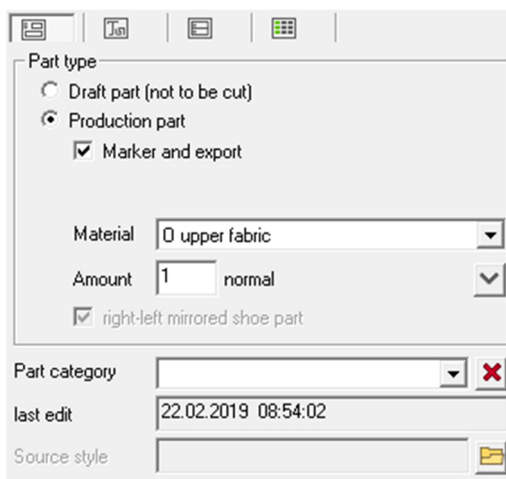
⇒ Enter the amount of this piece per style;

For right/left symmetrical pieces (pairs) the piece is required '1x normal' and '1x mirrored'. Please note that here, not the total number of pieces to be placed is to be entered but the amount for normal and mirrored position per style.

⇒ If you have activated *orthopaedic shoe style* in the size table, continuous sizes are automatically generated as *right-left mirrored shoe piece*, see section 3.5. In this case, only the number for *normal* is to be entered, see Picture 17-5

With the button  the piece parameters of the selected piece are transferred to the next piece. This relates to the attribute *Production piece*, the material type and the amount per style in normal/ mirrored position.

Optionally, each piece can be assigned a category for which the buffer at top/ bottom/ left/ right and the settings for rotate and flip during layplanning are prepared. Details on work with categories can be found in section 18.8.



Part type

☐ Draft part (not to be cut)

☒ Production part

☒ Marker and export

Material

Amount  normal

☒ right-left mirrored shoe part

Part category

last edit 22.02.2019 08:54:02

Source style

Picture 17-5

### Grade production patterns

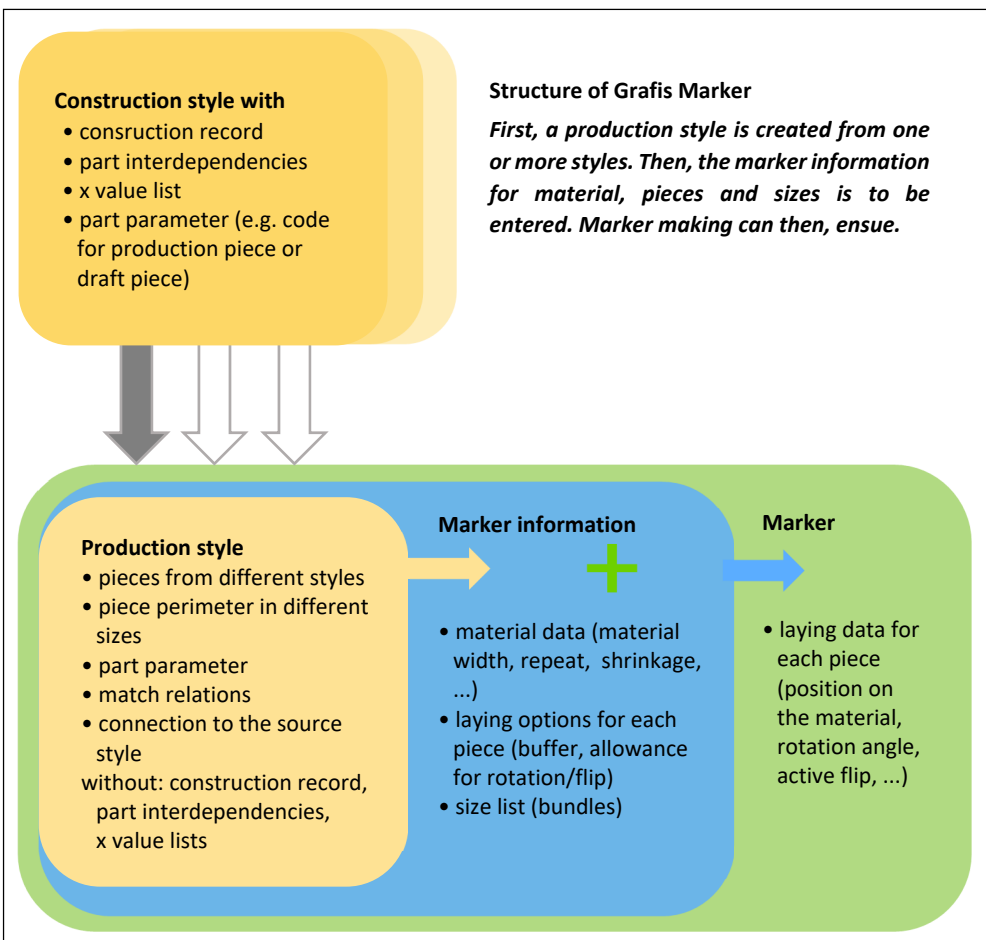
All sizes to be layplanned must be entered in the size table. One entry per size is sufficient. Grade all production patterns with *Grade all Parts* and save the style.

## 17.2 Structure of the Grafis Marker

The Grafis Marker making is started via the icon 'Marker making' or from Grafis Patternmaking via *File → Start Marker making*. Grafis Patternmaking and Grafis Marker making can be open at the same time

The Grafis Marker making can be used at different levels in industry, trade and education. It allows amongst other:

- marker making of all production patterns of the current style,
- combining patterns from different styles within one marker, also across different shoe systems,
- grouping of pieces,
- open and folded markers,
- transfer of optimised markers onto new markers to be generated,
- creation of fusing group and much more.



Picture 17-6

Technical parameters such as material type, grain, number of pieces per style and repeats are considered as well as planning parameters for buffer (global, piece-specific, direction-specific), shrinkage and material faults. Pieces can be rotated and flipped during marker making.

### **Data structure of the Grafis Marker**

The data of a marker is divided into production style, marker information and marker. In this order, the information for the marker is assembled. The overview in Picture 17-6 indicates the structure. The intermediate steps (production style, marker information and empty marker) can be saved, separately.

#### ***Production Style***

... is the assembly of pattern pieces from different styles and different shoe systems to be layed in a marker. It contains

- all required pieces as perimeter in all required sizes,
- the part parameter for the pattern pieces,
- match relations if required and
- a connection to the source of the respective pieces.

As opposed to the styles in the Grafis Patternmaking, the construction record with x value lists and the interdependence of the parts no longer exists.

#### ***Marker information***

... are the data of the production style and additionally

- all information about the material (width, repeat, shrinkage, ...)
- laying options for each piece (buffer, allowance for rotation/flip),
- sizes to be placed (bundle) and the name of the marker.

#### ***Marker***

... contains the data of the marker information with the data of the production style and additionally

- the laying data for each piece (current position in the marker, rotated, flipped,...)

The data of every placed marker are saved as marker files with the extension \*.scb.

## Prepare marker

### Step-by-step guide

- ⇒ Prepare the style according to section 17.1 and start Grafis Marker making
- ⇒ Load or assemble the **production style**
- ⇒ Assign **marker information**
- ⇒ Lay the **marker**

For each of the highlighted steps, there is a pull-down menu with all relevant functions:

Load or assemble production style:

- ⇒ Pull-down menu *Production Style*

Assign marker information:

- ⇒ Pull-down menu *Marker information*

Lay marker:

- ⇒ Pull-down menu *Marker*

To create a marker these steps are to be processed one after another. The individual steps are explained in sections 17.4 to 17.7.

## 17.3 Create production style

If only pieces of one style are to be placed, the following steps are sufficient.

### Step-by-step guide

- ⇒ Pull down menu *Production Style* → *Open Style*. Open a prepared style. Grafis suggests automatically converting the style into a production style. This should be confirmed. Thus, all production pieces are transferred and the alteration service is activated for each piece. Refuse this conversion only if not all required patterns have been declared as production pieces. In this case, all parts including empty parts and development parts will be transferred. However, this means that any alteration to the source style leads to updating of all pieces in the marker.
- ⇒ If necessary, check or edit part parameter via *Production Style* → *Part Organisation*, open file card *Part parameter* and check the material type and the required amount for each part.

The production style is now prepared. You can continue immediately with the marker information

**NB: The alteration service (section 18.1) can work only if the source style and the complete path to the source style (drive, collection, sub-collection) have not been renamed, moved or deleted.**

## Assemble production style

### Step-by-step guide






- ⇒ Open part organisation via *Production Style → New style*
- ⇒ Click *Insert connection part*
- ⇒ Select a style from any shoe system
- ⇒ The dialogue *Grafis- Part Connection* appears
- ⇒ Select the sizes required for the production style or click on *all sizes*. The order of the sizes remains intact in the marker when creating the bundles.
- ⇒ Click the button *Create connection* for all pieces required in the production style or click on *all parts*
- ⇒ Select the next style with the button *Back* or close the *Grafis- Part Connection* dialogue with the button *Close*
- ⇒ Open file card *Part parameter* and check the material type and the required amount per style for each piece
- ⇒ End with right mouse button

When assembling production styles from styles of different shoe systems, ensure identical size names. If the size names are not identical, individual sizes with identical names may have to be created. Ensure correct settings for the alias in the size table.







The production style is assembled with the function or the *part organisation* menu which are largely identical with the ones in the Grafis Patternmaking. All changes apply to the new production style, only. The source style remains unchanged.

Start Grafis Marker making and select *Production Style → New Style*. Assemble the new production style by clicking on *Insert Connection* and selecting the required style.





### Select style

In the dialogue *Open Style for Insert* select the drive on which the required style is saved under *Look in:*. In the window below, all shoe systems appear, indicated as folders with the icon . Double-click changes to the required shoe system. All available collections of the selected shoe system appear, also indicated by the icon . Double-click on the required collection opens the list of all available styles of the collection. Styles are indicated by the icon . If a padlock appears at the icon , the style is currently being processed and is therefore, write-protected. Parts from a write-protected style are transferred in the state of the last save. Move up one level of folder/ collection with the button .

Following table contains an overview of the icons used in Grafis and their significance.

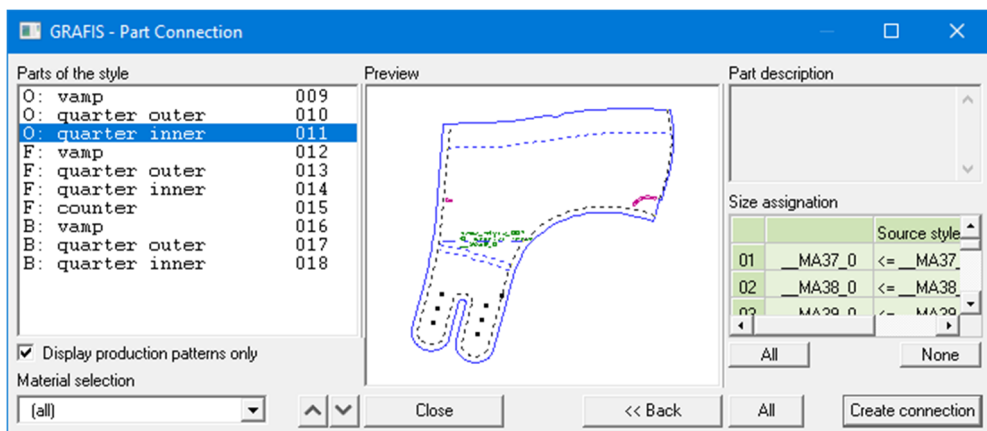
Icon	Significance
	folder (shoe system), collection
	style (Grafis Patternmaking)
	write-protected style
	production style
	marker
	marker information

The content of the window can be arranged with the following buttons.

Button	Significance
	List without details
	List with details
	Show/hide text preview
	Show/hide preview of the first piece

### Create connection

After having selected the required style, the window *Part Connection* appears (Picture 17-7).



Picture 17-7



### Step-by-step guide

- ⇒ Select all sizes to be transferred to the production style
- ⇒ Transfer pieces with: select piece and click button *Create connection* or double-click on the piece
- ⇒ Button *Back* to select another style
- ⇒ End with button *Close*

### Select sizes

All sizes positioned to the left of the arrow ' $\leq$ ' in the section *Sizes of the style* will be available in the marker. Double-click on the respective line transfers the size to the left or excludes it again. Selecting a number of sizes in one operation is also possible with pressed left mouse button. **The bundles will be created in the order of the sizes to the left of the ' $\leq$ '.**

### Transfer pieces

The check mark *Display production patterns only* can be set if all pieces to be layed have been assigned with the *Production piece* attribute. If the check mark is set, all draft patterns are hidden. After having clicked a piece its perimeter appears in the *Preview* area and the content of the text box - if applicable - appears under *Part description*. Clicking the button *Create connection* or double-click on the piece transfers the piece. The following piece is selected, automatically. A different insert position in the production style can be selected with the buttons  .

After having transferred all required pieces, another style can be selected with the *<<Back* button or the assembly of the production style can be ended with *Close*.

### Edit production style

The current list of parts can be opened via *Production style* → *Part Organisation*. On the *Part parameter* file card the date of the last edit of the piece, the name and the path of the source style are now shown for each piece. This information is used to ensure that any alteration of the source style will automatically be updated in the marker. Further information on updating pieces can be found in section 18.1.

If necessary, check that

- no pieces have been transferred, twice by accident,
- the material type of the piece is correct,
- the required amount per style is correct and
- if applicable, the part category is correct.




Corrections can be made immediately with the known function from the part organisation, see Chapter 13. Adding further pieces is started by clicking *insert connection part*. The part organisation is closed with the right mouse button.

In the style view, the function keys <F2>, <F3>, <F4> and <F6> are assigned as in the Grafis Patternmaking. Pressing <F5> arranges all transferred pieces in all transferred sizes. The functions *Copy*, *Measure*, *Stack* and *Move/Zoom* are also active (pull-down menu *Edit* or toolbox).

### Save production style

The production style can be saved at this stage via *Production Style* → *Save Style As...* Finished styles should be sent to the customer or the production unit in the form of production styles. Alteration through application of other finished measurements or x values are no longer possible.

For saving of production styles no fixed directory structure is given as the production styles are no longer attached to a shoe system. As the target, we recommend the folder \Grafis\SB\ and its subfolders. With the button  *New Folder* a new folder/directory can be created.

## 17.4 Edit marker information

### Step-by-step guide

- ⇒ Create or open a production style
- ⇒ Pull down menu *Marker Information* → *New*  
Now, three file cards are to be filled in.
- ⇒ Fill in file card **Material**  
(enter material width and material type minimum)
- ⇒ Fill in file card **Pieces**
- ⇒ Fill in file card **Sizes**
- ⇒ Save empty marker or lay the pieces in the marker

After preparation of the production style and before laying the pieces in the marker, all information about the marker must be entered into the file cards *Material*, *Pieces* and *Sizes*. As a rule, each of these file cards are indicated by one icon in the toolbox.

## File card Material

On this file card (Picture 17-8), enter at least the **material width** and the **material type**. All other fields can be edited if required. Some of the other options are explained in the following. Further information about pre-selection of material, repeat, shrinkage values (global), fault areas and spreading types follow in Chapter 18.

**GRAFIS - Material**

Material pre-selection

Material width: 1900 mm Material type: 0 upper fabric

**Repeat**

Distance Offset Sub repeat

Set values +/- 0

permitted repeat deviation

match only (match point not active)

Match pieces without repeat:

Warp Weft end with full repeat minus offset

**Shrinkage values**

Warp %

Weft %

relates to grain line in pieces

**Fault areas**

Consider material faults

Set values

**Buffer (global)**

0 mm

**Maximum material length**

7,00000 Metre (m) Efficiency (%)

**Spreading type**

Ri - Le Ri - Ri folded tubular material

two-way one way same sizes - same direction same sizes - same direction (compe)

**Anchor lines**

vertical horizontal

none active plotter every mm

none in mm piece

use as auxiliary lines only

Next >> Close

Picture 17-8

### Buffer (global)

The global buffer applies to all pieces in the marker. Grafis calculates a new perimeter for each piece with half of the buffer distance. Thus, the set safety margin between two pieces is ensured. If pieces are to be touching in the marker, the global buffer must be 0. A piece-specific buffer can then be entered on the next file card.

---

### **Maximum material length**

In this field, the maximum length for the marker in metres or a minimum efficiency in % is entered. A default setting for the maximum length is entered in the *Grafis.INI* file and can be altered at any time.

When entering a minimum efficiency in %, the maximum material length is calculated, automatically from the area of all pieces and the width of the material.

### **Anchor lines**

Anchor lines are laying aids which function like a border. Pattern pieces can be attached from left/ right or up/ down. Placing a piece on top of an anchor line is only permitted if the check mark ***use as auxiliary line only*** is set. Anchor lines can also be plotted.

With ***every...mm*** the distance between vertical or horizontal anchor lines can be randomly selected. For ***vertical*** anchor lines, the distance between the lines can correspond with the page size of the ***active plotter***. This setting is useful for single sheet plotter where the pattern pieces are not to protrude over the edge of the page.

### **Button Next**

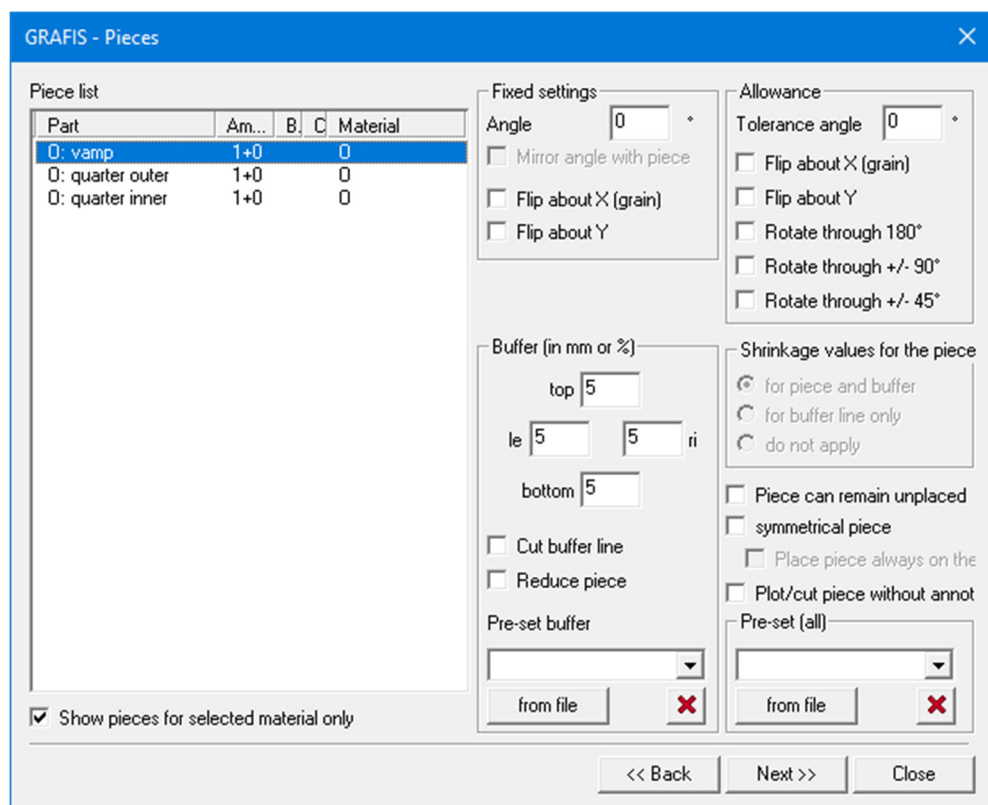
Clicking the *Next>>* button opens the *Pieces* file card.

### **File card Pieces**

On the *Pieces* file card, settings regarding additional direction-specific buffer, flip and rotate allowance and special settings for shrinkage value can be entered for each piece, see Picture 17-9.

If only pieces of the selected material type are to be displayed, check ***Show pieces for selected material only***. Thus, only pieces which will be layed out can be seen. The material type is selected on the previous file card *Material*.

The values in the entry fields *Fixed settings*, *Allowance*, *Buffer* and *Shrinkage values for the piece* apply to the selected piece(s), respectively. To select a number of pieces at the same time, press the <Ctrl> or the <Shift> key when clicking on the pieces.



Picture 17-9

In the part list (left on the file card) the following is stated next to the piece name:

Column	Content
Piece	Piece name
Amount	Amount of the piece per style; first number indicates normal and second number flipped position
Buffer	The character 'x' indicates that a piece and direction-specific buffer has been entered for this piece. Small 'x': original perimeter is cutting line; capital 'X': buffer line becomes cutting line; character '-': the piece will be reduced.
Category	Display of category number and name assigned to this piece.
Material	Code for the material type

---

**Fixed settings**

For each piece the following can be set:

- fixed rotation angle  
The piece is rotated through this angle before entering in the marker.
- flip about x or y  
The piece is flipped before laying.

**Allowance**

Additionally, the following rotate/flip allowances can be set:

- tolerance angle
- The piece may be rotated freehand about a maximum of this angle in the marker.
- flip about x (grain line)
- flip about y
- rotate through 180°
- rotate through +/-90°
- rotate through +/-45°

The piece may be rotated/ flipped according to these settings.

**Buffer**

The piece and direction-specific buffers are added to the global buffer from the previous file card *Material*. The settings apply to the selected piece(s). A buffer can be entered into the fields *top*, *bottom*, *left* and *right* in mm or in %. When using percentage, only the character '%' is to be entered. Move between entry fields with the <Tab> key. All settings relate to the first piece in the first bundle in unflipped position.

The check mark at **cut buffer line** results in the piece being increased by the global and piece-specific buffer and cut at the buffer line. Complex pieces or pieces which the cutter may not be able to cut, accurately can be cut roughly and can then be cut, accurately by hand.

If the check mark at **cut buffer line** is not set, the buffer is an invisible distance between the pieces.

A check mark at **reduce piece** results in the piece being reduced by the global and piece-specific buffer and cut reduced. Interlining can be reduced by 2mm all around for example, to prevent the fusing press from being soiled with glue.

In the part list (left on the file card) the current settings are indicated as follows:

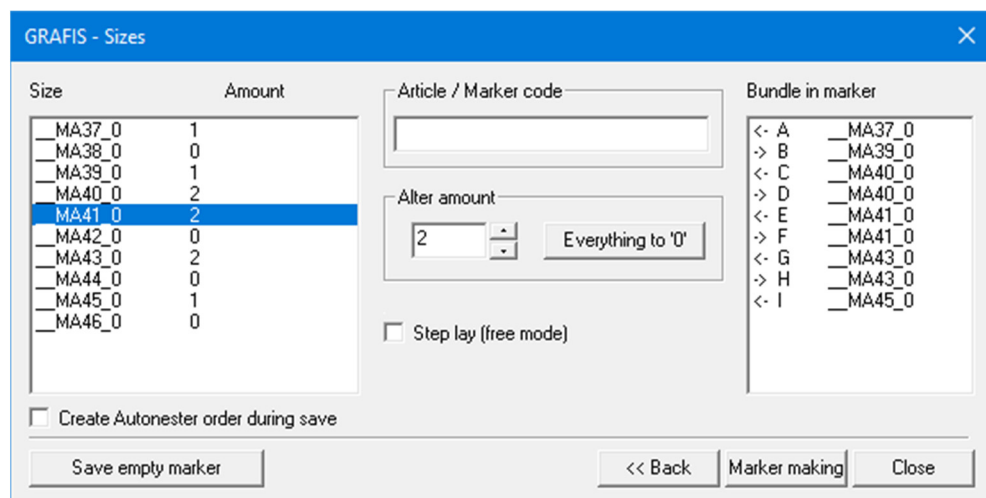
Character	Significance
x	<input type="checkbox"/> cut buffer line (original perimeter is cut line)
X	<input checked="" type="checkbox"/> cut buffer line (buffer line is cut line)
-	<input checked="" type="checkbox"/> reduce piece (piece is cut reduced)

All further options are explored in Chapter 18. These are

- shrinkage values for the piece
- pre-set buffer
- pre-set (all)
- replace style/add style

### File card Sizes

The file card *Sizes* determines **which sizes are placed and how often**. This information is displayed in the size list (Picture 17-10, left window). From this data, the bundles are created, automatically in the right window. Only the sizes set up in the production style can be placed. Adding unlisted sizes is only possible through reprocessing the production style. To edit the amount of the size, select one or



Picture 17-10

more sizes in the window on the left. Pressing a number on the keyboard or the arrow keys next to the dialogue **Alter amount** changes the amount of the selected size(s). A number of sizes can be selected with the <Shift> and <Ctrl> keys, analogous to the handling in the part list.

In the field **Article/Marker code** a short description of the marker can be entered which can be plotted at the material edge.

Further information about *Article/Marker code* and *Step lay* follow in Chapter 18.

### **Save empty marker**

As soon as all settings for the *Marker Information* are dealt with, this intermediate stage can be saved as an 'empty marker'. Often, a number of markers are required for the same style due to marker optimisation.

The first marker contains sizes \_MA39 and \_MA42, the second marker sizes \_MA40 and \_MA41 and so on. After having saved the 'empty marker' for the sizes \_MA39 and \_MA42, the sizes \_MA40 and \_MA41 have to be entered, only in the required amount on the *Sizes* file card. Then, the marker for sizes \_MA40 und \_MA41 is prepared, also.

Later, the first marker is opened with *Marker → Open Marker....* If consecutive names have been given when saving the markers, the next marker can be loaded, immediately with *Marker → Open Next Marker*.

### **Option Maintain bundle position**

If the size list for an already placed marker is altered, the option *Maintain bundle position* appears. It controls the transfer of placement positions of already placed pieces.

If this option is active, the bundles remain at their original position. During alteration of the size run, already placed pieces may overlap. The basic structure of the marker is retained. Use this option if the basic structure of the marker must not be altered but various sizes will be changed.

If this option is inactive, the sizes remain at their original position. Use this option if single sizes are to be changed with the other sizes remaining at their original positions, even if the bundle number is changed.

Example for the marker scheme *all bundles same direction (one way)*:

	before	after
1st bundle	__MA39	__MA40
2nd bundle	__MA40	__MA41

If the option *Maintain bundle position* is active, size \_MA40 will be placed where size \_MA39 had been and size \_MA41 is placed in size \_MA40's position. If the option is not active, size \_MA40 remains in its position and size \_MA41 is unplaced in the rack.

**Marker making** opens the marker interface, immediately.

### **Edit the marker information**

Via the pull-down-menu *Marker Information* the file cards *Material*, *Pieces* and *Sizes* can be opened, directly. Alterations to the file cards are possible at any time. They are automatically applied to the marker. If overlapping or gaps occur, the marker must be reprocessed.

## **17.5 Marker making**

Step-by-step guide

- ⇒ Create or open the production style
- ⇒ Enter the marker information
- ⇒ *Marker* → *Marker making*

First, prepare the production style and enter the marker information. From the last file card *Sizes* the button *Marker making* leads to the marker. If this file card is already closed, the marker is opened via *Marker* → *Marker making*.

### **Marker user interface**

The marker user interface (Picture 17-11) is divided into four areas:

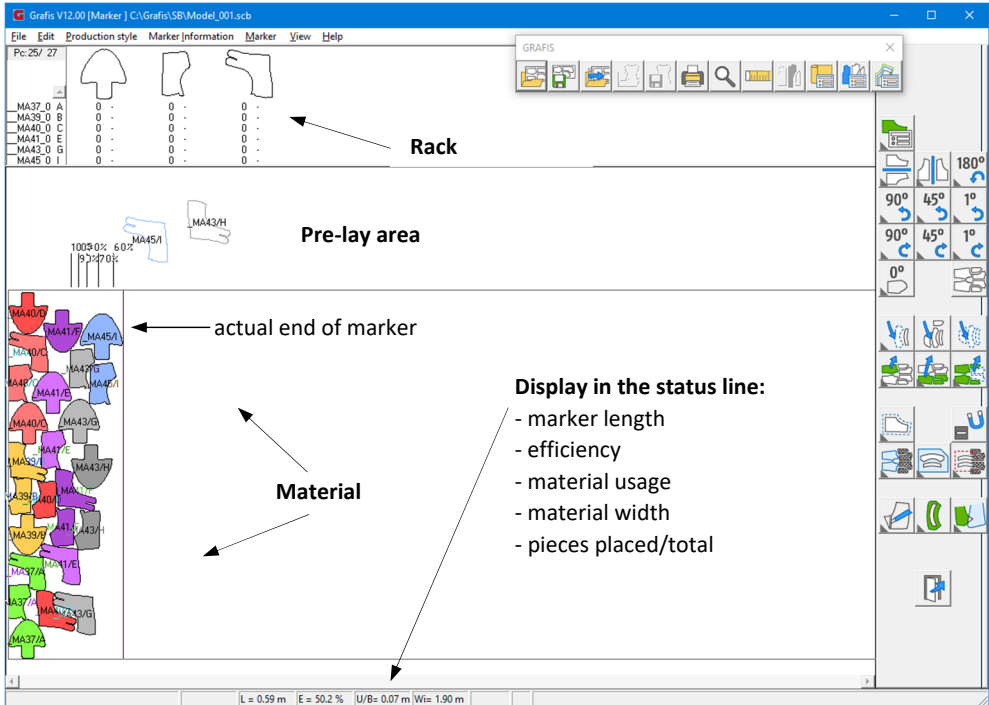
- the rack,
- the pre-lay area,
- the material and
- the status line.

The **rack** is situated at the top of the screen. It contains all pieces to be placed in all sizes or bundles. The order of the pieces corresponds with the order in the part list of the production style. The number of pieces in normal and flipped position and the bundle name result from the settings on the file cards in the marker information. If necessary, a scroll bar appears for scrolling to the left/right.



Below the boxes of the rack, the sizes to be placed and a capital letter for the bundle appear in the first column. The numbers in the following columns represent the amount of pieces in normal position (left) and in flipped position (right). A clicked number is highlighted in white and the respective piece of the relevant bundle in the respective position hangs on the cursor.



The **material** is situated at the base of the screen. The width of the material was determined on the *Material* file card. At the end of the material (right) a marking for the efficiency in percent can be found.



Picture 17-11

The **pre-lay area** is the area between the rack and the material. It serves as a temporary store and can be increased in size by folding the rack. Click the button  at the upper right end of the rack. Clicking  unfolds the rack.

The **status line** with information about the marker is situated at the lower edge of the screen. The individual fields show (from left to right):

- part number and name of the piece on or below the cursor
- size and a capital letter for the bundle
- current length of the marker in m
- current efficiency in %
- usage per bundle (average) in m
- material width in m
- placed pieces/total number of pieces to be placed
- placed production style

### Call and place pieces from the rack

A piece is called from the rack by clicking the respective number below the box with the left mouse button. The piece hangs on the cursor and can be dropped in the pre-lay area or on the material with another short click of the left mouse button.

**Only pattern pieces on the material placed without overlapping are displayed with colour fill.**

A piece hanging on the cursor will cease to follow the cursor as soon as it touches another piece on the material, the selvedge or an anchor line. At the same time, a **red thread** appears between the piece and the cursor. If the thread exceeds a certain length, the piece will follow the cursor, even across the edge of the material or already placed pieces. The length of this so-called search area can be altered via *View → Marker options*.

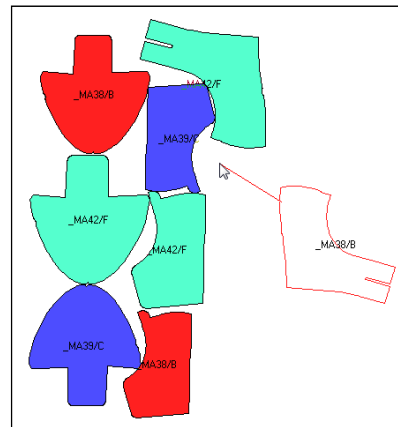
To **reposition already placed pattern pieces** move the free cursor (without pieces attached) over the pattern pieces. In the status line at the lower edge of the screen, the piece number and name, the size and the bundle appear. The size and the bundle name are also stated directly at the piece if this option is activated under *Marker → Options*. Clicking on a piece with the left mouse button picks up the piece.

All pieces of one size appear in one of seven **colours**. Three different shades of a colour differentiate between the bundles of one size.

A **number of pieces** can be called from the rack at the same time by moving the cursor over the numbers of the required pieces with the right mouse button pressed. The right mouse button must be released when still **in the area of the rack**. Thus, all selected pieces hang on the cursor. With the left mouse button the pieces are dropped in the pre-lay area or on the material, slightly removed. Sliding the stack is also possible.

### Sliding pieces

Click the piece for sliding so that it hangs on the cursor. Drag the piece with the left mouse button pressed. A red thread appears, indicating the direction of the slide (Picture 17-12).



Picture 17-12



As soon as the mouse button is released, the piece slides against already placed pieces or into the nearest gap.

The piece does not have to be picked up, first. The mouse button may remain pressed, immediately. Moving the mouse pulls the red thread. Releasing the mouse slides the piece onto already placed pieces.



### Move a number of pieces

Click on a number of pieces with the <Ctrl> key pressed down, let go of the <Ctrl> key, click quickly on one of the selected pieces and move them.

### Free anchor lines

In the area of the lower or left material edge the symbols  or  appear at the cursor. Having clicked and dragged, a free moving anchor line appears which can be positioned as required. The line can be placed exactly at full cm values with pressed <Shift> key. Already placed pieces in the area of the line are switched to 'unplaced'.

The free anchor lines behave in the same way as anchor lines with regular distance, see section 17.4. Depending on the setting of the switch *use as auxiliary lines only*, the lines are simple docking lines or magnetic lines.

To delete an anchor line, drag it to the edge. The symbol  or  appears at the cursor. After releasing the mouse button the anchor line is removed.

### Zoom/refresh

<F6> toggles between

- ⇒ zoom to optimum marker length and
- ⇒ zoom to optimum marker width.

At the same time, the pieces in the pre-lay area are rearranged according to bundles and the screen is refreshed. <F6> only changes the view if you have zoomed into a detail or if the marker is not completely visible at full marker width.

With <F4> or moving the marker to the left/right, the screen is refreshed.

To reduce/increase the size of the marker, the already known function **move/zoom** is available. It can be called from the toolbox or from the pull-down menu *Edit*. Maximum scale is 1:1.

## Undo or redo laying operations

While the marker user interface has not been closed, any number of laying operations can be reset via *Edit* → *Undo* (keyboard <Ctrl> + <Z>). Reset laying operations can be reprocessed with *Edit* → *Redo* (keyboard <Ctrl> + <Y>) as long as no new operation has been performed.


## 17.6 Functions of Marker making menu

### Constant functions















Marker making menu	
	properties
	flip about x
	flip about y
	rotate through 180°
	rotate through +90°
	rotate through +45°
	rotate through +1°
	rotate through -90°
	rotate through -45°
	rotate through -1°
	nil piece
	all unplace
	place automatically...
	single pieces
	active unplaced pieces
	unplaced pieces
	return...
	single pieces
	bundles
	pieces
	buffer on/off
	+/-magnet
	group
	fuse
	ungroup
	split piece
	place piece in piece
	place piece with overlap







Almost all functions of the menu strip are **constant functions** indicated by in the lower left area of the button. For these functions the following rule applies:

***If a constant function is active and the mouse hovers over a piece, a symbol at the cursor indicates which function is active. If the selected function may not be applied to the piece (e.g. rotation not permitted), the icon appears at the piece. The active function is triggered with the right mouse button.***

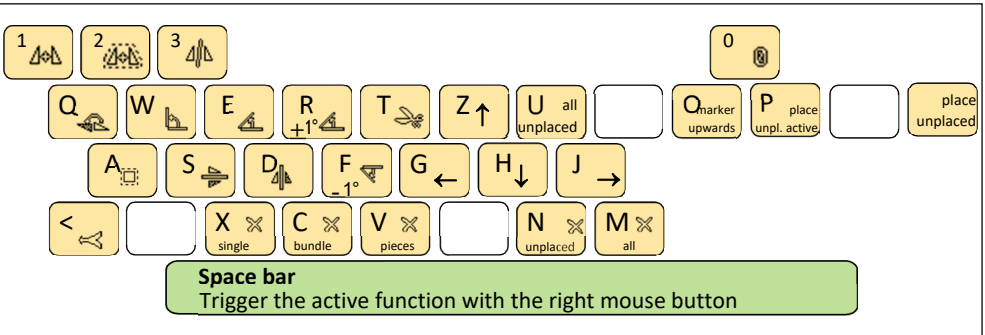
Example: The function *flip about x axis* is active. The icon  appears at the cursor. After having clicked a piece with the right mouse button, it is flipped about the x axis (if permitted for this piece).

### Overview of all functions in the menu strip

Function	Icon	Description
properties		Edit the piece properties on the <i>Pieces</i> file card
Flip:		
about X		Flip about x axis (grain line)
about Y		Flip about y axis
Rotate through:		
180°		1/2 turn
+90°		1/4 turn to the left
-90°		1/4 turn to the right
+45°/+1°		45°/1° turn to the left
-45°/-1°		45°/1° to the right
buffer+/-		Switch buffer (global + piece-specific) on/off
+/-magnet		Activate magnet function
nil piece		Reset flip and rotation; piece appears unplaced (no colour fill)
all unplaced	none	All pieces are <u>immediately</u> marked as unplaced.
Automatic lay:		
single		The clicked piece is placed, automatically.
unplaced active	none	All unplaced active pieces are <u>immediately</u> placed, automatically.
unplaced	none	All unplaced pieces, also from the rack, are <u>immediately</u> placed, automatically.
Return		
single		Return single piece to the rack
bundle		Return all pieces of the bundle to the rack
pieces		Return all pieces with the same part number to the rack


group		Group the hatched pieces.
fuse		Fuse the hatched pieces.
ungroup		ungroup
split piece		Split piece with seam allowance.
piece in piece		place piece inside another piece
overlap		place piece with overlap

Almost all functions can also be activated via the keyboard, see Picture 17-13.



Picture 17-13

### Flip/Rotate

If the icon  for 'function not permitted' appears at the cursor for one of the flip/rotate functions, it indicates that flip/rotate is not permitted for this piece. To permit flip/rotate

- select *properties* from the right menu,
- click the piece with the right mouse button,
- check allowance for flip/rotate on the open *Pieces* file card,
- return to the marker with the button *Close*,
- reactivate the function for flip/rotate and
- click the piece to be flipped/rotated with the right mouse button.

### Nil piece

All flip and rotate operations are reset. The piece appears in the original orientation and is unplaced (no colour fill). The fixed settings remain intact.

### ***Laying with magnet function***

The magnet function **+/-magnet** is used for aligning pieces. The surrounding rectangle of the selected piece(s) serves as the magnet. First, activate the magnet function in the menu. Then, select the piece(s) to which other pieces are to be aligned with pressed down <Ctrl> key. Now, let go of the <Ctrl> key, pick up another piece and move it to the selected piece(s). The magnetic lines appear as an echo in the vicinity of the selected piece(s). The piece catches at the magnetic lines.

### ***Automatic laying***

The automatic laying function is not an automatic nesting. The piece or the group is placed in the first permitted position in the marker (from the left). An optimisation considering perimeter or efficiency does not ensue!

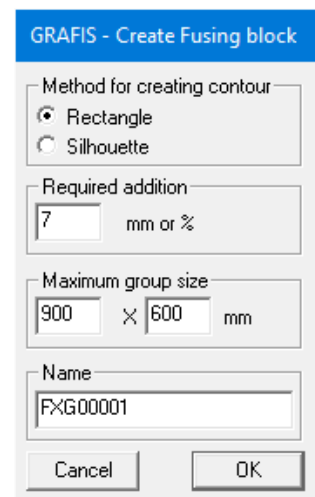
Automatic laying with the function *single* is useful for placing lots of small pieces into gaps. The piece clicked with the right mouse button is placed as far to the left as possible.

This also applies to the functions *unplaced active* (for unplaced pieces in the pre-lay area and on the material) and *unplaced* (all unplaced pieces). Further options for automatic laying can be found in the pull-down menu *Marker*.

### ***Group/fuse pieces***

Only pieces placed on the material without overlapping (with colour fill) can be grouped. To create a group, click the pieces once with the left mouse button while keeping the <Ctrl> key pressed. The pieces will be hatched. Then, activate the function **group** and click one of the hatched pieces with the right mouse button. The group can then be moved as one piece. The functions from the menu can also be applied to the group.

Only the allowances flip/rotate given to **all** pieces in the group apply. If one piece may be rotated through up to 15° and another up to 10°, the group consisting of these two pieces may be rotated through a maximum of 10°. The buffer apply to each piece of a group, individually even after grouping.



Picture 17-14

To ungroup pieces, activate the function **ungroup**. Clicking the group with the right mouse button dissolves the group. To release individual pieces from a group, the group must first be dissolved and then grouped again.

To create a fusing group, all relevant pieces are to be clicked with pressed <Ctrl> key, also. Then, activate the function **fuse** and click one of the pieces of the group with the right mouse button.

A window with the following options for the fusing group appears (Picture 17-14):

- method for **creating contour** (rectangle or silhouette),
- **addition in mm or %** around the fusing group in addition to the buffer of the fused pieces,
- **maximum size** of the fusing group, depending on the size of the fusing press and
- a **name** for the fusing group.

The fusing group is saved under the entered name as a new piece in the production style. When laying the interlining marker, the shape of the fusing group can be transferred from the main fabric marker with this piece.

### Split piece

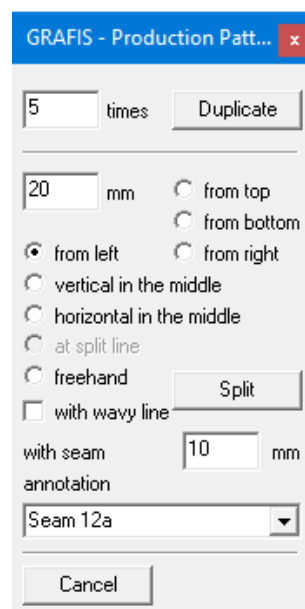
Pieces can still be split or duplicated in any number in the *Marker making* mode.

To split or duplicate a piece, the function **split piece** from the right menu must be activated first. Then, the piece is to be clicked with the right mouse button. A window with the following entry options appears (Picture 17-15):

To **duplicate**, enter the required amount in the field *times* and click on the button *Duplicate*.

To **split** a piece first, you have to select where the piece is to be split. A piece can be split

- at a distance of xx millimetres from the top/ bottom/ left/ right,
- vertical/ horizontal in the middle or
- at the split line.





Picture 17-15

Then, the **seam allowance** to be added to both edges is to be entered. Clicking the button *Split* splits the piece.



### ***Place piece inside piece***

When activating the function ***place piece inside piece***, the symbol  ***piece inside piece*** or the symbol  ***normal*** appears at the cursor during marker making. The symbol indicates the set parameters for the piece. With the parameter ***normal***, the piece is placed normally, without overlapping with other pieces. With the parameter ***piece in piece***, the piece can only be placed fully inside another already placed piece.

This laying option is useful for multi-layer cutting if for example a piece is required only once. Thus, a different smaller piece can be cut from a different layer in the same position. Pieces placed with ***piece in piece*** count as 'placed' pieces. They are filled with a background pattern on the material.

### ***Place with overlap***

Pieces can be placed with a small overlap. First, the 'normal' pieces are placed. Then, the piece to be overlapped is placed with pressed <Shift> key. Originally the piece is shown without fill colour. Activate the function ***place overlapped*** and click the piece with the right mouse button. The piece now counts as placed and is displayed with fill colour. The overlap area is marked in colour on the material. The area content of the overlap is limited to 50cm<sup>2</sup>. Therefore, it is not possible to create large overlaps.

### ***End***

With ***End*** or with the right mouse button in the menu area, the marker making function is quit after a security question. The marker user interface can be reopened at the last stage of work via ***Marker*** → ***Marker making***.

## 17.7 Additional functions in the Marker and View pull-down menus

Some of the functions from the pull-down menu *Marker* are only available when the marker is open or closed.

**Open Marker** to open a previously saved marker.

**Open Next Marker** to open the next marker. Markers are alphabetically ordered and the marker following the active marker will be opened.

**Save Marker** saves the marker, immediately under the name given.

**Save Marker As...** save the marker in a directory to be selected and under a name to be entered.

**Remove superfluous data** should be used when a marker has been layed and *Always remove superfluous data during saving* has been switched off. The perimeters of the unplaced pieces and unplaced sizes are removed from the marker. The marker file becomes smaller. *Always remove superfluous data during saving* can be switched on via *Edit* → *Settings*. The two remaining options *Save marker with preview* and *More columns in detail view* should be set only if not working within a network. Otherwise, the window for the *Open Marker* dialogue would build very slowly. The option *Save marker with preview* also requires sufficient memory.

**Marker making** opens the marker user interface.

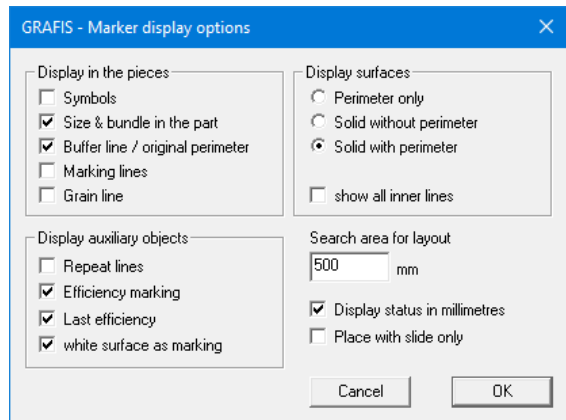
**Replace layout** transfers the layout of a previously saved marker to be selected with identical amount of pieces and bundles. A preview and/or a detail information about the marker appears via the buttons (list, details, preview).

**Delete layout data** resets all layout data. Only the marker information settings on the file cards remain existent.

**Automatic laying** (as described few pages previously)

- all pieces
- all active pieces from the pre-lay area or the material
- all pieces on the material
- all unplaced pieces\*
- all unplaced, active pieces\*

\* These functions can also be found in the right menu in the marker user interface.



Picture 17-16

**Return** (as described few pages previously)

- all pieces
- all unplaced pieces.

**View → Marker options** offer a window (Picture 17-16) with various display options in the marker and settings for handling during laying. The Search area for layout relates to the length of the red thread during laying.

## 17.8 Plot marker

Output of a marker is started via *File → Plot/Print...* The plot dialogue according to Picture 17-17 opens.

In the section *output to*, select the plotter/ printer for output. With the button *Settings* further settings are offered.

If **Plot with frame** is selected, the frame of the plot image is plotted. The frame is required, only when plotting onto a number of pages which are to be joined, subsequently frame by frame; or for output in full scale to small scale printers/plotters.

If **Stop before output** is selected, the prepared plot image is displayed. Output can still be aborted at this stage.



A **margin** can be added to the left edge. This is useful if a safety margin is required between the end of one plot and the beginning of the next for output to a number of pages, e.g. for output on a roll if the plot is not cut off at the end.

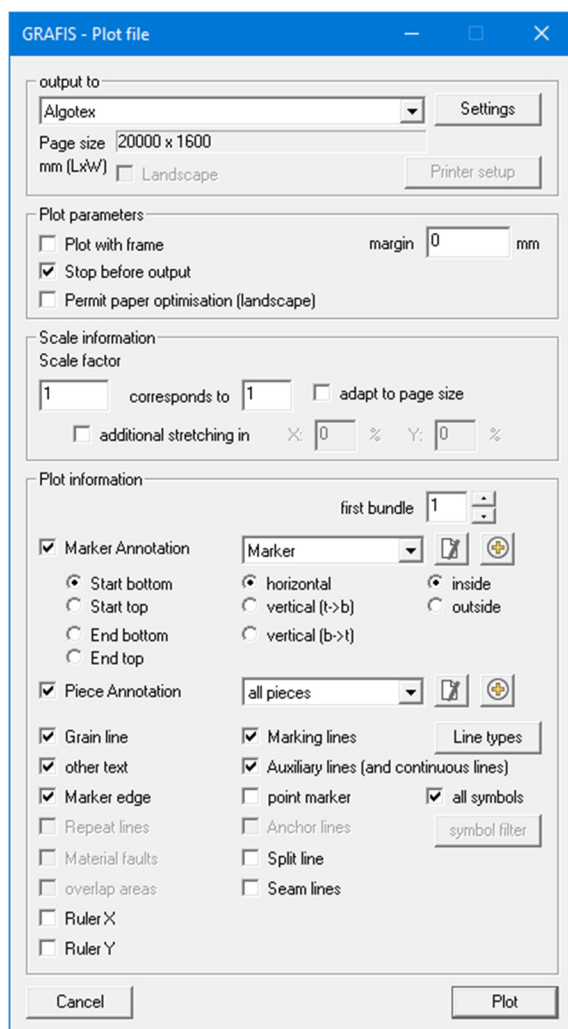
In the section *Plot information* the following can be set:

The entry fields **Scale factor** and **corresponds to 1:** are aligned. If the marker is to be plotted in original size, the **Scale factor** must be set to 1 or **corresponds to 1:** must be set to 1. For reduced output in scale 1:2 the **Scale factor** must be set to 0.5 or **corresponds to 1:** must be set to 2.

If **adapt to page size** is set the scale and page orientation are optimised by Grafis, automatically.

The digit for **first bundle** determines the number for the first bundle in this marker.

**Marker Annotation** determines if the marker is annotated and how. The position of the marker annotation, start or end, orientation and whether the annotation is to be plotted inside or outside the marker can be selected. With the button **Edit**  the content of the marker annotation can be edited. The button  creates a new file.





Picture 17-17

The marker annotation *Marker all* contains all codes which are replaced with the respective text, automatically during plot:

<b>Text for marker annotation</b>	<b>Code</b>
Date	{Sdt}
Time	{Szt}
Efficiency	{Sef}%
Usage per bundle	{Svb}m
Length	{Sln}m {Slc}cm {SIm}mm
Marker width	{Sbc}cm {Sbm}mm {Sbr}m
No. of bundles	{Sbz}
Size list	{Sgl}.....}
Production style	{Smd}
Marker (File name)	{Ssb}
Article /marker code	{Sar}
Material code	{Smk}
Material	{Smt}
Perimeter lengths	{Sum} m
Shrinkage	{Sdx} {Sdy}
Number of pieces	{Snt}
Number of placed pieces	{Sng}
<b>Text for area weights, see section 18.16, and Marker → Characteristics:</b>	
Absolute weight	{Stw} kg
Effective weight	{Sew} kg
Waste weight	{Sww} kg
Absolute weight per bundle	{Sbw} kg
Effective weight per bundle	{Seb} kg

The marker annotation is saved as a \*.stx file in the directory \Grafis\TEXTE.

**Piece Annotation** determines whether and how each piece is annotated with a standard text. The content of the piece annotation can be edited via the button  *Edit*. The button  creates a new file. The piece annotation *Pieces all* contains all codes which are replaced with the relevant content, automatically:

Text for piece annotation	Code
Date	{Sdt}
Time	{Szt}
Piece text	{Stl}
Piece text area	{Stb0106}
Size	{Sgr}
Bundle as letter	{Sbd}
Bundle as number	{Sbn}
Source style	{Sqm}
Source collection	{Sqk}
Material code	{Smk}
Material	{Smt}
Amount per style (normal+ flipped)	{Snz}
Piece category	{Skt}
Perimeter lengths	{Sum} m

The piece annotation is saved as a \*.ttx file in the directory \Grafis\TEXTE.

Additionally, you can adjust if further information, such as

- the grain line,
- other text,
- repeat lines,
- marking lines,
- auxiliary lines,
- the marker edge or
- anchor lines

is to be included in the output.

**Plot** starts the actual output. The output of cutter data is started via **File → Generate cutter data** see section 18.18.

**Content**

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Not every user will require all the options available for application during Marker making. The special application options are summed up in this chapter. The optimum way of working is often found, only in a direct dialogue between the expert in the company or the user and a Grafis expert, as company-specific requirements can often be fulfilled with a number of functions and procedures. The aim is to find the fastest and safest method of working.

## 18.1 Alterations to the production style


### Marker making - Alteration service for production styles


When opening a marker which has been created from a production style without connection parts, i.e. created directly from a style of the Grafis Pat-terntmaking, Grafis checks whether the original style has been altered and offers updating of the style, if necessary.

### Marker making - Alteration service for production styles of connection parts

When opening a marker which has been created from a production style of connection parts, Grafis checks for each connection part whether the source style is still available and the piece in the source style is unchanged. If this is not the case, the user is informed and asked whether the altered pieces are to be updated, if necessary.

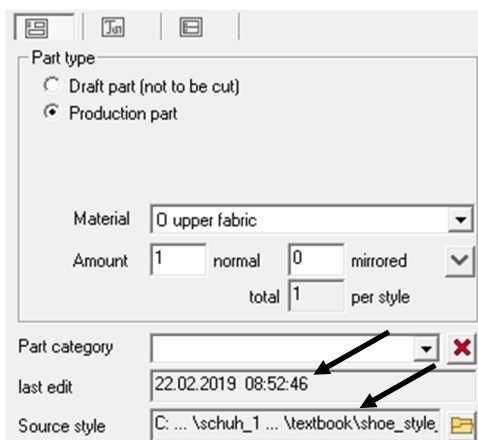
#### Alteration service for connection parts

Connection parts are parts inserted into the style in the part organisation menu via insert connection part. They are marked with the icon  in the part list (Picture 18-1).

The part parameter of the selected piece appear on the respective file card *Part parameter*. For each connection part, date/ time of last edit and the source style and path are saved (Picture 18-2). When loading a production style, marker and opening the part organisation, Grafis checks for each connection part whether the source style is still available and whether the source part is unchanged. If a question mark  appears in addition to the connection part mark, it indicates that the source style or the source part are no longer available. The exclamation


No	Part name	Obj	M	Descrip
001	O: vamp	921	O	1+0
002	O: quarter outer	471	O	1+0
003	O: quarter inner	971	O	1+0
004	F: vamp	921	F	1+0
005	F: quarter outer	491	F	1+0
006	F: quarter inner	501	F	1+0
007	F: counter	121	F	1+0
008	B: vamp	31	B	1+0
009	B: quarter outer	51	B	1+0
010	B: quarter inner	51	B	1+0
011	NN			


Picture 18-1







Picture 18-2



mark  indicates that the source part has been altered. A marker can continue to be layed with the already loaded pieces and sizes, irrespective of this. This also applies if the construction style is no longer available

A new connection can be set by clicking the button  on the right of the path to the source style in the *part parameter* window. Select the new source style and the new connection part.

### Update single part/ all parts (for connection parts, only)

To update single connection parts, open the *Part Organisation* via: *part rack* → button  or *Part Organisation* from the pull-down menu *Production Style*, select the respective part and click on *update connection* . With the button  the part parameters are also updated. The text box is always updated. The function *update connection* should be applied, especially if only individual pieces of the part organisation are marked with  or if some parts are to remain in their unchanged state.

Updating all connection parts of the production style is started from the pull-down menu *Production Style* with *Update All Parts* or *Update All Parts (with part information)*.

After having updated the pieces, the already placed marker remains existent. If overlapping or gaps occur, the marker must be reprocessed.

**NB: The alteration service can work only if the source style and the complete path to the source style (drive, collection, sub-collection) have not been renamed, moved or deleted.**

### Add sizes

Before adding one or more sizes, check in Grafis Patternmaking that the parts have been graded in the respective sizes in the source style. If not, grade all parts in all sizes of the marker and re-save the construction style under the same name. In Grafis Marker making, click on *Size Table* in the pull-down menu *Production Style* and add the missing sizes. However, the size table can only be altered without restriction if no marker information has been entered and no marker is available. The perimeters of the added sizes are only transferred after having updated the pieces with *Production Style* → *Update All Parts*.

### Add pieces

Individual pieces can be added in *Production Style* → *Part Organisation* as follows. First, a new empty part is created with *open* or *insert*. The piece is inserted with *insert connection part*, provided all required sizes are available.

## Replace style

*Production Style* → *Replace Style* replaces the complete production style with a new production style to be selected. The part parameter and the content of the text box are replaced, also. The marker information and the layout data of the marker remain intact. Prerequisite for replacing a style is that all required sizes are available and the assignment of the pieces is identical.

## Add style

With *Production Style* → *Add Style* the part list is extended by the parts of a complete style. All parts of the selected style are added to the end of the part list. Potentially new loaded sizes are added to the size list of the style. Alternatively to *Add style* you can use the options of *Production style* → *Organise styles*, see section 18.2.

## 18.2 Organise styles

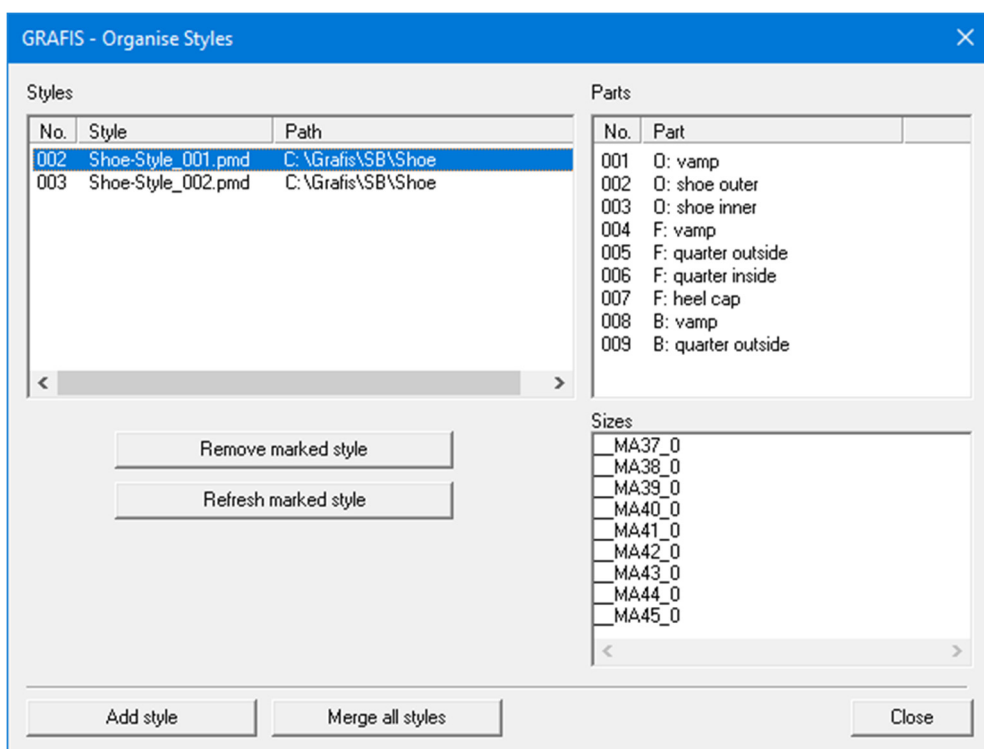
A marker can be compiled from different production styles with the *Organise styles* dialogue from the *Production style* pull-down menu. As opposed to *Insert connection* (via *part organisation* → *insert connection part*) all sizes of the loaded styles are organised separately. The sizes appear organised according to the loaded style on the *Sizes* file card. The amount of sizes to be layed is stated per style even if the size areas are identical in parts.

The compilation in Picture 18-3 consists of styles 'Style\_001' with sizes \_MA37\_0 to \_MA45\_0 and 'Style\_002' with sizes \_MA36\_0 to \_MA44\_0. Although sizes \_MA37\_0 to \_MA44\_0 appear in both styles, they are organised separately. Therefore, the following can be determined:

1x size \_MA42\_0 from Style\_001 and 1x size \_MA42\_0 from Style\_002

2x size \_MA44\_0 from Style\_001 and 1x size \_MA44\_0 from Style\_002.

Die zugehörige Ansicht im Legemodus ist in Picture 18-4 dargestellt.



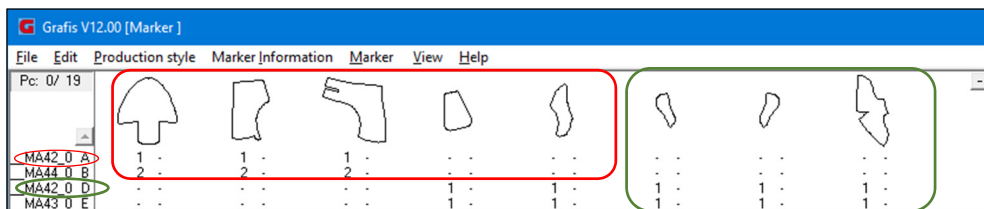
Picture 18-3

As a result, identical sizes from different styles are given different bundle names. When generating style combinations via *Insert connection part* only the following would be possible:

1x size \_MA42\_0 from Style\_001 and Style\_002

2x size \_MA44\_0 from Style\_001 and Style\_002

The button *Merge all styles* combines all sizes and creates the same status as with *Insert connection part*.



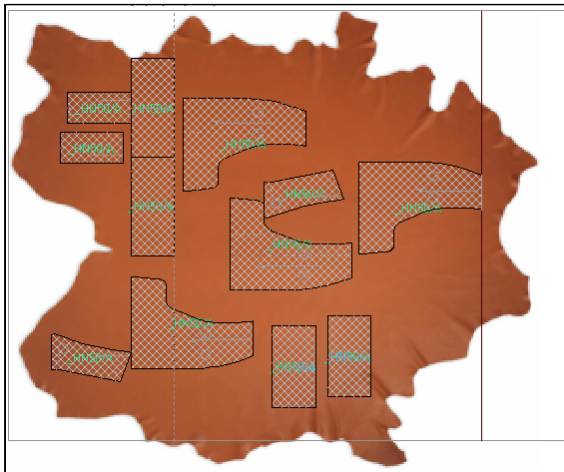
Picture 18-4

### 18.3 Pixel images in Grafis Markermaking

To enable loading of pixel images into Grafis, the option *Work with pixel images* must be activated in the *Grafis Setup* Picture 18-5. Pixel images of bmp, gif, jpg, tif and png formats can be loaded into Grafis. Pixel images can be used in Grafis Marker making as

- Material background without transparency
- Material background with transparency
- Fill/ Brush
- Symbol/ Logo

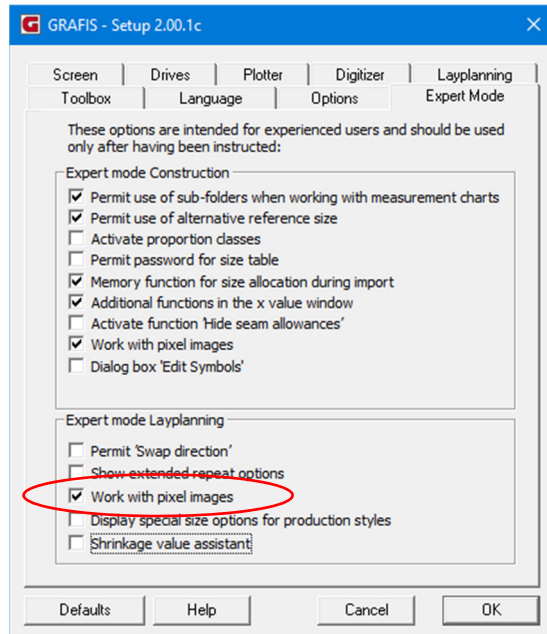
In Grafis Marker making, pixel images have many applications. Images of patterned fabrics can be positioned in the background of the material to enable material matching of pattern pieces.



Picture 18-6

Outline images of leather skins (Picture 18-6) or particularly shaped material as material back-ground facilitate the appropriate positioning of pattern pieces. Digital print adapted to pattern pieces can be pre-pared and correct positioning of logos is easily implemented.

*Material background without transparency* is useful for matching patterned fabric with the marker and for positioning pattern pieces on particular

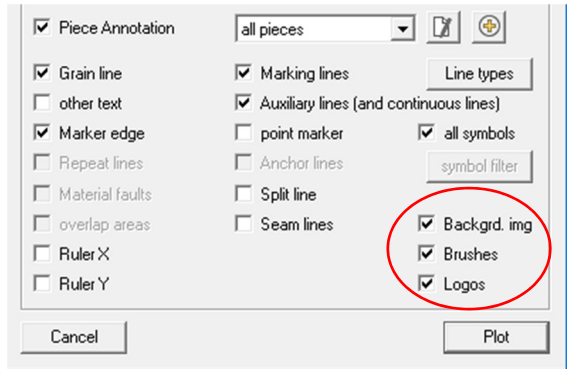


Picture 18-5

be moved within the pattern piece. With *Symbol/ logo* pixel logos are output at various positions previously prepared in Grafis Patternmaking.

### Material background *without transparency*

One or more images can be loaded into a marker as background without transparency. They appear on the material in the position assigned as offset point in the *Manage pixel image* menu. These can be marker templates or images of cutting material such as truck tarpaulin or leather skins.



Picture 18-7

During output of the marker, the switch *Material background* determines whether the background is printed or not, see Picture 18-7.

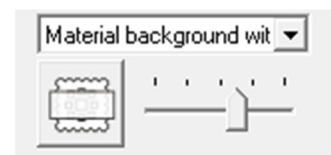
### Material background *without transparency with repeat*

The pixel image type *Material background without transparency* offers the additional switch *repeat x* and *repeat y*. This switch activates the repeat of the image at the repeat lines of the marker. NB: the image is not repeated on the basis of its own size but at the repeat lines of the marker. Prerequisite is a set repeat in the marker and the option *repeat x* and/ or *repeat y* is activated for the background material.



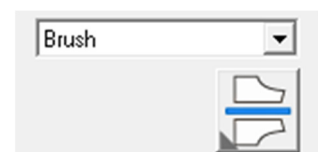
### Material background *with transparency*

The pixel image type *Material background with transparency* offers an additional switch on the background and a slider for the *gamma value*. The switch *on the background* determines whether the pixel image appears on the pattern pieces or only on the background. The *gamma value* determines the transparency in the area of the pattern pieces.



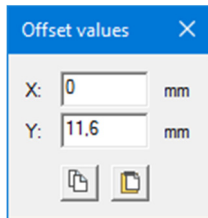
### Fill/Brush

For the pixel image type *Fill/ brush* an additional function is available in the list of images [...] for *display images in piece*. With this function, one or more pattern pieces can be selected to be filled with this fill/ brush in the marker.







A further button in the menu sets whether the fill is to be mirrored in mirrored pattern pieces.

The offset for the fill is set to the bottom left corner of the pattern pieces as standard.



Picture 18-8

In the *Marker making* mode, the offset for the fill can be moved interactively or via value entry for each pattern piece separately. Switch to *Marker making* mode and open *Marker information* → *Move fill*. The *Offset value* dialogue opens, see Picture 18-8. Now click on the fill. The offset values can be altered by dragging the fill with the mouse or by entering new offset values. With 

and  the offset values can be transferred from one fill to another fill. Click the source fill and then on the button  in the dialogue. Then, click on the target fill and on  in the dialogue. During output of the marker, the switch *fill /brush* determines whether the fill is printed or not, see Picture 18-7.

### Symbol/Logo

The logo position and their direction and logo IDs must already be constructed or assigned with the *text label* in Grafis Patternmaking. In Grafis Marker making, pattern pieces cannot be assigned new logo positions or new logo IDs. During transfer of data from Grafis Patternmaking to Grafis Marker making, pixel images are not transferred. The pixel images for logos must be loaded in Grafis Marker making in the *Manage pixel images* menu and assigned an ID.

### Photo of a leather skin as background image





Photos or scans can be loaded into Grafis Marker making as background images. A leather skin can be photographed or scanned and used as a background image to place the pattern pieces. Photos must be corrected, in particular, a lense correction of the camera optical system must ensue and the perspective has to be calculated. Both issues can be adressed via the additional software ‚ProfileFitPattern photo‘ available through Grafis. Faults in the material can be marked for consideration during marker making, see section 18.7.


Before loading the background image, the layplan is prepared as usual. The material width should correspond with the widest part of the leather skin. Before laying out the pattern pieces, the desired image(s) is/are loaded via *Maker Information* → *Manage pixel images*. The first image is automatically placed at the zero point of the marker, located at the lower left corner of the material. Subsequent images automatically follow on from the previous image.


The functions of the *Manage pixel images* menu have previously been explained in Section 2.2. They are identical to those in Grafis Patternmaking.

The loaded images can be scaled and/or moved on the screen via *Marker informationen* → *Manage pixel images*, see Pictures 18-9 and 18-10.

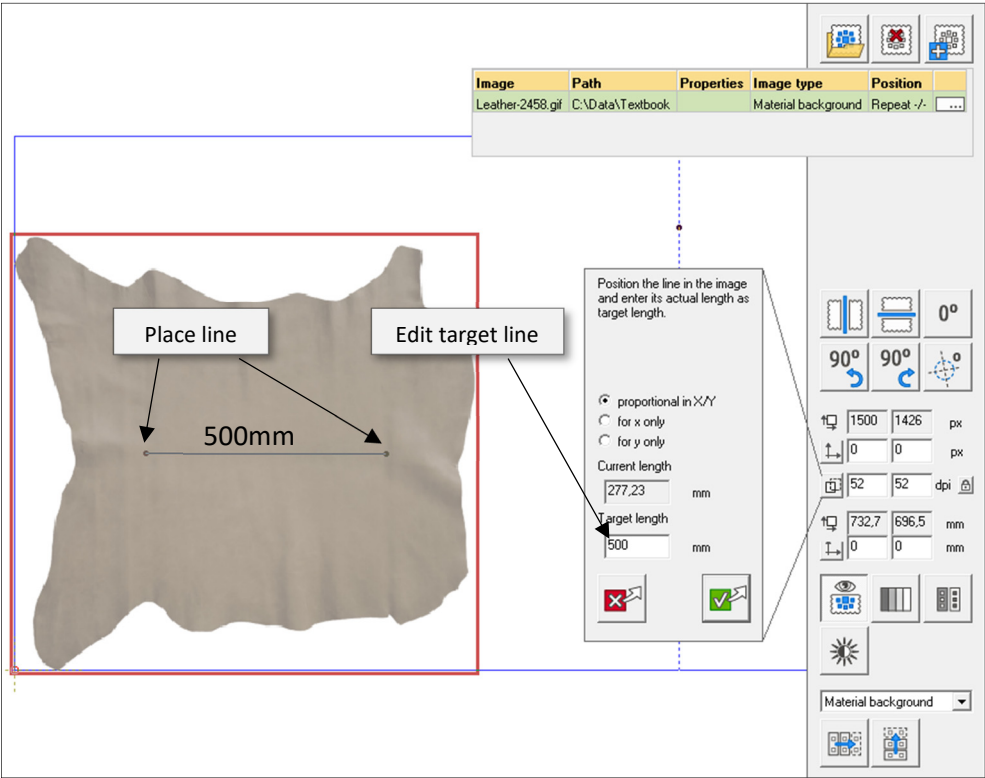
### Scaling a background image

For **size/ scale** in Grafis, the dpi value  200  200 dpi  in the third row is critical. It determines the calculation from pixel to inches and thus, indirectly into mm. If the dpi value of the pixel image is not known, it can be established in its own dialogue via the button  to the left of the dpi value, see Picture 2-4.

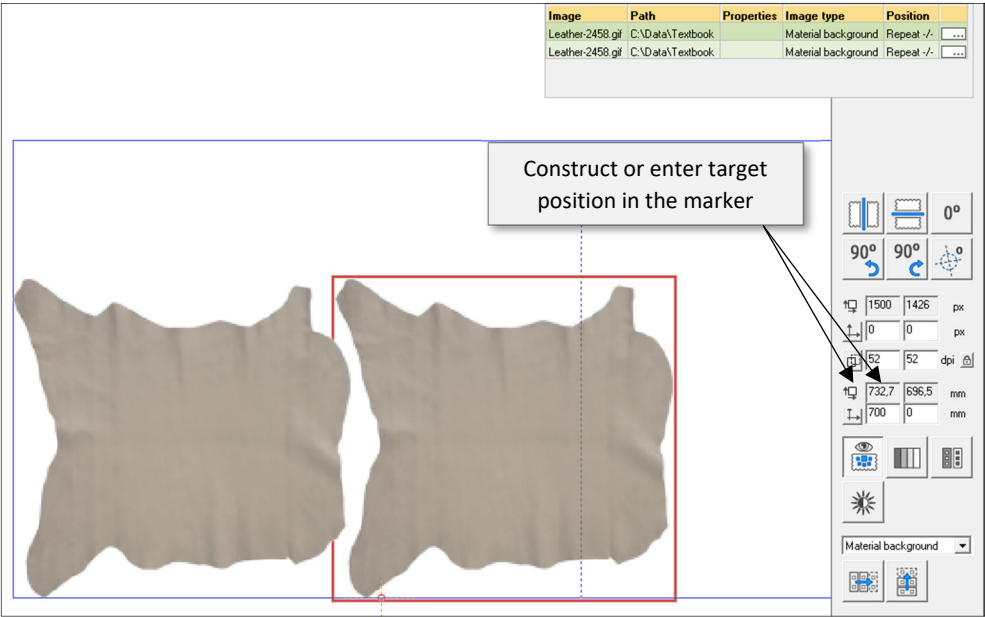
In this dialogue, the start and end point of a line is placed in the pixel image and the known target length of this line is entered. You can select if the scale is to be applied proportionally in x and y direction or in one direction only. If  is active in the menu, the scaling is carried out proportionally.

 accepts the scaling. The dpi value results from these data.

The size of image in Grafis in mm, shown in the fourth row, results from the dpi value.




Picture 18-9

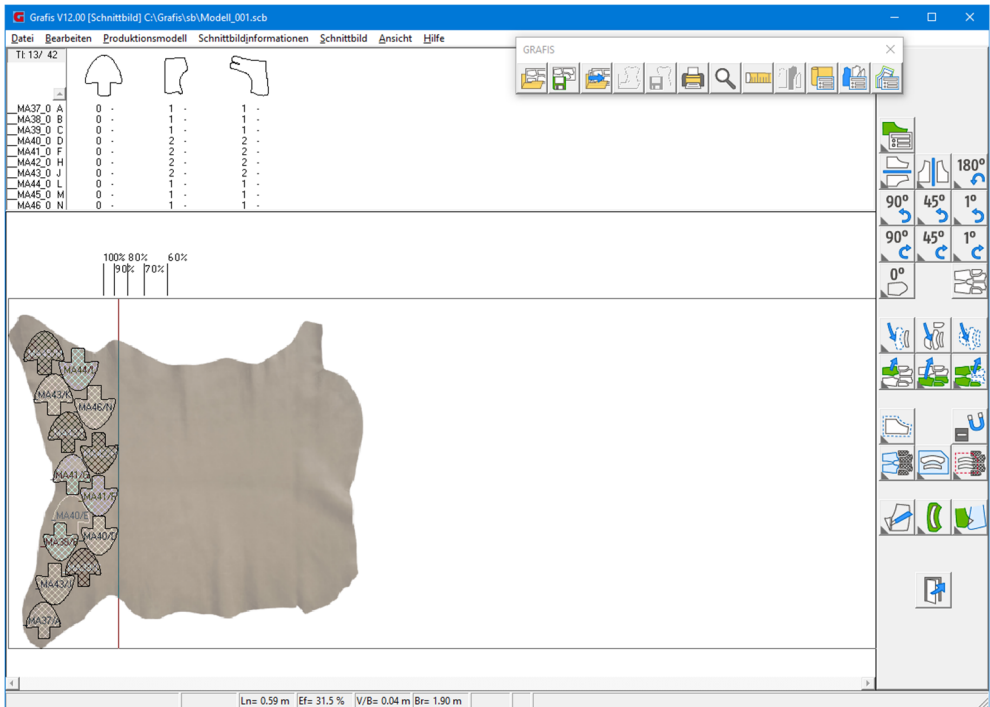


Picture 18-10



### Move the background image

The **target position of the offset point** can be determined through value entry in the fifth row or through clicking  and constructing the target point in Grafis (Picture 18-10).



Picture 18-11

Now, the pattern pieces can be placed onto the image, Picture 18-11.

## 18.4 Repeat

This function applies to clothing construction and is therefore explained only for sake of completeness.

### Step-by-step guide

- ⇒ If required: construction of additional points and lines as auxiliary objects for defining match relations
- ⇒ Compile production style
- ⇒ Set style specific match relations between pieces, independent of the fabric
- ⇒ If required: set a match point on one piece of the match group
- ⇒ If required: set match relations for left and right piece for one piece of the match group
- ⇒ Save production style for further markers
- ⇒ Enter the actual repeat information for a marker on the *Material* card

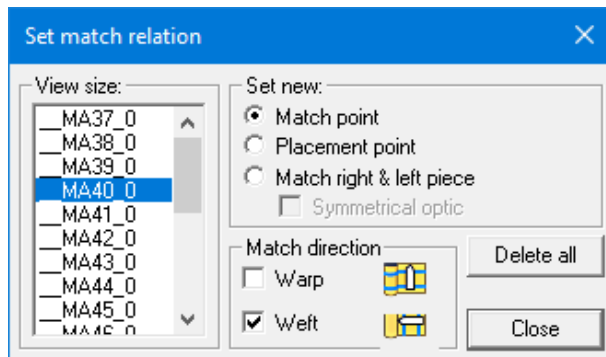
⇒ Layout the pieces.

### Set points/lines in the construction style

If a style is to be used for layout with fabric repeat (warp and/or weft), suitable points and lines must be constructed in the relevant pieces within the style. The actual match relations are set in the marker making software and attached to points or the beginning/ end of lines. Attaching to symbols is also possible. In this case, the base point of the symbol applies.

### The Set match relation dialogue

The match relations are set in the prepared production style with the *Production style* → *Matching...* menu. They are initially assigned specific to the style and independent from the fabric. Clicking *Production style* → *Matching...* opens the dialogue according to Picture 18-12.



Picture 18-12

The pieces can be **moved freely** by dragging with pressed down left mouse button and should be suitably positioned first. All pieces with set match relation are basically **visible** or can be made visible with <F6>. Further pieces without match relation appear once they have been made visible in part organisation, also in the *Set match relation* dialogue. If required, press <F6>.

The **View size** area allows selection of the currently displayed size. Only one size is visible at one time. The match relations apply equally for all other sizes. Check whether the match relations have been set correctly by displaying other sizes.

The **Delete all** button deletes all available match relations.

### Set match relations between different pieces

**'Match point' creates a connection between different pieces.** This match relation can apply to match direction warp (repeat lines in grain direction) and/or weft (repeat lines 90 degrees to the grain). First, click a point at the beginning/ end of a line and then, click the corresponding point in the other piece.

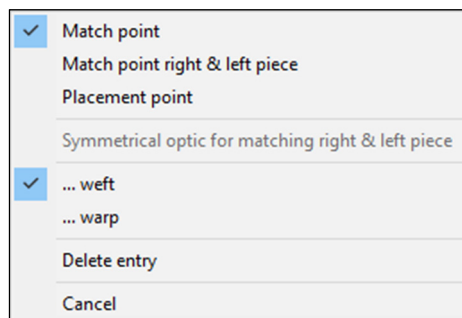
**When setting match relations, all possible style specific relations should be set in warp and weft direction.** *If a specific fabric has only one repeat, only this repeat*

***will be utilised during marker making. If a fabric has no repeat, the style can be laid out without repeat.***

### Display and edit set match relations, context menu

Existing match relations are indicated with a green line. Check whether the beginning and end points of the match relation have been suitably selected by displaying other sizes with *View size* and if necessary, move the pieces freely with pressed left mouse button.

When clicking on a point of the match relation with the right mouse button a context menu according to Picture 18-13 appears.



Picture 18-13

The first section and the line *Symmetrical optic...* indicate the type of point. These settings cannot be altered here.

The lines *...warp* and *...weft* indicate the match direction(s) set for this match relation. The match directions can be altered in the context menu directly by clicking.


Clicking *Delete entry* deletes the match relation.

***To close the context menu click on 'Cancel'. Clicking outside the context menu sets a new relation!***

In the *Set match relation...* dialogue the following symbols apply:

Marking on the piece	Significance
	match relation with the two match points
	placement point
	match point right – left piece
Cursor	Significance
	relation applies to warp and weft
	relation applies to warp

---

	relation applies to weft
---	--------------------------

**Match point right – left piece**

The match relations with *Match point* apply to both mirrored and unmirrored pieces in the same way. The mirrored, matched pieces form one group and the unmirrored, matched pieces form another group. ***With ‘match right and left piece’ a piece is matched with the mirrored piece.***

When setting a *Match point right – left piece* you can select between symmetrical or continuous optic. Symmetrical optic is used for most styles.

The *Match point right – left piece* is relevant for both warp and weft direction. In warp direction, the pieces are matched symmetrically or continuously to the warp pattern. If the weft direction is also active, the mirrored pieces are also matched to one another in the weft.

**Placement point**

***‘Placement point’ creates a direct link between the piece and the fabric.*** It is required when a fabric pattern is to be position in a particular place of the piece such as for appliqué or distinctive stripes. The placement point is mirrored with the mirrored piece. It will point to the same place in the repeat.

***Either one ‘match point right – left piece’ or one placement point can be set per group.***

### Summary and tips for setting match relations

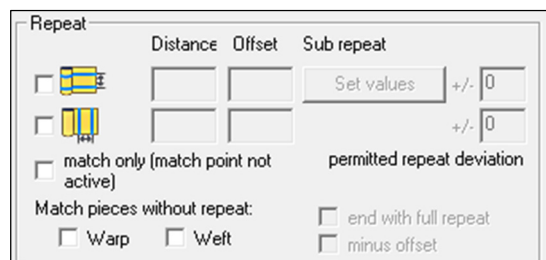
1. Match relations should be set style specifically and independent from the fabric considering all possible match directions in warp and weft.
2. First, set the match points. All pieces, which are connected through match points, form a match group. The piece placed first determines the position of the other pieces in the match group.
3. Either one placement point or one match point right – left piece can be set per match group.
4. Use the sew line for setting the match relations rather than the cut line as the repeat applies to the sewn piece and the seam allowance could vary in width.
5. Construct sufficient auxiliary lines and points for setting match relations before starting marker making. Match relations can also be attached to dashed lines and symbols. When attaching to symbols, the base point of the symbol is utilised automatically.
6. ATTENTION! Matching right - left (unmirrored – mirrored) pieces is often forgotten!
7. Check whether the match relations have been set correctly by displaying other sizes.

### Repeat settings on the *Material* card

In the file card *Material* under *Marker information*, it is determined whether the concrete material has a repeat in *warp* (repeat lines in direction grain line) or/and in *weft* (repeat lines vertical to the grain). The fields for *Distance* and *Offset* of the repeat are only active when the check mark for *warp* and/or *weft* has been set. *Distance* gives the distance between the repeat lines. These values can be entered with decimal places. This enables laying on pin-stripe repeats. *Offset* shows the distance of the first repeat line from the edge of the material (from the left or bottom).

***The match relations must be set for all pieces to be placed in a repeat!***

In the Grafis Setup, *Further repeat options* can be enabled, see



Picture 18-14

Picture 18- 18-14. ***Sub repeats*** displays additional auxiliary lines which have no further function and which cannot be placed against. Use the sub repeat as orientation for placing the first piece.

The *permitted repeat deviation* is the tolerance about which a piece is permitted to be moved out-side the repeat. The option *end with full repeat* en-sures that the marker always ends with a multiple of the repeat. The switch *minus offset* forms part of this option. If this switch is set, the marker ends exactly with the repeat line. During marker making, the **repeat lines** are only displayed if they have been switched on under *Marker* → *Options*. Output of repeat lines for plot/ print is set in the *Plot marker* dialogue (Picture 17 16). For plot output, the repeat lines can be set to appear as short lines, only at the edge of the material with *Edit* → *Settings*. The switch **match only (placement point not active)** means that the placement points are not considered for the layout. This switch is useful for example for a very small check while the match relations have been prepared for a distinctive fabric pattern.

With **Match pieces without repeat** matched pieces are matched at the same height. This option is required when the fabric has no obvious measurable pattern but for example a colour gradation or irregular repeat caused by distortion of the material.

**Attention! When rotating or mirroring in Marker making mode, match points are also rotated and mirrored!**

## 18.5 Shrinkage

This function is also mainly relevant for the clothing industry.

### Shrinkage values (global)

Many materials shrink after being steamed or washed. As the patterns are developed for the finished garment, the shrinkage of the material must be considered before cutting.

Enter the shrinkage values in warp or weft in the marker information on the *Material* file card in the *Shrinkage values* area after having set the respective check mark. Negative values are permitted, also if the material is stretched during processing. The pieces are placed in stretched/ shrunk form. Changing the shrinkage values for already placed pieces results in overlapping/ gaps. Placed pieces have to be repositioned.

### Shrinkage values for the piece

Also during fusing with interlining the material may undergo changes. As not all pieces are fused, shrinkage must also be adjustable for individual pieces.

If the values for shrinkage have been set on the *Material* file card, one of the following piece-specific options can be selected on the *Pieces* file card:

- for piece and buffer

The shrinkage values relate to the piece perimeter and the buffer line.

- for buffer line, only  
The shrinkage values apply to the buffer line, only. In this case, the original perimeter remains un-changed.
- do not apply  
The shrinkage values are not applied to this piece.

### Shrinkage value assistant

Via the menu option *Marker* → *Shrinkage value assistant*, an already completed marker can be increased as a whole by a given percentage value. ***This is only useful if the material width is big enough or if there is a width reserve.*** The assistant (Picture 18-15) carries out the following steps:

- Alteration of shrinkage values on the *Material* file card
- Increase of marker width by the % value in weft direction
- Moving all pieces according to the shrinkage values



Picture 18-15

Small overlaps of individual pieces may occur which usually can be fixed rapidly. As opposed to the percentage increase of a marker during plot output with *additional stretching*, in this case, all annotation text is updated. This includes length and width of the marker as well as perimeter lengths and area contents of the pieces.

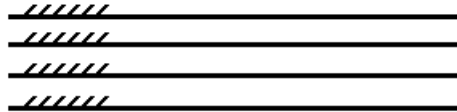
## 18.6 Spreading type

In the file card *Material* in section Spreading type, the spread type for the material and the bundle direction is selected.

### Spreading types

The following **spreading types** are available for the material:

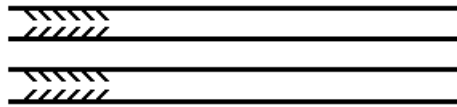
- **right-left** or **'open'** is used for single-ply and multiple-ply cutting. This is the most common spread type (Picture 18-16). The individual layers of



Picture 18-16

fabric lie in the same direction with the same side facing up-wards. Automatic spreaders lay one ply, cut off at the end, return to the beginning and lay the next ply in the same way on top. Patterns or a possible pile face upwards in all layers.

- **right-right** is used for multiple-ply cutting (Picture 18-17). The individual layers of fabric all face the same direction but with the other side upwards.

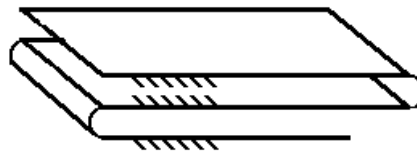


Picture 18-17

Automatic spreaders lay one ply, cut off at the end, return to the beginning and lay the next ply turned over (with the right side facing down). Patterns or possible pile face alternatively up or down (see sketch).

The pieces are placed unflipped as the flipped piece is taken from the turned ply.

With the spreading type right-right, markers can be created for **zig-zag lays**, also (Picture 18-18). As opposed to the spreading type right-right, the ply is not cut off at the end. A right-right layer is followed by a left-left layer. Zig-zag laying is unsuitable for materials with a sheen or pile.



Picture 18-18

- **Folded laying** up means a material of 1.50m width is folded along its length (Picture 18-19). The marker is only 0.75m wide and has a fold. Symmetrical



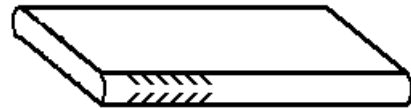
Picture 18-19



pieces can be placed at the fold. Symmetrical pieces must be marked with a check mark on the Pieces file card in the Marker information. This check mark can only be set for pieces which are not flipped.

In Grafis, the material appears unfolded but the pieces can only be placed on the lower half of the material. Flipped pieces automatically appear in the upper half of the material. Symmetrical pieces have to be dragged to the fold, only. They will then appear placed on the fold.

- **Tubular fabric** is material in tubular form of half width (Picture 18-20). As opposed to the spreading type *folded*, the marker has two folds. Everything else is identical.



Picture 18-20

### Bundle direction

For each of the spreading types mentioned, three bundle directions can be selected. The individual sizes, which may appear more than once, are arranged in bundles. All pattern pieces of one garment are given one bundle letter (Picture 18-21). The options for the bundle direction relate to the question 'Where does the hem of the bundle lie?'.

<- A	MA39_0
-> B	MA40_0
<- C	MA40_0
-> D	MA41_0
<- E	MA41_0

Picture 18-21

- **different bundles - different direction (two-way)** is used for material without sheen/pile, without check and without a directional pattern. Bundle A has the hem on the left, bundle B on the right, bundle C has the hem on the left and so on.
- **all bundles – same direction (one-way)** is used for directional patterns (e.g. a face) which cannot be rotated.
- **same sizes – same direction** is used for material with sheen/pile but without directional pattern. This option ensures that pieces, accidentally picked from another bundle of the same size still have identical sheen direction. All bundles of size 38 would have the hem on the left, for example; all sizes 40 would have the hem on the right etc.
- **same sizes – same direction (compensational)** As opposed to the previous option, here, the bundle direction is not categorically alternated from size to size. An internal logic ensures that the number of bundles in both lay directions is largely balanced. This option is particularly useful if the quantity per size varies significantly

If the expert mode *Swap bundle direction enabled* is activated in the Grafis setup, an additional button *Swap direction* is visible on the *Sizes* file card. With this button, the bundle direction can be specifically set for each bundle. Select the bundle and switch the bundle direction with *Swap direction*. If the bundle direction is altered manually, none of the available options for bundle direction will be activated on the *Material* file card.

### 18.7 Fault areas

For faulty material, up to three (also regular) fault areas can be defined and considered during marker making. The respective settings are made in the marker information on the *Material* file card. After having checked *Consider material faults*, the button *Set values* is active and can be clicked. The following is to be entered in the next window for each fault area (Picture 18-22):

- at warp (y) start from lower edge
- width (dy) width of fault area
- at weft (x) start from left edge
- length (dx) length of fault area
- repeat (in x) distance between the starting points of regular fault areas

	No.1	No.2	No.3	
at weft (y)	100			mm
width (dy)	10			mm
at warp (x)		50		mm
Length (dx)		5		mm
Repeat (in x)				mm

☐ Show fault areas only (placing allowed)

Selvege  
Width (dy) top 5 mm  
bottom 10 mm

Close

Picture 18-22

The entered fault areas are indicated. With the check mark *Show fault areas only* determines whether pieces can be placed in the fault areas (check mark set) or whether they are excluded from marker making (check mark not set).

The width of the **Selvege** can also be entered in this window. It appears as a dashed line in the marker and serves as an additional anchor line.

The settings for fault areas and selvedge remain ineffective, if the check mark for *Consider material faults* on the *Material* file card is not set.

### 18.8 Categories

With categories, piece-specific layout parameters, especially buffer can be categorised. Prerequisite for the use of categories is the existence of company-specific rules for buffers, e.g. in particular for sleeves, collars, cuffs, loops etc. For each category, the parameter on the *Pieces* file card of the marker information can be set. These are

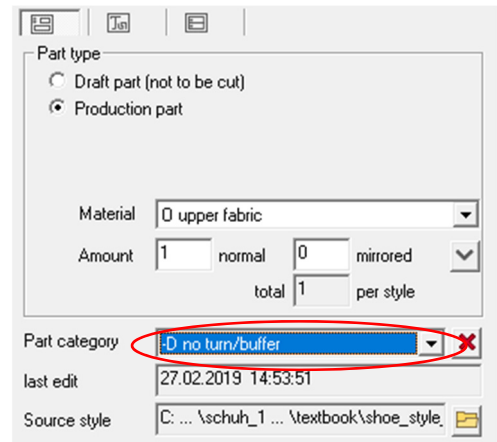
- fixed settings: rotation angle, flip about x, flip about y

- allowances during marker making: tolerance angle, flip about x or y, rotate through 180°/±90°/±45°
- buffer at top/ bottom/ right/ left
- application of the buffer: as invisible safety margin, buffer line as cut line or reduce piece by the buffer amount
- apply shrinkage values of the material to the piece and the material, to the buffer, only or not at all

### Set up categories

The category names are saved as measure group 999 in the file MASSCODE.DAT (directory \Grafis). Open this file with an editor, e.g. Notepad. First, the name for group '999.000.049' must be assigned. The name of the category can contain letters and numbers. Below, an extract from a MASSCODE.DAT as example:

```
!----- Group 999
999.000.044 Category
999.001.044 -- none/none
999.002.044 -D no turn/buffer
999.003.044 -B no turn/block
999.004.044 -S no turn/reduction
999.005.044 ID turn 180°/distance
999.006.044 IB turn 180°/block
999.007.044 IS turn 180°/reduction
999.008.044 XD turn 90°/distance
999.009.044 XB turn 90°/block
999.010.044 XS turn 90°/reduction
999.011.044 OD turn by 45°/distance
999.012.044 OB turn by 45°/block
999.013.044 OS turn 45°/reduction
999.014.044 I- turn 180°/none
999.015.044 X- turn 90°/none
999.016.044 O- turn by 45°/none
```



Picture 18-23

After having saved the MassCode.dat, the categories can be assigned to pieces. Assigning ensues in the part organisation in the piece parameter window (Picture 18-23), in construction style or in the production style.

### Assign categories with piece-specific parameters

The procedure for assigning categories, for in Grafis Patternmaking:

⇒ Open new style.

⇒ Construct a rectangle of any length in part 001.

⇒

- ⇒ Duplicate part 001 until the part number is identical with the required number of categories.
- ⇒ Set the attribute *Production piece* for each part in the part organisation and assign consecutive piece categories (part 001 becomes the first category, part 002 the second category etc.).
- ⇒ Save the style.

Now, the steps in Grafis Marker follow:

- ⇒ Open the new style.
- ⇒ *Marker Information* → *Pieces*
- ⇒ Set all parameters to apply to the first category for part 001.  
For part 002, set all parameters to apply to the second category etc. until the last part.
- ⇒ Button *Next*, button *Close*
- ⇒ Save this link between piece-specific parameters and the categories as a \*.sbi file with *Marker Information* → *Save As ....*
- ⇒ If the parameters are also dependant on the material type, a number of these files can be set up.

In the \*.sbi files, not all categories must be assigned. Later, the pieces are assigned with only the categories which have been set up in the \*.sbi file. A \*.sbi file is basically an empty marker with an empty part list, similar to a format template for word-processing

### Load piece-specific parameter from a \*.sbi file

To use pre-set marker information/ categories, the file card *Pieces* is to be opened for a loaded production style. The parameters can be transferred from the \*.sbi file in two different variations:

- A) All pieces of a production style which are assigned a category, are assigned with the parameters in the Buffer section, only (buffer at ri/le/top/bottom with two options). In this case, select the \*.sbi file in the list or with the button *from file* directly below **Pre-set buffer**.
- B) All pieces of a production style which are assigned with a category, are assigned with all parameters in the sections Buffer, Fixed settings, Allowance and Shrinkage values for the piece. In this case, select the \*.sbi file in the list or with the button *from file* directly below **Pre-set (all)**.

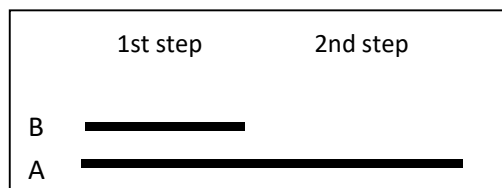
**Edit \*.sbi file**

To edit a \*.sbi file, load the file via *Marker Information* → *Open* and save after editing with *Marker Information* → *Save*. Alterations only become effective after re-loading the piece-specific parameter of the edited \*.sbi file.

**18.9 Step lay (free mode)**

The marker type *Step lay* is selected under *Marker Information* → *Sizes*.

In a step lay with two materials (Picture 18-24), the following sizes are to be layed:

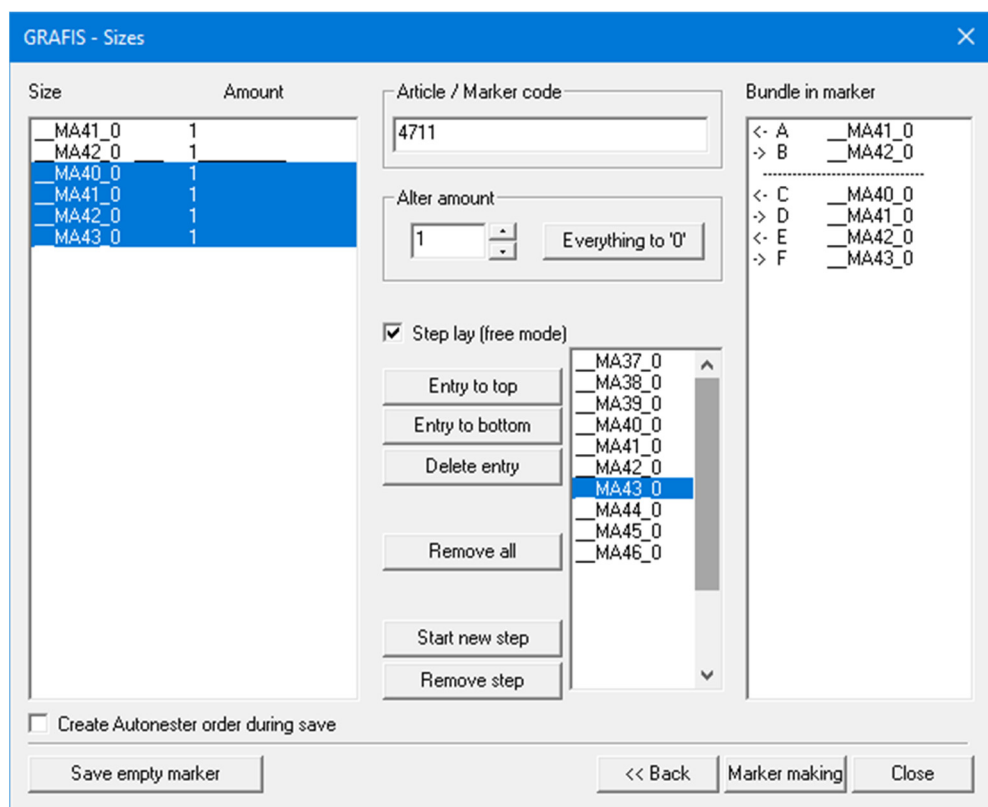


Picture 18-24

	Material A	Material B
size _MA40_0	1x	
size _MA41_0	2x	1x
size _MA42_0	2x	1x
size _MA43_0	1x	

The distribution of the sizes onto the different steps is to be optimised by the user. The example plan can be realised as follows:




	1st step	2nd step
size _MA40_0		1x
size _MA41_0	1x	1x
size _MA42_0	1x	1x
size _MA43_0		1x



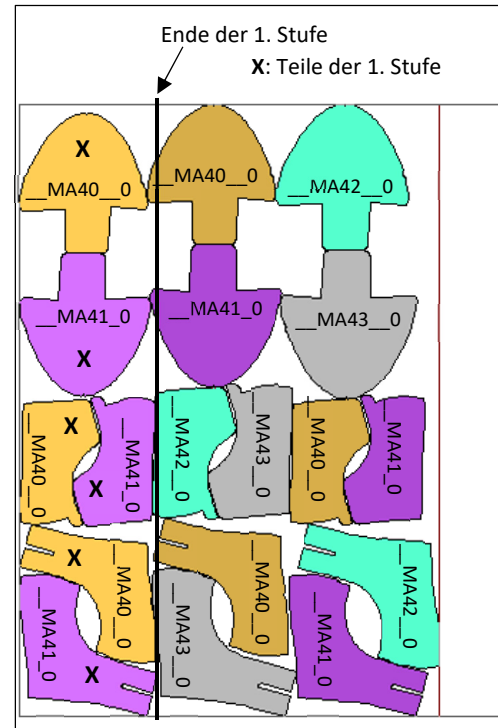
Picture 18-25

After having checked *Step lay (free mode)* on the *Sizes* file card, additional buttons appear (Picture 18-25).

After *Remove all*, first transfer the sizes for the first step and then, the sizes for the second step with double-click from the size list in the middle of the window. Then, select the first size of the second step (here: `_MA40_0`) and click on *Start new step*. After entry of the re-quired amount, the bundles appear on the right. A continuous line in the left and right window marks the start of the new step. All pieces of bundles A and B belong to the first step, all other pieces to the second. During marker making, the sizes are offered, separately for the different steps in the rack, see Picture 18-26. The end of the first step is marked, automatically in the marker. It is situated at the right edge of the piece furthestmost to the right of the first step (Picture 18-27). The marker can be interlocked. The end of the step(s) is marked at the edge when plot-ting.

Tl: 0/ 18				
MA40_0	A	1 -	1 -	1 -
MA41_0	B	1 -	1 -	1 -
MA40_0	C	1 -	1 -	1 -
MA41_0	D	1 -	1 -	1 -
MA42_0	E	1 -	1 -	1 -
MA43_0	F	1 -	1 -	1 -

Picture 18-26



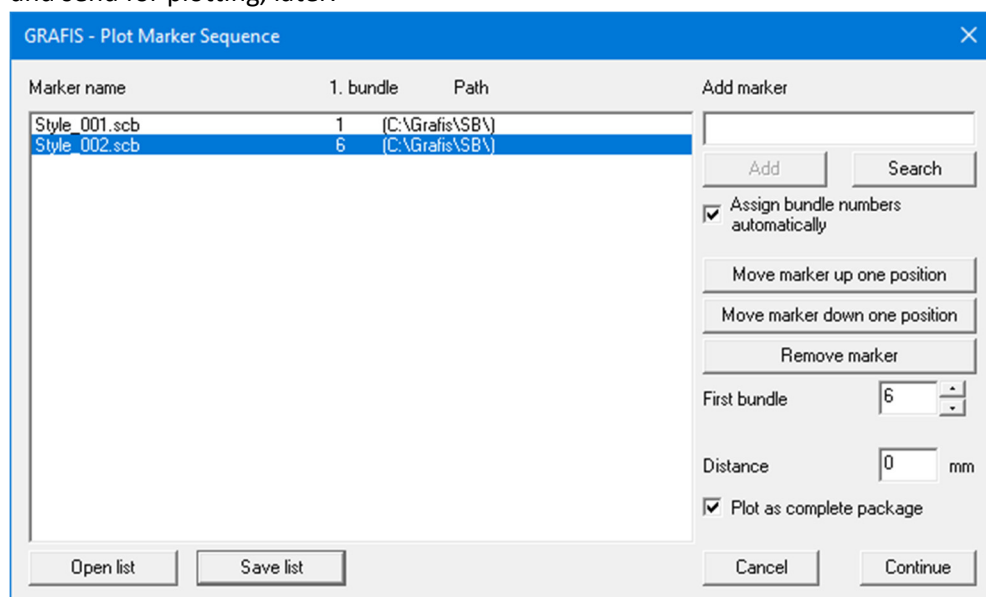
Picture 18-27

### 18.10 Marker sequence

A number of markers can be plotted in sequence. This function is required for plotting multiple size markers as a marker sequence, but also for quick output of 'mini markers' for control purposes. The individual markers are to be prepared in Grafis and are to be saved as marker. Then, the marker sequence is assembled via *File → Plot Marker Sequence* and can be output, immediate-ly if required. The function *File → Plot Marker Sequence* is only active if no marker and no production style are open. If *File → Plot Marker Sequence* is inactive, the production style or the marker must be closed via *File → Close*.

The individual markers are loaded and arranged in the *Plot marker sequence* window (Picture 18-28). For each marker, the number of the first bundle is to be determined. An optional distance between the individual markers can also be

entered. If required, a marker sequence can be saved, temporarily with *Save list* and send for plotting, later.



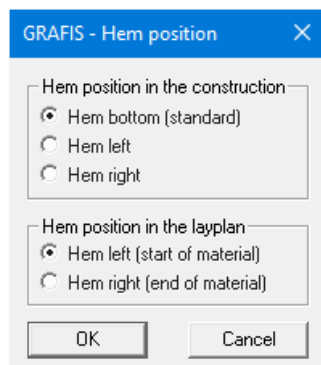
Picture 18-28

### 18.11 Saumlagen

In the Grafis Setup, the hem position can be aligned between patternmaking and marker making. Click on *Hem position* on the *Other* file card in Grafis Setup. The window shown in Picture 18-29 is opened.

The piece is aligned according to the setting under *Hem position in the construction*, only if no grain line symbol or grain line indicates the grain. The *Hem position in the marker* always applies.

The hem direction is saved in the marker. When opening a marker, the hem direction is checked. If the hem direction in the marker is different from the hem direction in the settings in the Grafis Setup, a query appears. You can decide to retain the hem direction of the marker or rotate all pieces according to the hem direction pre-set in the Grafis Setup.



Picture 18-29



## 18.12 Line types

With the construction function *attributes* individual lines can be assigned particular significance, which are interpreted in the marker.

The optional **annotation line** is used to attach and centre the piece text, align it and - if necessary - reduce to the length of the line.

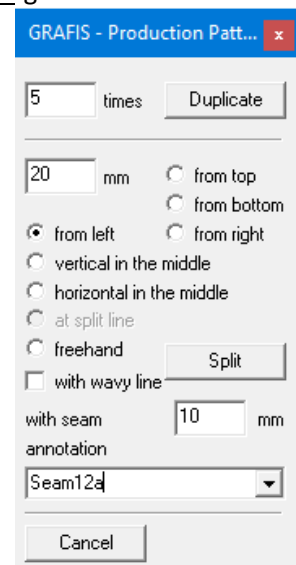
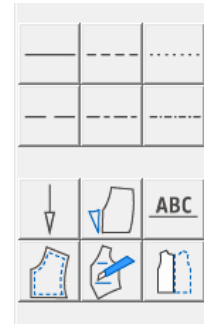
A line of the part can be assigned as **grain line**. However, the grain line symbol (set by function *symbols*) takes priority. If the grain line (set by function *attributes*) is to apply for a piece, no grain line symbol must be set.

The optional **split line** can be used to split a piece in the marker. During marker making, activate *split piece* from the right menu and click the piece with the right mouse button. In the following dialogue (Picture 18-30) the split line can be selected as the cut line. The seam allowance can also be set.

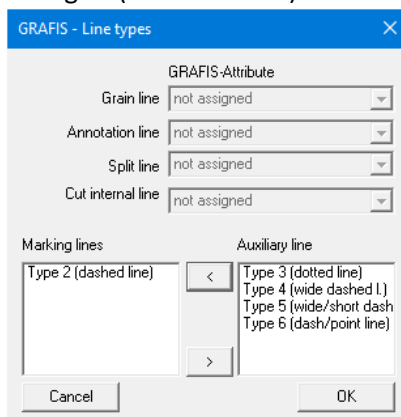
The optional **cut internal lines** are cut during cutting and are always plotted.

The **seam line** is interpreted only during export in ASTM format. It has no significance for the marker.

During plot/print from the marker, **marking lines** and/or **auxiliary lines** can be selected, additionally for output. Which line types are to be interpreted as marking lines or auxiliary lines have to be determined in the *Line type* dialogue (Picture 18-31). This dialogue is opened via the Grafis Setup on the file



Picture 18-30




Picture 18-31

card *Marker* with the *Line type* button. *Line type 1* is the continuous line, *Line type 2* is the dotted line etc.

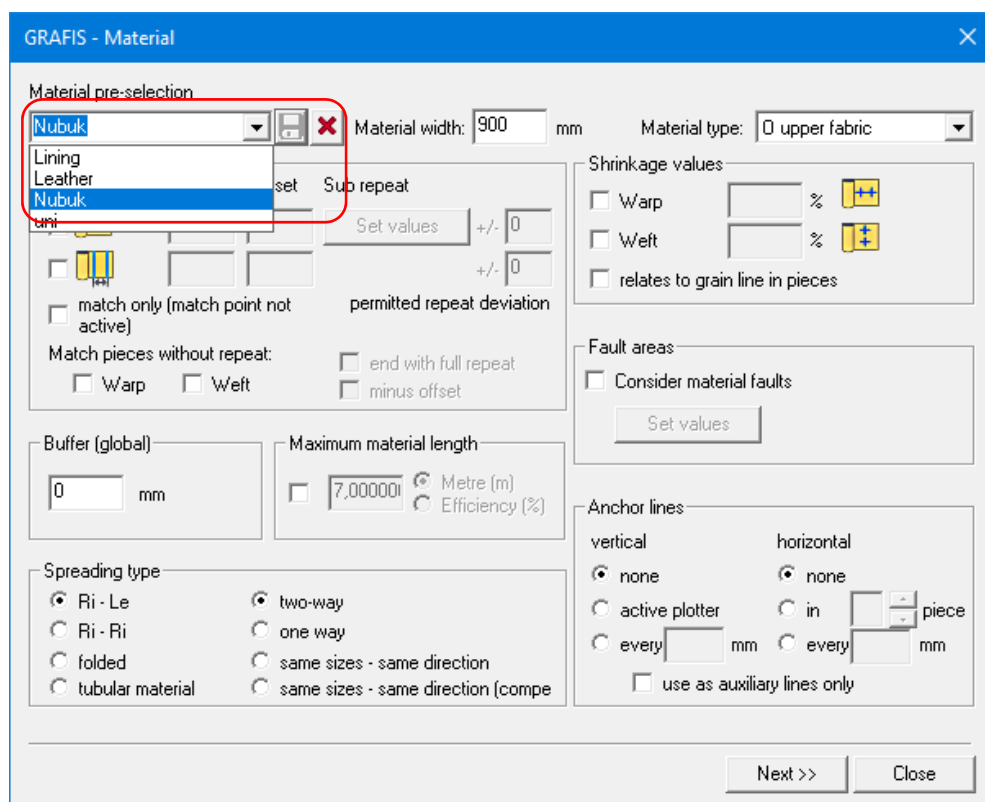
In the *Line types* dialogue, the grain line, annotation line etc should not be assigned.

### 18.13 Material catalogue/ Material pre-selection

A material catalogue for use in the *Material* file card of the *Marker information* can be set up, Picture 18-32. Material data saved in the material catalogue, such as material width, repeat information or material type is activated via selection in the combo box. Alteration to the material data can be transferred to the material catalogue with the button *Save*. After entry of a new catalogue designation and activating the button , a new entry is added to the material catalogue. With the *Delete* button, the selected entry is deleted. Use the material catalogue to quickly load frequently required materials

The material catalogue is saved as *Material.db* under \Grafis. The file can be edited with the editor Notepad according to the following principle: In each line, the following information is to be entered, separated by <Tab>:

- consecutive number
- name of the material
- width in mm



The screenshot shows the 'GRAFIS - Material' dialog box. The 'Material pre-selection' section is highlighted with a red box, showing a list of materials: Nubuk, Lining, Leather, and Nubuk. The 'Material width' is set to 900 mm and 'Material type' is '0 upper fabric'. Other sections include 'Shrinkage values', 'Fault areas', 'Anchor lines', and 'Spreading type'.

Picture 18-32

- material type code

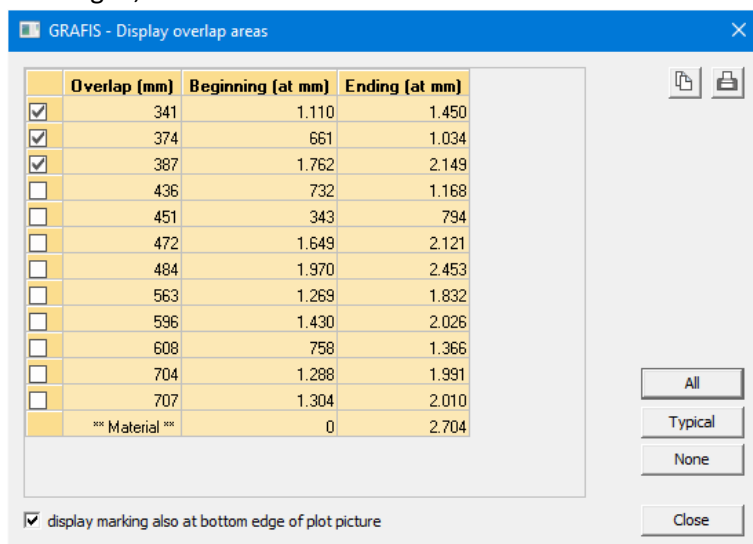
- repeat in warp in mm
- repeat in weft in mm
- offset for warp in mm
- offset for weft in mm

If the value for repeat in warp or weft is 0, no repeat is applied. In the future, the shrinkage values will also be included in the material catalogue.

### 18.14 Overlap areas

Via the *Overlap area* dialogue, areas in the marker can be indicated where material

can be restarted. This option is required for using up material remnants or if material has to be cut and restarted due to material flaws, see Picture 18-33. A list of possible overlap areas appears in

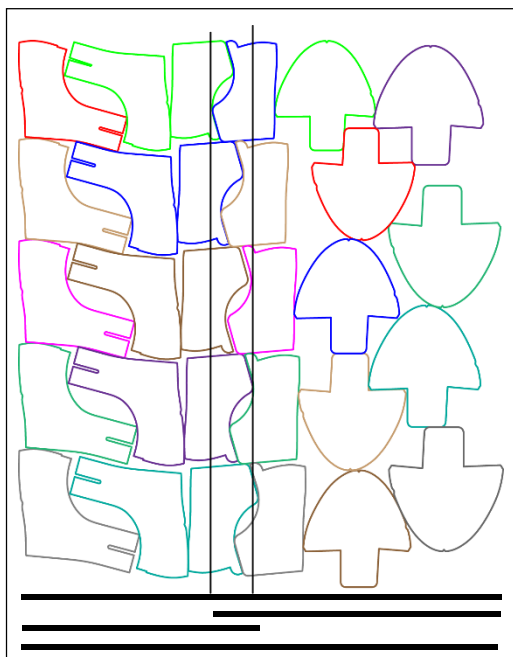


Picture 18-33

the *Overlap area* dialogue. You can select which overlap areas are to be shown in the marker. Initially, only the areas with the shortest overlap lengths are selected. With *All* you select all areas, with *None* all areas are switched off. *Typical* activates all areas with an overlap length of up to 30cm.

Overlap areas activated in the dialogue are shown as hatched areas in the marker. To ensure that each pattern piece is cut correctly once, the previous layer (material end) has to be layed at least to the right line and the following layer (material start) must be continued from the left line, see Picture 18-34.

In the plot picture, the overlap areas are indicated with a marking at the top edge of the marker. These markings appear at the bottom edge of the marker as well if the option *display marking also at bottom edge of plot picture* is selected in the *Overlap area* dialogue.



Picture 18-34

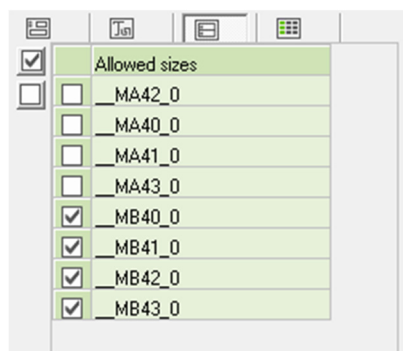
Even after having activated overlap areas, pieces can still be placed or positions can be changed. If however the position of a piece which defines the overlap area is changed, this overlap area is no longer valid and is removed. Replacing the piece does not re-activate the area. Open the *Overlap area* dialogue and re-activate the selected area.

### 18.15 Exchangeable pieces

The *Exchangeable pieces* dialogue allows for example the option to add fewer holes for lacing in the smaller sizes than in the larger sizes.

If no other selections have been made in the *Exchangeable pieces* dialogue, the pieces appear in the marker in all sizes. The *Exchangeable pieces* dialogue appears in part organisation on the respective file card. First, all sizes are marked and thus, active for marker making. By clicking the sizes or an area of sizes, the selection can be changed, see Picture 18-35. The pieces must be selected one after the other and the sizes must be activated in the *Exchangeable pieces* dialogue.

***During grading of the style, all parts are calculated in all sizes and exported during 'Export pattern pieces'.***



Picture 18-35

The settings in the *Exchangeable pieces* dialogue are taken into account in the Grafis Marker. The settings are not significant for grading or export.

## 18.16 Additional options

### Dialogue Marker Characteristics

Via *Marker* → *Characteristics* ... the dialogue shown in Picture 18-36 opens. In the simple variation, this dialogue shows some basic information about the marker: width, length, efficiency, name of the production style and the number of pieces and bundles.

With the button *Extended>>* the dialogue switches to a more detailed version. It allows for indication and calculation of weights and costs. The entry field for area weight and price per meter are saved with the marker. A number of values are calculated on the basis of the entered data, such as total cost or the effective weight per bundle.

### Toolbox

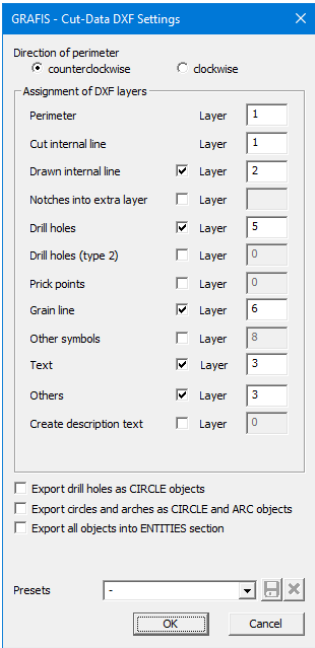
The toolbox contains the most commonly used functions. It can be turned on/off in the *View* pull-down menu. The content of the toolbox is determined via the Grafis Setup.

Material width	1.00	m
Used length	0.87	m
Efficiency	71	%
Usage per bundle	0.10	m
Perimeter lengths	19.37	m
Area usage	0.62	m²
Bundle / Pieces	9 / 3	
Production style: C:\Grafis\SB\Characteristics_Style_001		
Marker info file: 		
Extended >>		Close

Picture 18-36

18.17 Cut Data DXF

A Cut-DXF data file for controlling DXF cutters can be generated via *File → Generate Cut-Data-DXF...* Further adjustments are made in the *Cut-Data-DXF Settings* dialogue. Specific objects can be assigned to specific layers in the DXF file. For some object types, output can be activated or de-activated. If the option *output drillhole as circle element* is not activated, the drillhole is output as a simple point, see Picture 18-37.



Picture 18-37

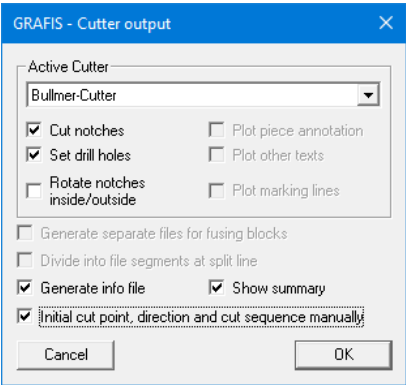
18.18 Cutter output

***The output of cutter data is optional. It is enabled and set up by the Grafis Team.***

Control data for a cutter can be created directly from a placed marker. *File → Generate Cutter data* opens a dialogue in which you can select the cutter and determine some options, see Picture 18-38.

***Cutter-specific options***

The options *cut notches* and *set drillholes* control the output of the respective symbols. The option *rotate notches inside/outside* rotates V notches and rectan-gle notches by 180°. If the cutter can also plot, fur-ther options are available. In this case, annotation, text and internal lines can be output as drawn ob-jects. Adjustment of the annotation can only be made in the plot dialogue.



Picture 18-38

### General options

In the lower part of the dialogue, you can find general settings. If fusing blocks are contained in a marker, their content can be saved as a separate cut file: set the option *generate separate file for fusing blocks*. These separate files are required for subsequent cutting of the small pieces.

The option *divide into file segments at split line* is useful for large marker files, longer than the length of the cutter table. To consider a cutter table length of 10m, set the display of anchor lines to *every 10m* on the *Material* file card. Considering the anchor line, you can create a marker of 12m length for example. With the set option, two cutter files are output, one with 10m length and one with 2m length.

The option *generate info file* creates a text file containing information about the marker. This includes data such as length, width and name of the marker. Additionally, each part of the cutter file is assigned the original Grafis part name

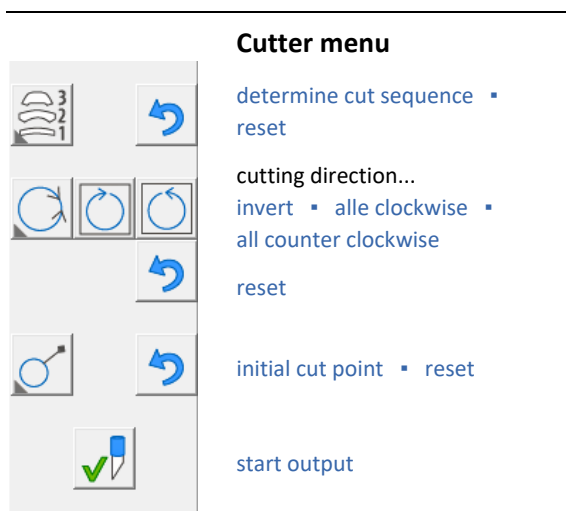
With the option *show summary*, after creation of the cutter file, a summary is displayed containing information about length, width, cut path length, free travel, amount of drillholes and amount of notches amongst others.

If the option *initial cut point, direction and cut sequence manually* is set, a further dialogue opens where cutting settings can be controlled and altered specifically for each piece.

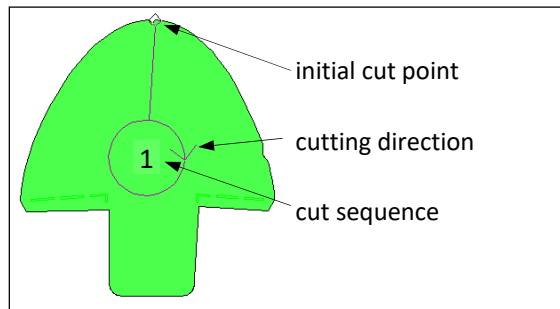
### The cutter menu

The Cutter menu opens during generation of cutter data if the switch *initial cut point, direction and cut sequence manually* is set.

If the Cutter menu is active, the number in the cut sequence, the cutting direction and the initial cut point are indicated for each piece, see Picture 18-39. These current settings can still be altered at this stage.



With the function *determine cut sequence*, the sequence in which the pieces are cut can be re-determined. Activate *determine cut sequence* and then click on the piece to be cut first with the left mouse button, then the second and so on. With *reset* the original sequence is reinstated. If you now want to determine the first piece to be cut again, de-activate *determine cut sequence* and then re-activate the function.



Picture 18-39

The following three functions influence the cutting direction. The functions *all clockwise* and *all counter clockwise* set the cutting direction of all pieces to clockwise or counter clockwise. With the function *invert cutting direction* the cutting direction can be changed for individual pieces by clicking on the piece. With *reset* the original cutting direction is reinstated.

If the function *initial cut point* is active, the initial cut point for each piece can be dragged with the mouse to a different point of the perimeter. With *reset* the original initial cut point is reinstated.

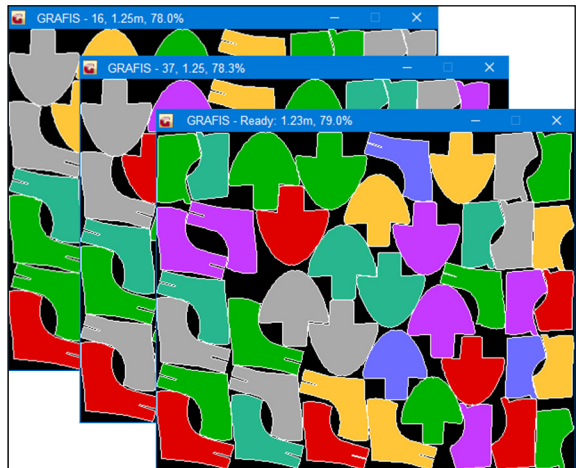
### 18.19 Autonester

***The control of Autonester is optional and is enabled and set up by the Grafis Team.***

The Grafis Autonester is an optional additional software package for automatic nesting. The marker is prepared as usual. On the *Material* file card, enter the material width, the fabric type and the spreading type. On the *Pieces* file card permission for rotation or mirroring in the marker can be given. The last step is setting the desired size run. Having opened the marker making mode, the marker is sent to Au-tonester via *Marker* → *Send to Autonester*.

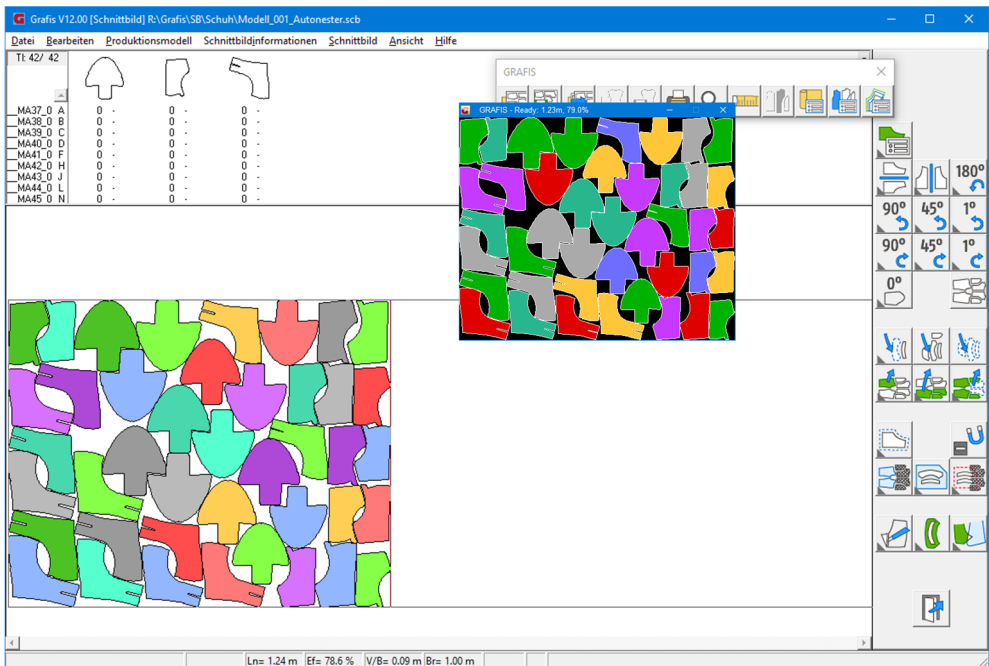


The Grafis Autonester is a separate program with its own user interface. During calculation of a marker, the interim results appear in a control window. The length and efficiency of the current interim result is shown in the title bar of the control window and in the Autonester window, see Picture 18-40. A reference to the interim result of the respective marker appears in the Grafis Marker.



Picture 18-40

As Autonester works independently of the marker making program, you can continue working parallel to the automatic nesting. As soon as the Autonester has been processed the marker, a reference appears in the marker making program and the calculated marker can be transferred, see 18-41.



Picture 18-41

Often, several markers are to be created for an order. From the Size file card, the different size range markers can be transferred rapidly to Autonester. Select the desired size combinations and save an empty, unplaced marker. If the option *Create*

*Autonester order during save* is active, the marker is sent automatically to Autonester when saving the marker.

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**A.1 New in Grafis Patternmaking****Part organisation**

The content and the appearance of the part organisation have been revised. In addition to the part organisation, a part rack has been added to the left of the workspace. The part organisation can be docked to this rack or displayed in a separate window. In the part organisation, it is possible to mark a number of parts and then, to delete them, to remove them or to save them as a part module, see Section 5.1.

**Part Assistant**

The new part assistant speeds up derivation of production pattern pieces. The existing Grafis functions from different Grafis menus have been compiled into individual dialogues in the part assistant and optimised exactly for these processes, see Section 11.1.

**Z-values**

The z values and corresponding dialogues have been improved. The new entry assistant for z values simplifies the creation of z values and allows for case differentiation with up to three conditions. Furthermore, new operands for creating z values have been made available, such as the partial length. Inserting z values into a previous record step enables adding z values subsequently. The z values are now easier to comprehend as the clicked operands are highlighted in colour and the values are displayed graded in an overview, see Section 12.5.

**Size sorting in tables**

In various tables, individual sizes such as S, M, L, XL, and XXL are sorted according to their reference size. This applies to the finished measurement table, editing measurement charts, editing z values and editing identification measurements in the Grafis notes of the interactive constructions.

**Pixel images**

There are various new functions for scaling and positioning and for image editing in the new *Manage pixel images* menu. Loaded pixel images can be stored as background images or as logos in the style, see Section 2.2.

**Quick measure**

In addition to the normal measure, quick measure has been introduced, started via the key combination Ctrl+Shift+M. The user can measure point co-ordinates, line lengths and distances. These measurements are displayed in a list, one below the other.

**Last opened files**

In the pull-down menu *Files*, the most recently opened files are displayed under *Recent files*.

**Zoom on active part**

With the key combination Ctrl+F6, the active part is zoomed.

**Move/ zoom with space bar**

*Move/ zoom* of the screen is started via the space bar. Once *move/ zoom* is activated, the active part can be moved separately on the screen with Ctrl. This is particularly important in the new part assistant.

**Edit symbols**

In the pull-down menu *Extras*, a new dialogue can be opened via *Edit symbols....*. Here, set symbols can be lengthened or shortened.

**Symbol colour**

All symbols of the active part are displayed in orange – red and thus, highlighted in colour.

**Symmetry line**

A line can be defined as a symmetry line. The part is automatically mirrored along this line in the marker.


**Xgz values**

X, g and z values can be assigned to selected drag points of the interactive constructions or tools, see Section 13.3. Styles generated in Version 11 are updated and also obtain these adjustment possibilities. Linking interactive tools with x, g and z values enables hiding some existing functions. The affected menus are now clearer and easier to learn.

### Starting interactive constructions and tools via right click

Interactive constructions and tools can be started by right clicking the corresponding line. If more than one interactive tool has been used at a line, the required one can be selected.

### Autostart tools

Via a new button in the menu  the user can decide whether the tool is started automatically after call or not.

### Updating click images

When calling any tool or interactive construction, click images are automatically generated and saved. They are updated during 'reset click'. This applies also to constructions and tools used for style development in Version 11. Saved images can now be viewed as a click preview in the <F12> list.

### New corner tools

- *Corner 90 bevel*: free slanting of corners
- *Corner 100 bevel co-ordinated*: free slanting at two positions simultaneously
- *Corner 110 u-shape*: corner treatment with three lines
- *Corner 120 u-shape co-ordinated*: corner treatment with three lines at two positions simultaneously
- *Corner 130 step corner*: corner treatment of a seam with different seam allowances

### New fashioning tools

- *Fastening 10*: Velcro closure and straps
- *Notch 10*: notch round or pointed
- *Notch 20*: notch as incision
- *Notch 30*: notch as incision at two positions simultaneously
- *Perforation 10*: free perforation
- *Perforation 20*: perforation along a line
- *Perforation 30*: perforation along three lines with cutting line
- *Marking line 10*: template generation

### New construction tools

- *Parallel 20*: parallel co-ordinated to a number of lines
- *Raster 20*: raster along a line with start and end distance, replacing *Raster 10*
- *Link 20*: free or constructive linking, replacing *Link 10*
- *Link 30*: free or constructive linking at two positions simultaneously

### Revised tools

- *Curve 10*: this tool now also has options which can be selected from the menu for adjusting interactive constructions.
- Tools with shape points, such as *Curve 10*, *Link 10*, *20 and 30*, *Corners 40*, *50 and 110*, *Notch 20 and 30* now have more shape points if the base points of the curve are placed close together.
- Many tools such as *Line 10 and 20*, *Rectangle 10 and 20*, *Circle 10 and 20*, *Curve 10 and 20* and *Link 10*, *20 and 30* contain a new option *Move base point in mm or %*.
- *Corner 60*: new option *Apply length from top or bottom*, see Section 5.6.
- *Corner 70*: option for cut corner, apply length from top or bottom, see Section 5.6
- *Corner 80*: additional notches
- *Dart hood 10*: arrow representation of fold direction
- *Raster 10*: number of points increased to 50
- *Pinch 20*: option *Permit release from base point (Y/N)* complemented by one entry allowing for release of base points in direction of symmetry axis.
- *Pantograph 10*: symbols are also graded
- *Ruffle 10*: error correction and revision of frill beginning and end.

### Preallocation for tools during call

A new preallocation file is available where options and different parameters of the tools can be preallocated. Further information can be obtained from the Grafis Team.

## A.2 New in Grafis Marker making

### Part organisation

Content and appearance of the part organisation have been revised. A part rack has been added to the part organisation in the left area of the workspace. The part organisation can be docked to this rack or displayed in a separate window. In the part organisation, it is possible to select a number of parts and then to delete or remove them, see 5.1.

---

### **Edit symbols**

In the pull-down menu *Extras*, a new dialogue can be opened via *Edit symbols....* Here, set symbols can be lengthened or shortened.

### **Place symmetrical pieces at the fold**

For parts with a symmetry line, the user can determine that they can only be placed at the fold and not open.

Pattern pieces which have been constructed as half pieces and have been assigned the line attribute *symmetry line* are automatically mirrored in the marker and recognised as symmetrical pieces.

### **Pixel images**

There are various new functions for scaling and positioning and for image editing in the new *Manage pixel images* menu. Loaded pixel images can be stored as background images, fills or as logos in the marker, see Sections 2.2 and 18.3.

### **Quick measure**

In addition to the normal measure, quick measure has been introduced, started via the key combination Ctrl+Shift+M. You can measure point co-ordinates, line lengths and distances. These measurements are displayed in a list, one below the other.

### **Last opened files**

In the pull-down menus *Production style*, *Marker information* and *Marker*, the most recently opened files are displayed under *Recent files*.

### **Zoom on active part**

With the key combination Ctrl+F6, the active part is zoomed.

### **Move/ zoom with space bar**

*Move/zoom* of the screen is started via the space bar. Once *move/zoom* is active, the active part can be moved separately on the screen with Ctrl.

### **Export/ import**

Data in cut-data DXF format can now be imported into or exported from Grafis marker.





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**B.1 Grafis Installation****Administrator rights and write permission**

For a new installation of Grafis, normally the installation program must be performed with administrator rights. These rights are required for the creation of the desktop icon for all users, the link of Grafis file extensions with Grafis applications and the installation for the dongle driver.

Under **Windows 10** the installation is usually started with the rights of the current user. If this user does not have administrator rights, the INSTALL.EXE should be executed as administrator with right click.

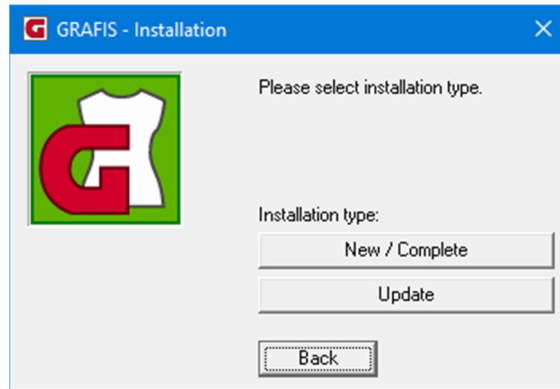
Initially, the new folder C:\GRAFIS contains write permission for the current user only. All other users only have read permission. This is insufficient for using Grafis. Therefore, after installation, write permission may have to be added for the user group 'User'.

Under **Windows 7** the installation program automatically demands administrator rights. If the installation is to be carried out with simple user rights, for example for installation on a substituted drive or a network drive, the INSTUSR.EXE can be started instead of the INSTALL.EXE. This does not automatically demand administrator rights. However, creation of the desktop icon is permitted for the current user only. Dongle installation is normally not possible and must be started separately at a later time. For separate dongle installation start HASPUserSetup.exe from C:\GRAFIS\HILFEN.

If Grafis is installed for the first time it may be required to give write permission to the installation directory (normally C:\GRAFIS) to normal 'Users' of the computer.

### Start installation

As a rule, all open Grafis applications should be closed before installation. This includes Grafis Patternmaking, Grafis Marker making, Grafis Setup and Grafis Autonester. Grafis is usually delivered on CD or DVD. If the Autostart function of the drive is active, the installation program starts automatically after inserting the data carrier. If the installation does not start automatically, it can be initiated manually by starting the INSTALL.EXE on the data carrier. If Grafis has already been installed on the current computer, after the welcome window, you can choose between the installation variations *New/Complete* and *Update*, see Picture B-1.



Picture B-1

### Installation New/Complete or Update

The variation **New/Complete** installs Grafis completely and resets all existing settings and options to the delivery conditions. Style data, individual measurement charts and basic blocks will not be lost. Plotter and export/ import settings, path settings and window positions however, will be reset. Select this variation if Grafis is being installed for the first time or if an incomplete Grafis folder without functioning application exists. With the button **Installation in a network** Grafis can be configured for common use of a number of workstations within a network. For more information, please refer to details later in this section.

The variation **Update** should be selected if an existing version of Grafis is to be updated. All existing settings for paths, window positions, recently opened files, export/import settings, plotter setup etc. are carried over or a query appears before overwriting files.

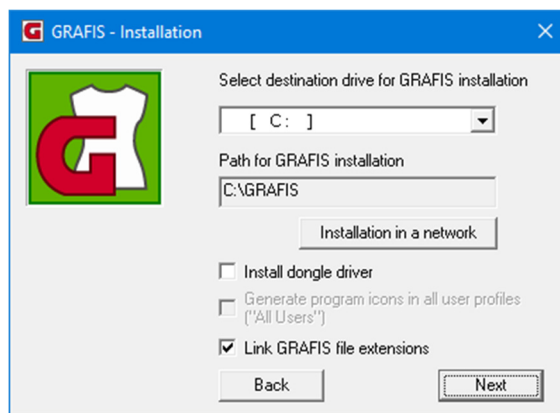
Before updating an existing Grafis installation, a backup of all existing data should be carried out. It is sufficient to copy all Grafis directories in use from the local computer and from the network onto a separate medium or to save them as a copy on the local drive.

### **Select target drive and options**

In the next step, the target drive is selected. Grafis is always installed in the folder \GRAFIS on the target drive. The following options can be selected, see Picture B-2 as an example for the installation variation *New*:

### **Install dongle driver**

This option should always be activated. The installation of the driver may only be omitted if the same or a later version of Grafis has already been installed on the computer. The driver installation itself checks if a dongle driver is already installed and proposes updating or skipping the installation.



Picture B-2

### **Set up icons for all users**

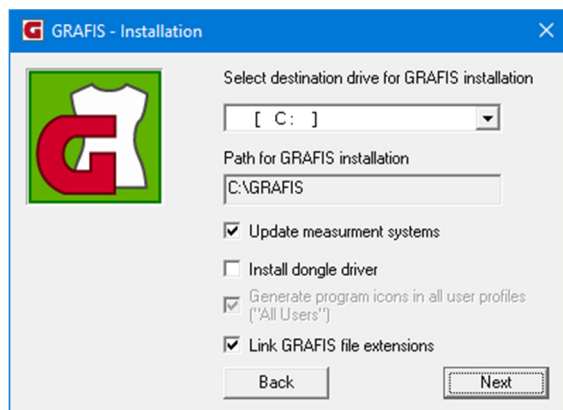
With this option you determine for which user profiles the Grafis icons are to be set up. If basically all users of this computer work with Grafis, this switch must be activated. If only the registered user is to work with Grafis, this switch can be deactivated. If the installation runs with simple user rights, i.e. without administrator rights, this option is inactive.

### **Link Grafis file extensions**

This option activates the linking of the file extensions \*.MDL, \*.PMD, \*.SCB and \*.SBI with the respective Grafis program of the current installation. Files with these extension can then be opened with double-click in Explorer.

**Update measurement systems**

This option is only available for an **Update** installation, see Picture B-3. With this option, the installation of measurement systems can be specifically switched on or off. Use this option if the basic Grafis data is to be updated but the measurement systems are to remain unchanged.



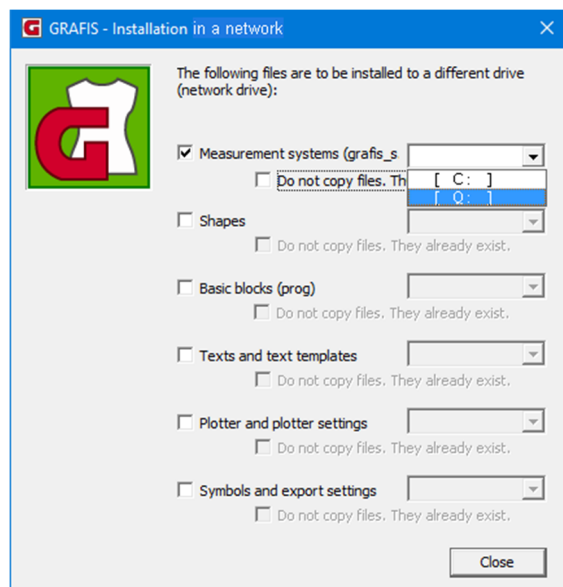
Picture B-3

**Installation in a network**

For an installation of the **New/Complete** variation, a further dialogue can be opened via the *Installation in a network* button, see Picture B-4. This dialogue permits moving six different folders or folder groups to other drives for shared use in the network. The folder or folder groups are:

- Measurement systems
- Forms
- Basic blocks
- Texts and text modules
- Plotter settings
- Symbols and export settings

If only style files are to be exchanged, it is not necessary to move these folders to the network. It is sufficient to assign a common network drive for the Grafis users, activated in the Grafis Setup on the *Drives and Paths* file card. This drive should ideally be linked with the same drive letter on all Grafis user workstations. This variation is



Picture B-4

recommended if a number of independent users, such as service providers or students, wish to exchange styles or if styles to be provided for classes.

If measurement charts, forms and basic constructions are to be shared as well as the style data, these entries must be moved to a shared network drive. The drive letter for the network drive should be the same on all Grafis workstations. During installation on the first workstation, all data must be copied. For further workstations the option ***Do not copy data. They already exist.*** can be activated. This variation is recommended for companies with a number of workstations, in particular if data backup is carried out via this central drive.

If other information (text modules, plotter settings, symbols, export settings) are to be shared as well, the corresponding folders can also be activated.

It is not absolutely necessary for all these folders to be stored on the same network drive. Theoretically, each of these data groups may use its own drive. However, to ensure clarity, the data should only be spread over different drives in exceptional circumstances.

Over and above the already mentioned folders, other types of data can be migrated to network drives. For special configuration options right up to establishing a 'diskless workstation', please contact the Grafis Support.

### **Start installation**

After having started the installation, all data is copied to the corresponding target folders. In the variation ***Update***, targeted queries appear questioning whether specific data is to be overwritten. If applicable, at the end of the copy process, a list of files is displayed showing files which could not be copied as they were write-protected in the target drive or currently in use.

In the variation ***New/Complete***, the setup program starts automatically after copying is completed. Here, fundamental setting for screen, available drives or system language can already be undertaken.

If the option ***Install dongle driver*** has been activated, the driver installation 'Safenet Sentinel Runtime' by Safenet follows.

## B.2 System adjustment Grafis Setup

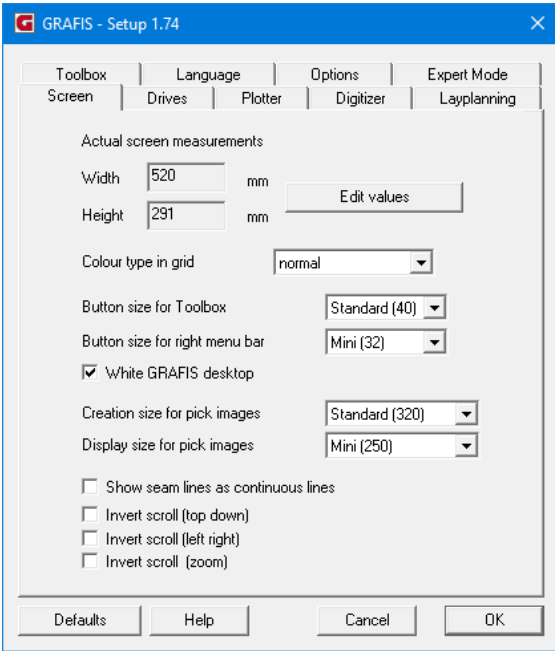
The system 'Setup' is started automatically during Grafis installation. It can be called at a later date from within Grafis via the pull-down menu Help → Grafis Setup or by starting the setup.exe in \grafis\hilfen\.

Changes to the Grafis Setup normally require a restart of the respective Grafis program to take effect.

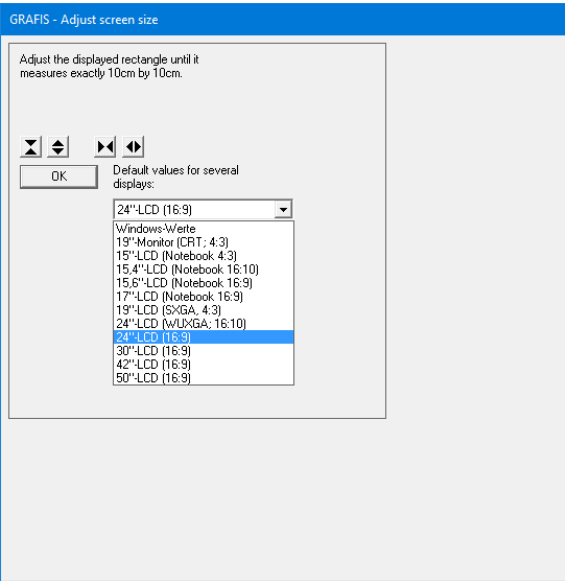
### Screen file card

On the *Screen* file card Picture B-6, the parameters for a distortion-free screen display can be adjusted. After the Grafis installation and after each adjustment of the display size on the screen these settings should be checked and if necessary, adjusted.

To alter or check the settings click on *Edit values*. A square appears which has to be adjusted to 10cm length at the sides using the four buttons or by dragging the lines, see Picture B-6. This ensures that a circle is displayed as a circle and a square is shown as a square on screen. For simplification of the setup, a number of pre-defined settings for particular display types are available.



Picture B-5



Picture B-6

The *Screen* file card also offers a number of options for illustration and display in the Grafis window.

From version 11 onwards, the menu on the right is displayed with graphic symbols (buttons) as standard. The button size can be determined on this file card. A button size of 32 pixels is recommended for a screen resolution of up to 1024x768. For a higher resolution, 40 pixels are recommended.

### **Drives file card**

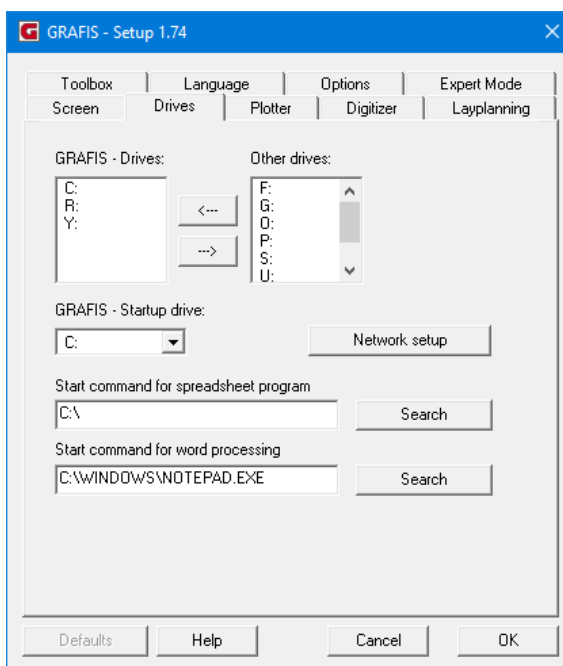
The setting of drives is of fundamental importance. It ensues on the *Drives* file card, see Picture B-7. In the *Grafis drives* list on the left, all drives on which Grafis data is to be saved must be listed. One of the Grafis drives has to be selected as the Grafis start drive. This ensues in the field below the left window. The Grafis start drive should always be accessible. It is usually a local drive and ideally the original installation drive.

The selected drives can be moved from one side to the other with the arrow buttons.

Drive letters for removable disks are only indicated if these data

carriers are connected (e.g. USB sticks) or if media is inserted (e.g. for removable disk drives). CD/DVD or Blue-ray drives are never suggested or displayed.

The start commands for table calculation or text processing can be saved to permit a quick start directly from within Grafis.



Picture B-7

## Network setup

The button *Network setup* opens a separate dialogue window with the Grafis network configuration, see Picture B-8. Changes to these settings have fundamental impact on saving of files and should only be altered by a system administrator or experienced users.

During installation it is possible to install specific folders or folder groups on network drives. If this option has not been used, folders can be moved to different drives at a later date with the *Network setup* dialogue in the setup program.

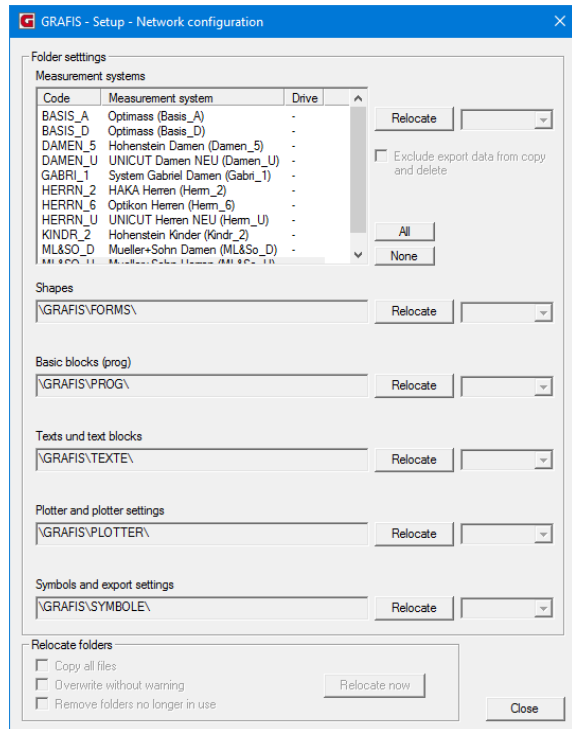
Initially, the dialogue shows the current situation. If specific allocations have already been made, this will show here. As

well as paths for the different folders, the button *Relocate* plus selection of a target drive enables new allocation. The selection *<basic drive>* resets previous relocation back to the original installation drive. This allocation can be carried out separately for each measurement system in the upper list area.

The actual move is initiated via the button **Relocate now** in the lower area of the window. Here, you can also determine if

- the existing files are copied,
- existing files are overwritten without warning or
- the files are removed from the original location and are to be relocated to a new location.

If you waive copying the data, only the path entries are altered during the move. Use this option if the data has already been copied to the network drive from another workstation.



Picture B-8

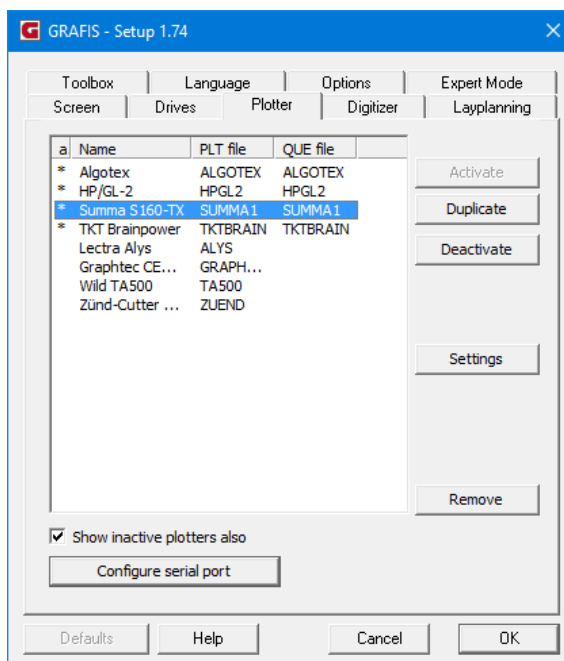


### Plotter file card

The *Plotter* file card (Picture B-9) lists the plotters available in Grafis. Only plotters marked as active with '\*' in the first column are offered in Grafis.

Certain basic settings for the plotters can be adjusted via *Settings* (Picture B-10), such as the resolution or the maximum paper width.

*Configure serial port* adjusts the output parameter for direct output of plot data from Grafis to a COM port.



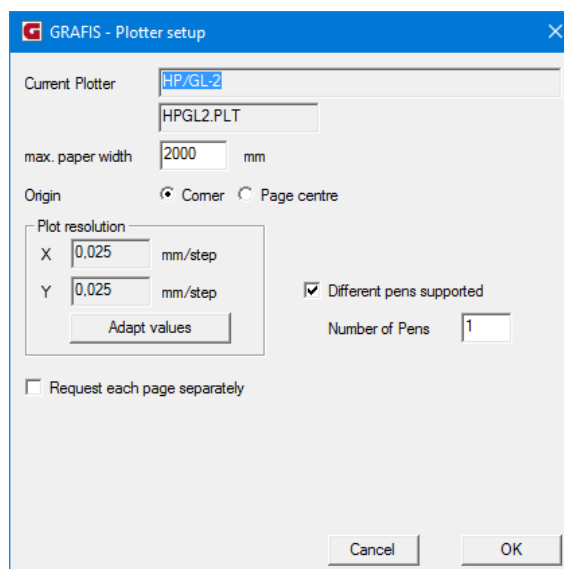
Picture B-9

### Digitizer file card

Digitizing with Grafis is possible under the following circumstances:

- The digitizer is connected to the Grafis computer.
- The WinTab driver for the digitizer is available and installed.
- A 16 button cursor is connected.

To test the WinTab driver the Tabtest.exe in the \Grafis\Hilfen directory can be used. If Tabtest reports 'No Info (Keine Info)' the WinTab driver is not installed correctly.



Picture B-10

If the WinTab driver has been installed successfully, the following variables can be adjusted on the *Digitizer* file card (Picture B-11):

*Size of menu area*

The distance  $p1 \Rightarrow p2$  is 245mm on the menu pads supplied. As the pads can also be used enlarged or reduced proportionally, the current distance  $p1 \Rightarrow p2$  is to be entered in millimetres.

*No. for OK button*

cursor key for <OK>

*No. for Cancel button*

cursor key for <Cancel>

*Delay after key press*

Delay after key press in milliseconds

*Digi-Cursor Standard...*

for normal digitizer mouse key assignment

*Digi-Cursor Numeric1...*

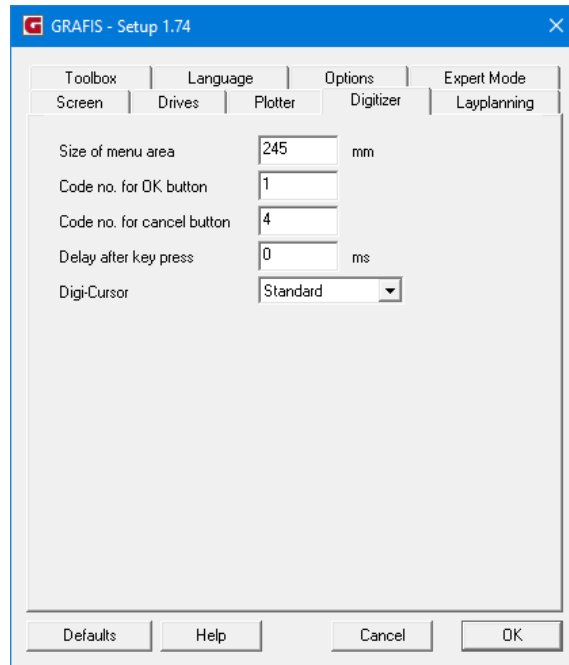
for numeric digitizer mouse, can be recognised at numbers in left three columns and letters in the right column

*Digi-Cursor Numeric2...*

analogue Numeric1 with different key numbering

**Marker file card**

The *Marker* file card (Picture B-12) offers some basic settings and options for the Marker making programme. *Hem position* defines the alignment for the automatically selected grain line direction in the Patternmaking and the Marker making, see section 18.10. *Line types* offers assignment of specific line significance to line attributes, see section 18.11. These parameters are fundamental and should be determined once during installation of the programme and then maintained.



Picture B-11

Furthermore, the following can be adjusted:

**Minimum letter size ...** Minimum size for automatically set annotation for plot and print  
**Add size designation to Marker name...**

During *Save as...* of a new marker, the placed sizes are named in the suggested marker name.

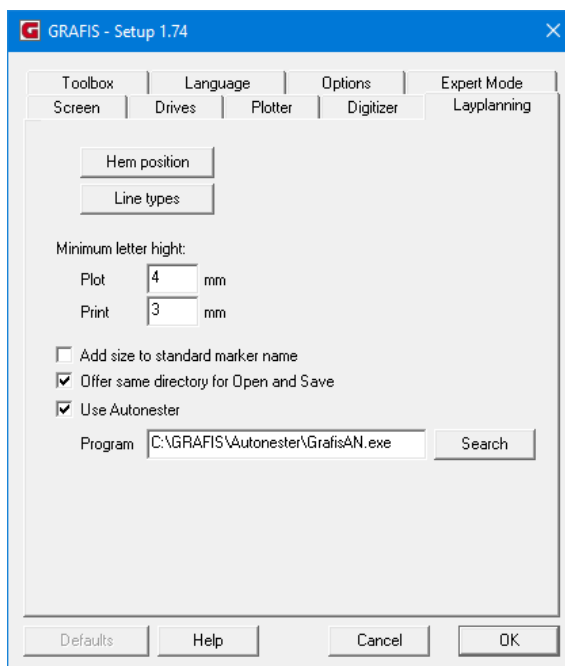
**Offer same directory for open and save...**

For open and save only one common path is saved.

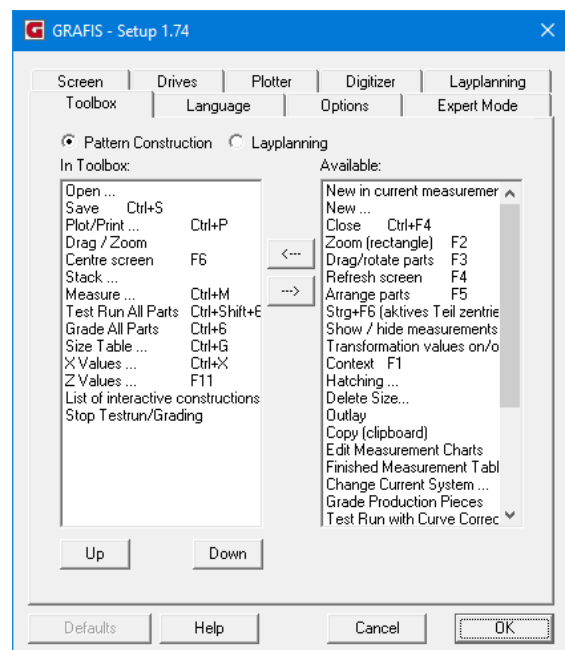
**Use Autonester...** If the Autonester programme was purchased it can be activated here.

### Toolbox file card

On the *Toolbox* file card (Picture B-13), the combination and organisation of the buttons in the toolbox of Patternmaking and Marker making can be altered. The arrow buttons move the activated entries from one side to the other. *Up* and *down* alters the order.



Picture B-12



Picture B-13

**Language file card**

As well as German and English, Grafis is available in various other languages. The installed language packages are offered for selection in this dialogue. The basic language is the language in which the main data is available. It is marked with '\*'.

For use of Grafis in areas with non-Latin letters, such as Russian, Mandarin (Chinese) or Thai, extended language options can be selected:

***Use Window fonts for plot output***

Here, Grafis switches to Windows fonts for display of Grafis text in picture and plot/

printer output. Windows fonts tend to have double lines and therefore, take significantly longer to plot with pen plotters. Furthermore, they are more difficult to recognise on the screen. However, the complete character set of the selected language is available. This is important for example in Mandarin.

***Activate multi-byte characters in Grafis texts***

This option is connected to the previously described option and must be used if the characters of the selected language are always coded with more than one byte per character 'multi-byte', such as for Mandarin.



Picture B-14

### Options file card

The *Options* file card (Picture B-15) contains a number of additional options.

With the option **auto-save** regular automatic saving of the current style can be pre-set. Save ensues in the background every .... minutes. Entering 0 into this field switches off the automatic save.

With the function **graphic font** you can choose between different typefaces. The setting applies to output of text in drawings. The typeface GRAFIS2 is the default setting. In case of Cyrillic or Thai characters the selection of graphic fonts is limited. If the use of Windows fonts for plot output is activated under *Extended language options* on the *Language* file card, this setting has no effect.

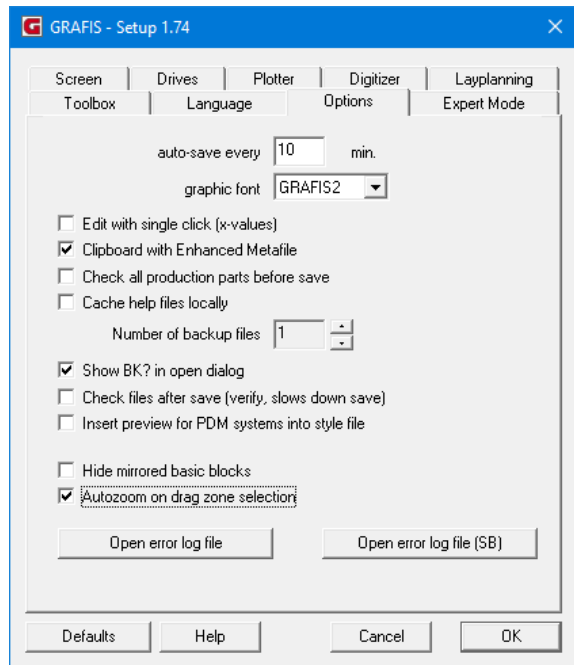
Furthermore, you can choose to start **text editing of the x value list** via simple click or double click.

If the patterns are not transferred correctly during transfer via clipboard, the switch **Clipboard with enhanced metafile** can be changed.

**Check all production parts during save** is useful for companies where style development and marker is carried out by different departments. Should an error occur during creation of a style, with this option the error is flagged up directly during saving of the style before the style is opened in the Marker making.

**Cache help files locally** is only required if the Grafis auxiliary files are loaded from networks and are not displayed correctly.

**Number of backup files** determines how many backup copies per style are saved. The backup copies are saved in the same directory in which the original style is saved and carry the extension \*.bk0 for the first backup, \*.bk1 for the second backup etc.



Picture B-15

With **show BK? during open** you can determine that the backup files can also be opened directly through switching of the data type.

**Check MDL files on save** activates a control after writing of the data. Activate this option only if files which can no longer be opened appear frequently.

**Store preview for PDM systems in the style** activates saving of a screen shot in the style which can be used by PDM programmes for file preview.

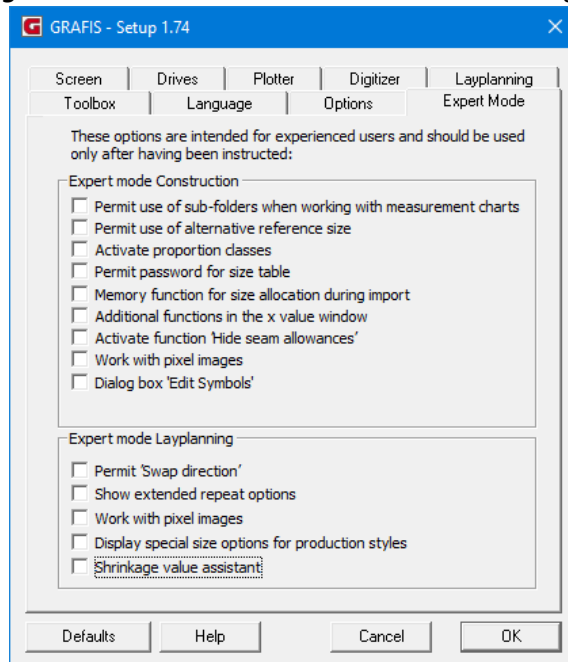
**Hide mirrored basic blocks** hides the mirrored basic blocks in the call list.

**Auto zoom during drag area change** switches the automatic zoom function during changing between different drag areas within an interactive construction on or off.

**Open error log** displays the record files created by Grafis for patternmaking or marker making (SB). This information may be required for Hotline support by the Grafis Team.

#### **Expert mode file card**

A number of complex or rarely used functions can be activated via this file card (Picture B-16).



Picture B-16

### B.3 Grafis directory structure

Ordner/ Unterordner und deren Bedeutung

\GRAFIS	Grafis.exe, GrafisSB.exe, *.INI files and help files
\GRAFIS\Forms	shapes of the interactive constructions
\GRAFIS\Hilfen	Setup.exe and various help tools
\GRAFIS\Masken	mask files
\GRAFIS\Menues	menu files
\GRAFIS\Module	projects of Grafis Programming language and help files for the functions of the programming language
\GRAFIS\Plotter	*.PLT control files of Grafis plotters and *.QUE plotter link files
\GRAFIS\Prog	constructions which can be called in all measurement systems
\GRAFIS\SB	markers and marker information
\GRAFIS\SB\Mas	size list for marker
\GRAFIS\Symbole	system files symbole.sys and interfac.sys, export configurations
\GRAFIS\Texte	files of the typefaces and own standard texts
\GRAFIS\0440	files for the display of Grafis as partial translation in English
\GRAFIS\0860	files for the display of Grafis as partial translation in Mandarin
\GRAFIS\Damen_U	measurement system Womenswear UNICUT

Jedes Maßsystem ist wie folgt strukturiert, beispielhaft für das Maßsystem Basis\_A:

\GRAFIS\Basis_A\Interfac	export data
\GRAFIS\Basis_A\Kollekt	folders and subfolders with style files
\GRAFIS\Basis_A\Mas	folders and subfolders with measurement charts
\GRAFIS\Basis_A\Mask	program mask files for old Grafis programming language
\GRAFIS\Basis_A\Prog	program files
\GRAFIS\Basis_A\Swert	grade rule patterns
\GRAFIS\Basis_A\ST	part modules
\GRAFIS\Basis_A\Xwert	X value tables for old Grafis programming language programs

**B.4 Grafis.ini parameter**

Area, Name and Description

**[SCREEN]**

WIDTHMM=300	Screen width in mm (visible image)
HIGHTMM=225	Screen height in mm (visible image)
BACKGROUND=0	Background colour (0-black, 15-white)
MENUFONTHIGHT=14	Type size in right menu
CONTINUOUS_SEAM=0	Show seam line as continuous (charcoal grey) line

**[PATH]**

DRIVES=AC	Letters for available Grafis drives
STARTUPDRIVE=2	Consecutive no. of Grafis start drive
TABCALCRUN=	Path for table calculation
TEXTPROC RUN=	Path for text processing
WPADRUN=zzz	Path for text program WordPad (C:\Program Files\Accessories\wordpad.exe); set during installation by the install program according to the windows version
PATHMASK=	Path for masks \Grafis\MASKEN
PATHMENU=	Path for menus \Grafis\MENUES
PATHPLOT=	Path for plotter driver \Grafis\PLOTTER
PATHSYMB=	Path for symbol file \Grafis\SYMBOLE
PATHTEXT=	Path for text files \Grafis\TEXTE
PATHPROG=	Path for measurement system independent programming language programs \Grafis\PROG
PATHFORM=	Path for shapes \Grafis\FORMS
PATHMODULE=	Path for module developments (programming) \Grafis\Module
PATHTEMP=	Path for temporary working files \Grafis\Temp
PATHDAT=	Path for *.DAT and Material.DBA
RUN01M=zzz RUN02M=zzz ...	Additional menu entry (menu text) for user defined programs (e.g. management programs, design programs, data converters)
RUN01L=zzz RUN02L=zzz ...	Start command for respective entry



[OPTIONS]

SAVEMINUTES=0	Time elapsed between automatic save in minutes
GRAFISFONT=Grafis2	Name of Grafis font used (default = Grafis2)
EDITONCLICK=1	Edit (x values) with single click
ENHMETAFILE=0	Copy to clipboard as Enhanced Metafile (0=no, 1=yes)
FIXTOOLBUTTONS=32	Size of buttons in toolbox (32 or 40)
FIXMENUBUTTONS=40	Size of buttons in the right menu (32 or 40)
USEMBRAM=xx	Use xx % of installed RAM
SHOWAVICURSOR=0	Special cursor for recording of screen sequences: 1=active, 0=inactive
CYCLESTATUSBAR=1	Continuous messages in the status line (0=no, 1=yes)
SAUMNR=0	Hem number menu usable (0=no, 1=yes)
CATHELP=0102	Entry help for category; how many digits are to be found from which place
MATHELP=	Entry help for material; In which position can the code letter be found.
XEDITINLINE=0	Edit entry in x value box analogous to part organisation (0=no, 1=yes)
CHECKFDONLY=0	Checking method for connections: 0=standard option, connected style file is originally check to the file date. If there is a difference the file is opened and the content is checked. 1=only date/time are checked; Alteration here means alteration in any part irrespective of content. 2=extended mode; As 0 but alteration date is automatically entered for certain actions within the style.

NOPARAMUPDT=0	Update WITH part parameter not permitted (0=no, 1=yes)
EXTERRMSGLINK=0	Extended error message for unsoluble connection (0=no, 1=yes)
TITLECMAX=45	Length of path displayed in the title bar
PIECENN=NN	Standard entry for empty/new pattern pieces
ZOOMFAKT=2.0	Zoom factor for zoom function
NODK4003MEM=0	Switch off sticky function for separate menu (0=no, 1=yes)
NODK4004MEM=0	Switch off sticky function for parallel menu (0=no, 1=yes)
NODK4005MEM=0	Switch off sticky function for corners menu (0=no, 1=yes)
NODK4017MEM=0	Switch off sticky function for attribute menu (0=no, 1=yes)
MENUFONT=Courier	Menu font (True-type font)
MENUCHARHIGHTCORR=0	Height correction value for character height at right menu
MENUCHARSET=0	Character set for menu font (right menu)
DELEXPLISTONSAVE=0	Delete export record list 'Last output' when save style with 'Save as...'
DK5012EH=0	Show function 'hook in' at insert menu
REBUILD_ON_MDLCALL=1	Automatic test run after calling a construction
SYSTEMBEEP=2	system sound 0 = no sound 1 = beep over integrated PC loudspeaker 2 = Windows standard signal (pling)
CHECK_GRD_PTS=0	Extended grade point check
PRESET_DRAG_ARROW=1	Preset of yellow drag arrow at dragging 0 - like until Jan/2006 (during a Grafis session the orientation remains unchanged ) <standard until 1/2006> 1 - One preset 'right' per drag session <standard from 2/2006>

CHECKMDLONSAVE=0	Automatic check of perimeter of production pieces when saving the style
HIDE_MIRFOLD=0	Hide all PROG sub-folders with mirrored constructions
ALLOW_CPRMDL=0	Allow module combinations in measurements PROG folders
ALLOW_PRG_FOLDER=0	Allow sub- folders with PRG programs (compatibility to V8)
USE_TTF=0	Use Windows True-type fonts as printing font
PTTFCHARSET=0	Character set for plot font
PTTF_SUPP_UNICODE=0	Recognize unicode characters in plot texts automatically
PTTF_FACE=Courier New	Plot font Courier New
PTTF_PITCH=48	'pitch' and 'family' values for plot font
CACHE_CHM	Cache CHM files of net drives locally
BAKMAX=1	Maximum number of style backup copies (x=number)
LANGUAGE=0000	Language or country code for masks and menu texts (four digits)
LANGNAME=	Name of selected language
TXTDIRAUTOM	Pre-set direction automatic in text menu
TXTSZEAUTOM	Pre-set scale automatic in text menu
MTABEXTRACT_MODE	Measurement chart extract method 0 - only extract if not available <default> 1 - only extract if different date or size, after query 2 - always extract without query
DRAGZONEMENUPOS=0	Position context menu in interactive environment: 0 - absolute (300,100) on current screen 1 - at mouse position <default>
NO_GRD_ZOOM=0	No zoom during start of grade rule pattern edit
GRD_GRP_ADD=0	Group grade rules additive

FORCE_PDM_COMPAT= 0	Allow compatibility with old PDM Programme up to V9
MDL_PREVIEW_IMAGE= 0	Store MDL style with preview image for Bizzoflex
MARKLINE_CUTLINE=0	Generate marking line directly with attribute <i>cut internal line</i>
DIALOGFONTHIGHT=8	Text size for system font (dialogue font)
STACKMOTHERPCS=0	Recorded stack also in mother parts
STACKBOUNDARY=1	Stack at part circumference
DISABLE_FIXED_LINTYPES=0	Generally disable old line type assignments
SHOW_BAKFILES=0	Offer opening BK? files
ENABLE_GRDTAB_SUBPATH=1	Managing measurement charts in subfolders (expert switch)
ENABLE_GRDTAB_ALTREF=1	Use of alternative reference size (expert switch)
SAVE_VERIFY=0	Plausibility check of write process. The file content is tested for structural logic. The file is not compared byte by byte.
SWITCH_SEAMADDITION=0	Function <i>remove seam allowance</i> (expert switch)
DELETE_SEAMADDITION=1	Delete allowance for function <i>remove seam allowance</i> , with =0 the old contour is changed to dashed attribute
ENABLE_EXTDXVAL=1	Additional functions in the x value window (expert switch)
ENABLE_GRDTAB_MEMMAP=1	Memorise import size assignement (expert switch)

## [INTERFACE]

LINE51=>....<	Output for header GerberEPN: collection
LINE52=>....<	Output for header GerberEPN: style
LINE53=>....<	Output for header GerberEPN: part number
LINE54=>....<	Output for header GerberEPN: part name
LINE55=>....<	Output for header GerberEPN: line format

LINE56=>....<	Output for header GerberEPN: base size
LINE57=>....<	Format for size name
IMPNONLECTRA=1	0- when importing AAMA data Lectra-AAMA data is expected (Lectra does not supply notch points for graded contours) 1-when importing general AAMA data is expected
USEEPNCONV=0	EPN direct output using EPNCONV or EPNIN (0/1=normal); Special option =2: Data is copied directly to the folder defined in EPNCONVPROG.
EPNCONVPROG=xx	Path for program file for EPN direct output
EPNSORT=0	Subsequent sorting of sizes in the EPN file (0=no, 1=yes)
EPNGRADGRAIN=0	Graded grain line in EPN file (0=no, 1=yes)
EPNCATEND=	End character or limit for category name (for part names with name elements of different lengths)
EPNNOSPACES=0	Remove spaces from part names and categories (0=no, 1=yes)
EPNUSELONGNAMES=0	EPN file: permit long file names (more than 8.3) (0=no, 1=yes)
EPNNUMBERONLY=0	EPN file: always reduce size designation to numbers (if possible) (0=no, 1=yes). This option can completely replace the entry LINE57 (see above).
GRAINDOWN=0	Automatic grain line detection: select grain line in direction hem/bottom (1) or away from hem/top (0)
AAMASMOOTHPT=0	Consider smooth points (intermediate curve points) during AAMA file import (0=no, 1=yes)
ANNOTASPIECE	Use 'annotation' as piece name

DXFEXP_STARTLAYER	Standard DXF Export: first layer No. ...
DXFIMP_IGN_BLOCKS	Standard DXF Import: ignore 'blocks' entries
DXFEXP_NAMEMODE	Name modus for DXF file 0 = according to old standard (style_<part No.>.DXF) 1 = DXF file will be created with dialogue 'Save as' 2 = DXF file name will be created using the part name (style+<part name>.DXF) Spaces and '.\/:*?' are changed into '_ '.
DXFIMP_CIRC2DRILLRAD	Radius of circle to drill hole conversion
IGN_GRADE_REF	Ignore AAMA/ASTM line type 'grade'
IGN_PLAID_REF	Ignore AAMA/ASTM line type 'plaid'
IGN_STRIPE_REF	Ignore AAMA/ASTM line type 'stripe'
MIN_SLITNOTCH_LEN	Preset minimum 'slit' notch lenght for import (general)
MIN_VNOTCH_LEN	Preset minimum 'v' notch lenght for import (general)
OPTNSALWY	Open options dialogue at every export
AAMASAVEAS	Save packed DXF files with 'Save as...' dialogue
DUPL_PCE_MODE=1	Treatment of double piece names: 0 = pack everything into one part 1 = create a second/ another part
AAMA_ACCEPT_FFPTS=0	Import or omit free function points as points
AAMA_CHK_DOUBLE_RULES=0	Check for double grade rules on a point

[PRINTER]

LEADINGBLANKS=xx	Number of leading blanks for print output
MAXCHARPERLINE=x	Maximum number of characters per line for print output
MANAGER=zzz	Path for plot manager empty
NOEMPTYPAGES=	Do not print empty pages (only for Windows print) (0=no, 1=yes)
PORTNAMEMODE2K=	use alternative port name for direct output under Windows 2000 (0=no, 1=yes)
NOPOSRESET=x	Do not store position of parts in plot dialogue

[DIGITIZER]

DIGISTOP=0	Waiting time after digitizer mouse click in milliseconds
SCHABLONEMM=205	Distance P1-P2 of digitizer template in mm
DIGIOK=1	Digitizer mouse key code for OK button
DIGIQUIT=4	Digitizer mouse key code for Quit-Button
LUPE=>..<	Digitizer mouse key assignment
ALLOW_KEYB_KEYS=1	Accept keyboard strokes as digitizer mouse clicks

[SYMBOL]

GRAINLINE=13	Symbol number for grain line
DRILLHOLE=10	Symbol number for drill hole
AUXDRILLHOLE=14	
NOTCH=1	
VNOTCH=4	
CASTLENOTCH=2	
LABEL_SYM=18	optional: Label symbol number

[SERIALPORT]

BAUDRATE=9600	Baud rate for plot output to serial port
PARITY=0	Parity for plot output to serial port (0=none, 1=odd, 2=even)
DATABIT=8	Data bits for plot output to serial port
STOPBIT=1	Stop bits for plot output to serial port
FLOW=8	Serial communication, handshake settings, possible variations:

	Hardware handshake (Pause) (CTS/RTS): FLOW=8236 Grafis-Standard (Hardware/Spezial): FLOW=8 Hardware handshake 'mode com1:9600,n,8,1': FLOW=4112 Software handshake (XON/XOFF) 'mode com1:9600,n,8,1,x': FLOW=4880
--	--

## [TOOLBOX2]

B01=xx...B25=xx	Assigning toolbox in Grafis Patternmaking; the possible parameter are listed in the Grafis.ini.
-----------------	---

## [TOOLBOXS]

B01=xx...B25=xx	Assigning toolbox in Grafis Marker making; the possible parameter are listed in the Grafis.ini.
-----------------	---

## [MARKER] Pre-settings for marker making

BLGINIT=7000	Standard value for material length in mm
MINPLOTLETTER=30	Minimum letter height for plot in tenth of mm (mm/10)
MINPRINTLETTER=20	Minimum letter height for printing via Windows in tenth of mm (mm/10)
PIECETEXTLETTER	Height of piece annotation (mm/10)
MARKERTEXTLETTER	Height of marker annotation ( mm/10)
PIECETEXTLINLETTER	Height of text at annotation lines (mm/10)
TITLECMAX=50	Maximum length for path entry in Grafis title bar
ADDSIZETOFOFNAME=0	Suggest size name for standard marker name (0=no, 1=yes)
BASEPATHSCB=x	Base directory for marker files \Grafis\SB
BASEPATHSBI=x	Base directory for marker information files
BASEPATHMDL=x	Base directory for production style files
RESETPPARAM=0	Reset layout parameter for rack pieces (0=no, 1=yes)
ONEPATHONLY=0	Remember only one path for open and save (0=no, 1=yes)



NOFLIP=0	Do not permit flip with click at crosshair during crosshair display (0=no, 1=yes)
NOTURN=0	Do not permit turn with click at crosshair during crosshair display (0=no, 1=yes)
CHECKCHAIN=0	Update prompt for chain plot (0=no, 1=yes)
ALLOW_SAVE_ON_CHECKCHAIN=1	Allow save after update
USESAVEFILE=1	Work with local copy (and write protection) (0=no, 1=yes)
BAKMAX=1	Number of backup copies
USE_MKX=1	Cut order planning interface on/off
MKXMODE=0	Mode for reading marker orders (0= Cut order planning (default), 1=Lago)
MKXSBEX=zzzz	Exchange directory for Grafis marker data in direction Cut order planning
MKXSBIM=zzzz	Exchange directory for Cut order planning marker request in direction Grafis
MKXMDEX=zzzz	Exchange directory for Grafis style data in direction Cut order planning
MKXSB_ADD_FILE=0	Output to a file MKXSBEX is the complete path to the target file
ALLWAYS_SMALLFILE=0	Always set option 'delete superfluous data' (0=no, 1=yes)
STRECHVALUEONGRAIN=0	Preset stretch value switch 'relate to grain line of pieces' (0=no, 1=yes)
AUTONESTERPATH=	Directory for Grafis Autonester
AUTONESTERKEY=	Release code for Autonester application
AUTONESTER_INCFOLDERNAME=0	Include path when determining name (n levels)
MDLACTMOD=0	Mode for updating styles 0 = discard piece properties (also for same style) 2 = transfer piece properties for identical ID or per category 3 = transfer piece properties (ID, piece text, material)

SCBOPENLIST	Structure of list view for 'Open marker...' dialogue (detail view) 0 = end list at this point 1 = file size 2 = date/time 3 = marker width 4 = marker length 5 = one letter for material code 6 = efficiency 7 = style name if available 8 = size list 9 = U/B (usage per bundle) 10= total length of perimeters
STATUSWDTHF01..08	Arrangement of status line 1 = part number/ part name 2 = size 3 = length 4 = efficiency 5 = U/B (usage per bundle) 6 = width 7 = current rotation angle 8 = warning symbol
PLTSAVEAS_JOB=0	Create job file also when plot to 'FILE:' (Save As)
OLDMDLNOTIFY=0	Always display old warning message at non-existing production style.
MOVEUP_PIC	Create preview image at 'Complete marker upwards' 0 = no (standard) 1/2 = yes as bitmap 3 = yes as Metafile
SPLITCURVE_ENABLE=0	Split pieces with wavy line
SPLITCURVE_STRT=10	Starting distance for wavy line
SPLITCURVE_HGHT=10	Height of wavy line
SPLITFREEHAND_ENABLE=0	Allow splitting of pieces by freehand

ZOOMSIZEVAL=2.5	Size of material in proportion to screen at <F6> zoom (value in 1/X of screen size; standard = 2.5)
PLOT_RESTOREPOS=1	Restore original piece position after piece plotting (standard='yes')
SHOW_ALL_OPTPCS=0	Display also exchangeable pieces which are not in use
PMDLBASEPATH=	Basic path for production styles (for search)
OPTIPLAN_LOADSCB=0	Instead of styles markers are loaded as templates (0=no, 1=yes)
PSCBBASEPATH=	Basic path for marker templates (for search)
SCBBASEPATH=	Basic path for search of placed markers
MKCOLORMODE=0	Colour mode for piece display 0= normal (7 colours in 3 shades) 1= only one shade (7/1) 2= two shades (7/2) 3= continuous, one shade (7/c) 4= continuous, two shades (7x2/c) 5= continuous, three shades (7x3/c)
PCSWINLNS=2	Counter window pieces/placed line number
PATHSBMAS=r:\grafis\sb\mas\	Path to SB\MAS folder
PLOT_NORESETDISTANCE=0	Do not reset distance value during plotter change
CUTPLOT_FOLLOW_THE_LINES=1	Plot-cut import with/without Follow Lines (expert switch)
DXFEXPMODE=1	Export mode for DXF markers (0-standard, 1-AAMA-like mode)
ENABLE_BDL_FLIP=1	Swap bundle direction (expert switch)
ENABLE_ENH_REPEAT=1	Further repeat options (expert mode)
ENABLE_BG_PIC=1	Background image (expert switch)
ENABLE_PMD_SZOPT=1	Special production style options (sizes)
ENABLE_SHRINK_ASST=1	Shrinkage assistant (expert switch)

## B.5 Printer/Plotter Setup

The dialogue *Printer/Plotter Setup* opens via

- the pull-down menu File → Printer/Plotter Setup or
- in the plot menu with *change*.

In this dialogue all settings for pattern output to plotters/ printers are carried out.

Fundamentally, the following output options are available:

1. Printer/ Plotter with installed Windows driver
2. Printer/ Plotter without Windows driver for direct output to LPT or COM interface
3. Plot to file.

### Printer/ Plotter with installed Windows driver

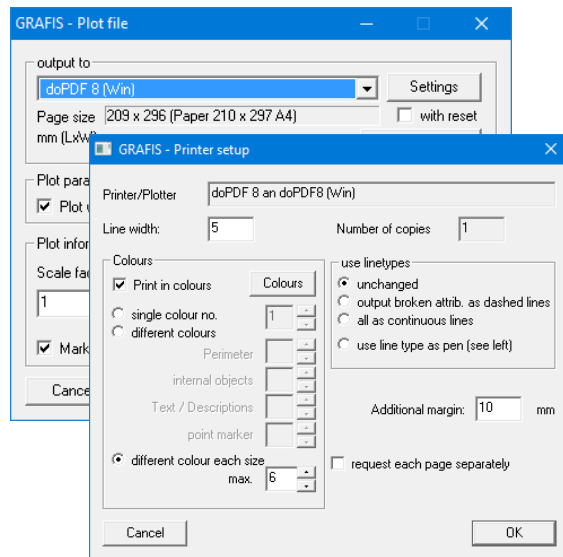
These devices are marked with (Win) in *output to* field. The *printer setup* button opens a further dialogue, see Picture B-17.

### Printer/Plotter without Windows driver for direct output to LPT or COM interface

These devices have no particular indicator in the *output to* field. A further dialogue opens via the *Settings* button, see Picture B-18.

For directly connected devices, the corresponding interface must be selected in this dialogue.

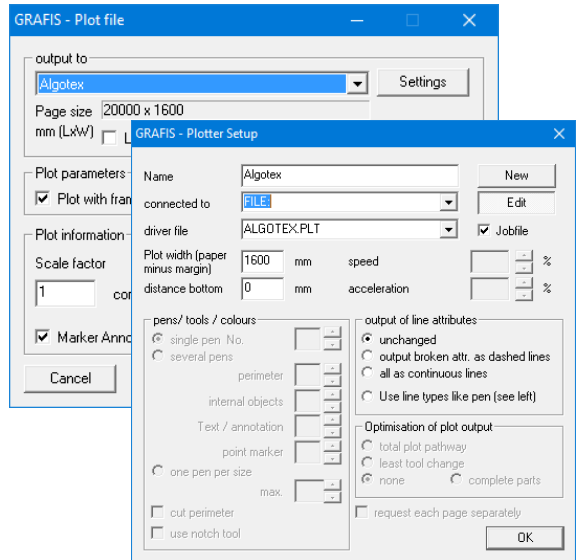
If the required device is not contained in the *output to* list, please read the explanations in section B.6.



Picture B-17

## Plot to file

Plot to file is only possible for printer/plotter without Windows driver. Select the prepared plotter in the *Plot file* dialogue. Pressing the *Settings* button opens the *Plotter Setup* dialogue where the option *connected to* must be set to 'FILE', see Picture B-18. Having accepted these settings, the next plot with this type of plotter will create a file. The file name choice is unrestricted, e.g. 'Trouser345.plt'.



Picture B-18

Depending on the operating system, type of plotter and connection option, the output of plot files may vary. Some devices, in particular large format inkjet plotters (Algotex, TkT, Brainpower, Lectra Alys) are delivered with their own plot software which work directly with the plot files.

If the plotter is connected directly to the computer via LPT or COM port (parallel or serial interface), you can also work with a COPY command. To send a plot file to a plotter click on *Start* → *Run....* on the windows desktop. Enter the following into the *Open* field:

```
copy e:\test.plt com2:
```

e:\test.plt must be the complete path to the plot file including its name.

com2: is the interface to which the plotter is connected.

Output to USB interfaces and plotter with direct network connection (printer port) with the COPY command is not possible. In this case, the Grafis plot manager, described in Appendix D can be deployed.

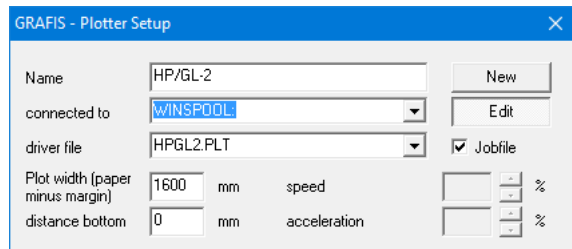
### Controlling a plotter via 'WINSPOOL' for plotter connected via USB or network (printer port)

Plotter connected via USB or network (printer port) cannot be fed directly with data via an interface. In this case, Grafis offers the possibility to use a windows printer driver as a forwarding entity via the 'WINSPOOL' option. A windows driver matching the plotter, which allows forwarding plot data (PASSTHROUGH) must be installed. As a rule, drivers included in the Windows delivery content or HP drivers fulfil these requirements.

If the driver does not fulfil the requirement or no Windows driver is available for the plotter, the devices 'Generic/ Text only' or 'HP/ Hewlett Packard HPGL-2-Plotter', delivered with Windows, can be installed.

The following step-by-step process must be completed to activate plotting via 'WINSPOOL':

- File → Printer/Plotter Setup
- Click on *Edit* button
- Enter 'WINSPOOL:' (Picture B-19)
- Click on *Edit* button again
- A window for selection of all printer drivers available on the PC appears. Select the driver for the plotter to be driven or the 'Text only' or 'Hewlett Packard HP-GL-2' plotter described above, see Picture B-20.
- Confirm with *OK*.

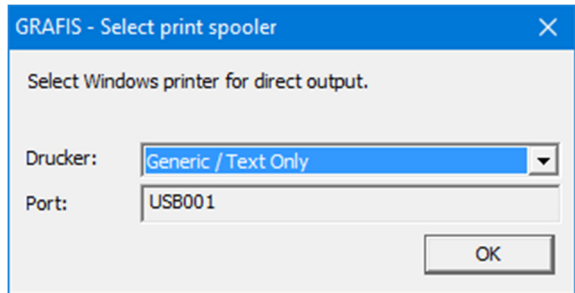


Picture B-19

If the driver does not support forwarding data, an error message appears during plotting. In this case, repeat the process with the printer driver 'Generic/ Text only'.

### **Pens and line types**

The settings for pens/colours and line types are of similar significance in the two dialogues.



Picture B-20

### ***Pens/Tools/Colours***

From Version 11 onwards you can print in colour with Windows printers.

If the device is to use one colour/tool only, e.g. one pen or one knife, select *single pen no.* and enter the number for the colour/the tool. Select *several pens* if you want to use different tools. Select the corresponding number for colour/pen in the fields *perimeter*, *internal objects*, *texts/annotation* and *point markers*. Select *one pen per size* to output each size with a different tool.

### ***Line types/Output of line attributes***

The individual options have the following significance:

- *unchanged*  
All line types are available.
- *output broken attribute lines as dashed lines*  
The plotter differentiates only between continuous and dashed lines.
- *all as continuous lines*  
The plotter draws everything as continuous lines.
- *use line types like pen*  
The settings area for colours is active. The colour numbers are interpreted as line type numbers. In this case, the printout is single-coloured but with different line types. If *one pen per size* is active, every size is printed with a different line type like on a paper sewing pattern.

The available six colours are coded through colour numbers: 1- black, 2 – red, 3 – yellow, 4 – green, 5 – turquoise, 6 – blue.

**Options in the dialogue Printer setup for Windows printers**

Useful are values between 0 and 6 for the *line width*. If certain line types are no longer recognisable, reduce the line weight step-by-step.

Windows printers offer the option to add an *additional margin* around the plot image. This is particularly important when printing to PDF printer drivers. PDF printer drivers offer the full format (A4, A3 etc.) and it may be possible that the print image of a PDF file does not fit fully onto the connected printer. If the page is adjusted to the available page size, it loses its scale. If it is not adjusted, areas along the edge may be missing. When printing with PDF printer drivers it is recommended to set an additional margin of 10mm. Thus, PDF files can be output to a number of different printer models in original scale.

**Options in the dialogue Plotter setup for devices without Windows driver**

If *job file* is active, a job file is created during plot output. The job file is only useful when working with the plot manager. It contains information about the plot such as length, width, content, scale, bundle no.

***Speed/Acceleration***

Entering a value for *speed* can reduce the plot speed. A percentage value relating to the maximum speed is to be given. Analogous to the speed, the acceleration can also be reduced. Enter a percentage value relating to the maximum acceleration.

***Optimisation of plot output***

The individual options have the following significance:

- *complete parts*  
The plotter optimises the plot path relating to the piece. This may mean frequent tool changes.
- *least tool change*  
The plotter optimises the plot path with as little tool changes as possible.
- *none*  
No plot path optimisation, e.g. for inkjet plotter.



## B.6 Plotter adjustment and printer/plotter in a network

Grafis can support all plotters and printers with available Windows drivers. These devices are set up in Windows Control Panel. Further options are available in the *File* pull-down menu under *Printer/ Plotter setup*. Setup and application of these devices is described in section B.5.

### Plotter adjustment

The adjustment of plotters without Windows drivers ensues in Grafis with plot code files with the extension .PLT and plotter queue files with the extension .QUE. The files are stored in the directory \Grafis\Plotter. For some plotters PLT and QUE files are already prepared. Setup and application of these devices is described in section B.1.

The following basic options can be set in the Grafis setup on the *Plotter* file card for prepared plotters: maximum paper width, plotter resolution, number of pens or colours, zero point position, request for each page.

For output of patterns Grafis directly supports the following output devices:

- all Hewlett Packard plotters (e.g. DesignJet, Draftmaster), which process HPGL
- Encad Cadjet 2, Encad T-200 and NovaJet
- Canon iPF-Serie (if HP/GL is supported)
- Summa plotter and cutter (e.g. S-Class)
- Graphtec plotter and cutter
- Wild plotter and cutter TA40, TA400, TA500, TA10
- Zünd plotter and cutter
- Mutoh plotters of iP, XP, XP-C and AC series
- Gerber plotter AP300 and AP700 (with special adjustment only!)
- all unlisted plotter which work directly with HP/GL or HP/GL-2
- DM/PL-compatible, i.e. Ioline devices (Summit series)

Furthermore, a range of inkjet plotter exists which can output HPGL data via a plot software included in the delivery:

- Algotex plotter
- Gamma Tech plotter
- Lectra Alys series
- Gerber Infinity series

The devices in the following list have already been prepared in the Grafis installation and can be activated in the setup on the *Plotter* file card:

<b>Plotter driver file</b>	<b>Controllable plotter/printer</b>
Algotex	Algotex Projet, ClassicJet, Streamjet, Windjet, Wavejet, Powerjet various widths (default set to 180cm)
HP/GL-2	all HP-GL/2-compatible plotter and printer, e.g. HP Designjet, Canon iPF, Encad T-200, and many more
Summa S160-TX	Summa cutter S-Class
Graphtec	e.g. Graphtec CE 3000-120 AP
Gerber Infinity	Gerber Infinity series and other Gerber plotter with plot manager
Lectra Alys	Lectra Alys series (ink jet plotter) with plot software
TKT Brain	TkT Brainpower plotter
Wild TA500	Wild plotter TA 500
Zünd	Zünd L800

If your plotter is not contained in the above list, please obtain the following information:

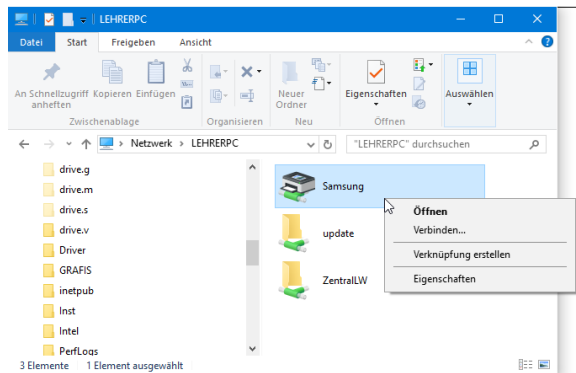
1. Is a driver for the printer available for your operating system? If yes, it should be installed as a Windows printer.
2. Is the plotter HPGL-compatible (can it process HPGL-language)? If yes, it can be addressed as a HP-plotter.
3. Is the plotter compatible with one of the devices mentioned above? If yes, it can possibly be controlled with the respective control file.

If the answer NO to all the questions, a special plotter control file is required for the device. It can only be generated by experienced specialists. Basis for the generation of a plotter control file is a plotter manual which can be obtained from the supplier or manufacturer in most cases. Generating a new plot code file requires special knowledge about controlling plotters. It is realised by the Grafis team as part of a service agreement.

### **Shared use of printers/plotters with Windows drivers**

As a rule, printer and plotter with Windows drivers can be used from various Grafis workstations within a network without special settings. It is merely required to enable the printer in the printer setup of the computer to which it is connected. Other workstations can also address and use the printer via this sharing. The simplest way to connect to the network printer is to search for the PC within the network environment. Here, all available network printers are listed. Select the required printer with a right-mouse click and select *Connect...* from the menu, see Picture B-21.

For printer or plotter directly connected to the network via a so-called printer port, installation of the supplied driver on all computers to use the printer or plotter is required. Proceed as for a normal device installation under Windows.



Picture B-21

### **Shared use of printer/plotter without Windows driver or direct output of plot data**

If an older plotter is to be connected to Grafis via the network, verify that the plotter can process HPGL data. Only in this case can the plotter be supplied with plot data directly from Grafis.

To enable the plotter via the network, a Windows driver must be installed on the host PC. If no Windows driver is available for the device, use the 'Generic/ text only' driver supplied with Windows (or if still available the 'HP/Hewlett Packard HP-GL/2' driver). This driver must then be connected to the interface to which the plotter is connected and enabled in the network. The name used should be the actual name of the plotter. Please ensure that no test page is printed during setup of the printer driver. Enabling ensues as described in the previous section.

The printer driver must be connected on the client PCs also as described in the previous section. Use 'WINSPOOL' in Grafis as the output target, see section B.1. Alternatively, the plot manager may be used, the setup is explained in Appendix D.

## B.7 Settings for EPN export to Gerber

### Options in Grafis.ini

Experienced users can control the export with the following switches in the Grafis.ini, section [INTERFACE]:

DATAINTERFACE=x	default output format (1=Grafis, 2=EPN, 4=AAMA/DXF, 0=menu selection) 0
EPNSORT=0	Subsequent sorting of sizes after export (1=on, 0=off)
EPNGRADGRAIN=0	Graded grain line (1=on, 0=off)
EPNCATEND=-	End character or delimiter for category name (e.g. '-' or '_')
EPNNOSPACES=0	Remove spaces from part name and category (0=no, 1=yes)
EPNUSELONGNAMES=1	Permit long file names (more than 8.3) (0=no, 1=yes)
GRAINDOWN=	Automatic grain line detection; Select grain line in direction hem/downwards (=1) or away from hem/upwards (=0)
EPNNUMBERONLY=	always reduce size designation to numbers (if possible) (1=on, 0=off)
EPNCONVPROG=...	external program file for EPN direct output (e.g. c:\grafis\hilfen\epnconv.exe)

The EPN file contains a header with three pre-set fields in which the information part name (1-20), category (A-40) and part description (41-60) is expected. These fields can be collated by the user from the Grafis designation for collection, style, part number and text. This is determined in the Grafis.INI file in the [INTERFACE] area via entries in LINE51 to LINE56. Here, it is specified from which position of the Grafis text how many characters are transferred to which position in the header. The following entries in the [INTERFACE] area are also relevant:

LINE51=>....<	Output for header GerberEPN: collection
LINE52=>....<	Output for header GerberEPN: style
LINE53=>....<	Output for header GerberEPN: part number
LINE54=>....<	Output for header GerberEPN: part name
LINE55=>....<	Output for header GerberEPN: line format
LINE56=>....<	Output for header GerberEPN: base size
LINE57=>....<	Format for size name

### Options in Interfac.sys

The file `\GRAFIS\SYMBOLE\INTERFAC.SYS` defines the interpretation of the different Grafis symbols for output to an interface file. It applies especially to the output to Gerber systems.

Gerber Accumark systems have a code letter for each object (line, symbol). The assignment of these codes to the Grafis lines and symbols ensues in the INTERFAC.SYS file. This file contains only ASCII characters and can be edited in any editor. Symbols and line types not assigned in this file will not be exported. Furthermore, the file contains details about the minimum distance between two grade points (this is also the minimum distance between notches). This distance is checked during export. A warning message appears if the distance falls below the determined value. The piece is still exported.

The file contains the interpretation instruction for one Grafis symbol per line.

The **first digit** gives the symbol type. The following applies:

- 1 = line symbol. Symbols output only in connection with lines, e.g. notches.
- 2 = point symbol: These symbols can be positioned anywhere and do not have to be connected to a line, e.g. buttonholes or drillholes.
- 3 = point symbol. In general as 2, but they contain two points for output (for special Gerber systems)

The **second digit** states the number of the Grafis symbol to be defined for interpretation.

A field with up to 10 digits follows. Here, it has to be defined which letter or letter combination is to be used for the symbol in the file. For line symbols (type 1) two letters are significant, for point symbols (type 2 and 3) only one letter is significant.



The mode of operation for the Autonester was explained in chapter 18.17.

### **Preparation/System requirements**

The Grafis Autonester functions independently from the Grafis Marker making program. It can run on a separate computer that has been setup for this purpose. Communication between the marker making software and the Autonester ensues via nesting job orders and nesting job solutions. These job orders are saved in the Grafis Autonester directory. If the Autonester runs on a separate computer, the Grafis Autonester directory must be enabled in the network. If Autonester and Grafis Marker making run on the same computer this is not necessary.

Please note that the Autonester puts demands on the system during nesting. Since it is the processor that is mostly affected, this may slow down the system if working with other software (such as Grafis) at the same time. Also please note that the processor generates more heat under full load than under normal conditions. For computers which do not have optimum ventilation this can lead to problems with the stability of the whole system. Laptops in particular are not suitable. We recommend the following minimum requirements for a computer that is to be configured especially for use with the Grafis Autonester:

- Intel Pentium i3/i5/i7 or AMD Athlon, Dual- or Quad-Core
- minimum 2 GB RAM
- The other components can be according to mass-market PC standards. There are no particular requirements for graphic cards or hard disk size.

### **Installation**

The Grafis Autonester is installed from the Grafis CD via its own installation program. Connect the USB-Hardlock only after installing the Autonester. The file can be found on the CD in the folder \Tools\Autonester and is called "Autonstr.exe". After starting the installation program you are guided through the installation process.

Select a target network directory that can be enabled for other users (e.g. C:\Autonester) for the installation. If installing Autonester on a local workstation, install directly in the recommended directory C:\Grafis\AUTONESTER or on the appropriate Grafis drive.

After the Autonester installation is complete, the hardlock driver setup required for the program (Safenet Sentinel) starts automatically. The USB-Hardlock is to be connected only after the driver installation. A system reboot may be required.

When using Grafis and Grafis Autonester on the same PC, it is necessary to connect both hardlocks. The hardlocks and their corresponding drivers are compatible.

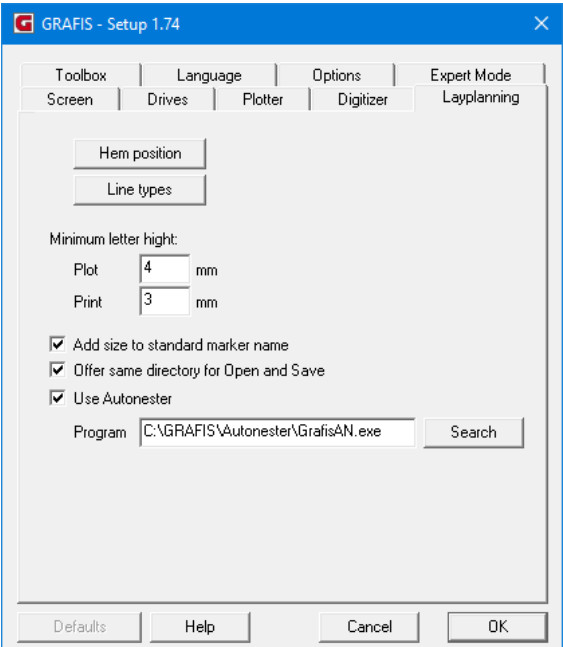
The Grafis Autonester is entered into the Autostart folder of the start menu during installation. This will start the Grafis Autonester automatically and make it available for nesting jobs after each new start of the computer. The entry in the Autostart folder can be deleted if this is not required.

### Setup of the Marker making software

After the successful installation of the Autonester, a link between Grafis Marker making and Grafis Autonester has to be established. All Grafis workstations must be able to save files to the Autonester directory.

The path for the Autonester directory is now entered in the setup of each Grafis workstation. To enter the path start Setup (e.g. via Start → Programs → Grafis → Setup) and select the *Marker making* tab. Check *Use Autonester* and enter the path for the Autonester application (GrafisAN.exe) with *Search*, see Picture C-1.

End Setup with *OK*. The Autonester is now set up on this Grafis workstation.



Picture C-1



---

**Prepare and send Autonester orders**

Finished marker as well as unplaced marker job orders can be sent to the Autonester. A job order can be sent as soon as a marker file is open and the marker making mode is active. A nesting job order is created with *Marker* → *Send to Autonester*. All pattern pieces are returned to their original position (rotation and mirror) and unplaced is selected.

Grafis Marker making saves the job order file directly into the Grafis Autonester directory. The order file contains all the information (e.g. piece perimeters and laying parameters) required by the Autonester for the calculation. If the Autonester is active and set to automatic mode, calculation of the nesting job starts automatically after a few seconds.

The marker file can be closed during calculation. The user can also continue working on the marker. However, please note:

- The basic structure of the marker must not be altered. In particular the order and amount of sizes and pieces and the marker parameters of the pieces.
- The marker file must be saved before closing. This also saves the information about the sent job order file. Otherwise, opening the completed nesting job may no longer be possible.

Taking these two points into account, the user can

- prepare a number of markers,
- send them to Autonester and
- save them under a new names

in a short space of time. The Autonester processes the nesting job orders successively.

**Loading Autonester solutions**

When the Autonester has calculated a solution or an interim solution, a file is entered into the Autonester directory. To load this file the respective marker must be open and the marker making mode must be active. Load the solution via *Marker* → *Load Autonester file*. When opening a marker file with an available solution, a message box appears asking if the solution is to be accepted.

After accepting an Autonester solution, it is possible that individual pieces do not appear to be placed despite the correct calculation of the marker in the Grafis Marker making software. This is due to the different ways in which Grafis Marker making and Autonester operate. Should this happen, attempt to place the pieces in question by moving the surrounding pieces slightly. If this does not work a certain operation parameter in Autonester can be changed. This results in slightly reduced marker efficiency but the situation mentioned above occurs less often.

### **Options for marker making with Autonester**

Grafis Autonester supports all fabric and laying parameters that can be entered in the Grafis Marker making. These are:

Material/ fabric:

- fabric width
- spread type
- fabric faults
- repeat
- shrinkage values
- global buffer

Piece parameters:

- raster rotation (45/90/180°)
- free rotation angle
- fixed rotation angle
- flip allowance
- tolerance (buffer, block addition)
- symmetry switch for folded or tubular material

Use of shrinkage values that do not relate to the grain line in a piece is not possible. Otherwise, the shape of a piece would be altered during a rotation. The Autonester cannot automatically take this into account. The automatic splitting of pieces is also not possible with the Autonester - even if this option is enabled in the marker, e.g. automatic splitting of the crutch point from a trouser leg.

Check carefully that the correct piece parameters are set before sending the nesting job order. The Autonester will use all possible rotation options! It is often the case that more options are enabled for marker making than should be permitted. During manual marker making, the human operator can compensate for any exceptions. This procedure is not possible when using the Autonester.

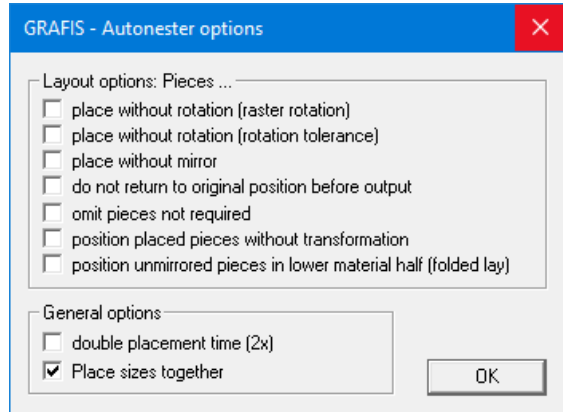
To change the enabled Autonester marker options, use the dialogue window *Marker* → *Autonester options*, see Picture C-2.

In this dialogue window the following can be disabled:

- use of raster rotation (45/90/180°),
- use of free rotation (rotation tolerance) and
- use of flip allowance.

### ***Omit pieces not required***

This option is valid only for pieces where the parameter *Piece can remain unplaced* has been checked on the file card *Pieces*. This Autonester option defines if a piece should or should not be placed.



Picture C-2

### ***Do not return pieces to original position before output***

If the first three options have been enabled and the pieces in the marker have not been rotated or flipped, you do not have to select *return and switch to unplaced* when sending nesting orders.

### ***Position placed pieces without transformation***

This option allows you to define certain rotation or flip transformations for single pieces. The Autonester will not rotate or flip/mirror any pieces that have already been placed even if this has been enabled in the piece parameters.

### ***Non-flipped pieces on the top ply (closed spread)/ Position unmirrored pieces in lower material half (folded lay)***

When laying on tubular fabrics or folded face-to-face spreads, it is possible that all non-flipped pieces are to be cut from the top ply (lower half of the ply on the screen). The Autonester, however, places the flipped pieces for best efficiency. Therefore it can be expedient to lay all non-flipped pieces (those occurring only once in the spread) on the top ply i.e lower half of the ply on the screen.

***Double placement time (2x)***

The time used by Autonester for nesting is doubled between the min-max limits. This option is useful when the Autonester has to calculate markers more efficiently i.e. better fabric utilization.

***Place sizes together***

Individual sizes are placed in blocks within the marker (interlocking multi-size markers).

***Send to Autonester (active piece only)***

Only active pieces (placed pieces or pieces on the laying field) will be sent to the Autonester when this option is enabled. Pieces still in reserve will be ignored. This option is useful when only certain groups of pieces are to be automatically placed.

***Opening an Autonester file ...***

If the link between a marker and an Autonester job order has been lost (e.g. a marker was not saved after the order was sent to the Autonester), this option can be used to import the corresponding Autonester file. It is important that the Autonester file matches the current marker. If not the pieces will be jumbled or not placed.

***These options, when set, are saved and apply permanently.***

**Autonester user interface****Mode**

The Autonester operates automatically if the switch *Automatic mode* is set. In automatic mode the job order list is compiled automatically. Incoming Autonester jobs are registered every 10 seconds. The order of the job entries can be altered. As soon as an entry appears in the jobs list, calculation of the marker begins. Once a job order calculation is finished, calculation of the next job order begins automatically.

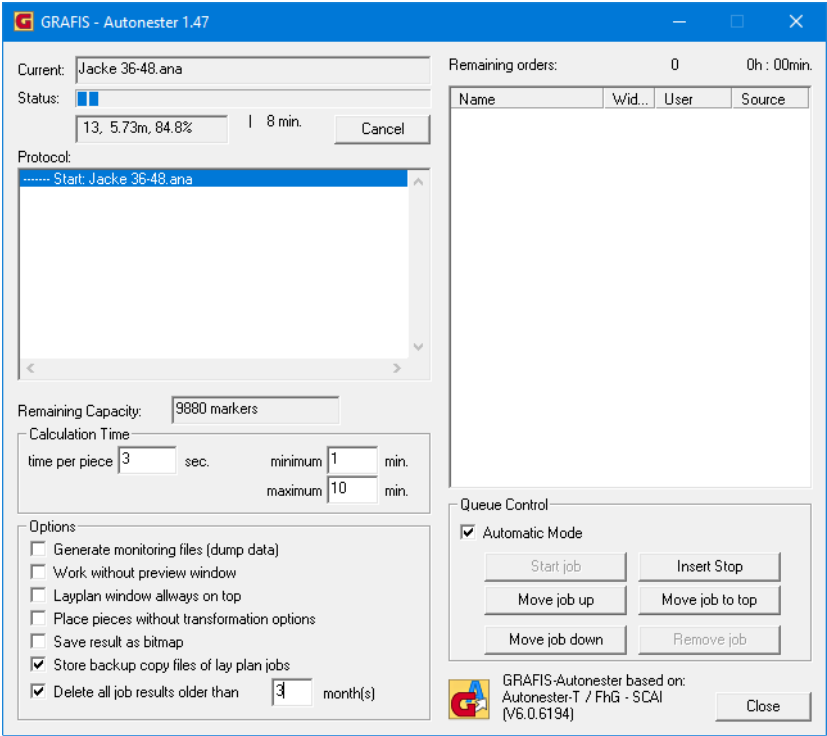
**Calculation time**

The quality of a nesting solution at constant placement time is dependent on the amount of pieces to be placed. More calculation time should be allowed for markers with a large number of pieces than for simple markers. The given placement time is calculated on the basis of the number of pieces and a time factor per pattern piece. The resulting amount is limited by a minimum and a maximum value. In the above screenshot, placement time is set to 3 seconds per piece with a minimum of 1 minute and a maximum of 10 minutes placement time. The most appropriate time values depend on computer processor speed and the

requirements of the marker making department (quick response, high efficiency etc).

**Status**

As soon as a nesting job order is being processed, the name and current status of the job order can be found in a window in the top left corner. The progress bar



Picture C-3

displays the selected calculation time, the time elapsed, the number of interim solutions and the current length. If the option *without preview* is not selected an additional preview window displaying the current status of the calculation appears. Calculation of the current job order can be stopped by closing the preview window or with *Cancel* if required. Comments or error messages for the current order appear in the *Record* window. The entries in this list can be clicked individually. They appear in full in a separate dialogue box.

## Options

### ***Generating monitoring files***

Standardised monitoring files for the nesting job orders are generated. These files are important for error diagnostics. Activate this option only if you have been requested to do so - e.g. by the Grafis Hotline.

### ***Work without preview window***

The preview of the nesting solution in progress is not displayed. Select this option if the graphic display of the nesting solution is not required or not desired.

### ***Marker window always on top***

This option displays the marker preview window always on top of all other windows. This enables the user to simultaneously work with the Grafis Marker making program and follow the progress in the preview window. This option is only useful if Autonester and Grafis Marker making run on the same system.

### ***Save result as a Bitmap file***

If this option is activated and the preview window is open, a Bitmap file of the nesting job result can be generated. The Bitmap file will be saved under the same name as the nesting job in the Autonester folder.

### ***Placing pieces without transformation options***

This option disables any allowance for rotation and flipping of the pieces to be placed. All pattern pieces will be placed in their original orientation.

### ***Retaining backup copy files of nesting job orders***

When an Autonester nesting job order (\*.ANA) has been fulfilled, the job order is deleted. When this option is active, backup copy files (\*.ANB) can be generated. These are saved in the Autonester folder. This option is useful not only for error diagnostics but also for statistical evaluation of Autonester utilization.

### ***Delete all job results older than...***

All Autonester job results (\*.ANL) are saved in the Autonester folder even if they have been transferred to Grafis Marker making. Thus it is always possible, at a later date, to reset the marker file to that of the Autonester status. To avoid an overflowing Autonester folder, this option can be activated to delete older no longer needed Autonester job results (\*.ANL). The time span is given in 1 monthly intervals. All corresponding files such as bitmaps (\*.BMP) and backup files (\*.ANB) are also deleted.

### **Options in the Grafis.ini for the Autonester application**

A series of entries for the Autonester are found in the text block [MARKER] in GRAFIS.INI. All entries begin with AUTONESTER, see section B.5.

The entries AUTONESTERPATH and AUTONESTERKEY can be regulated in the setup program. AUTONESTERPATH specifies the Autonester directory where nesting job orders and nesting job results are saved. If the Autonester is to be displayed in the marker menu, AUTONESTERKEY must not be set to "0".

In addition, there are the options AUTONESTER\_SOL and AUTONESTER\_INCFOLDERNAME. After importing an Autonester nesting solution, AUTONESTER\_SOL shakes the marker so that all pieces are shifted to the left i.e. as close to the beginning of the marker as possible. AUTONESTER\_INCFOLDERNAME is to include the directory in the file name. This avoids ambiguity when assigning file names to Autonester nesting job orders. The number specifies how many directory levels are to be included in the file name - 1 to 3 levels are recommended. The options AUTONESTERTIME and AUTONESTEREXEC are not in use at this time





## Appendix D

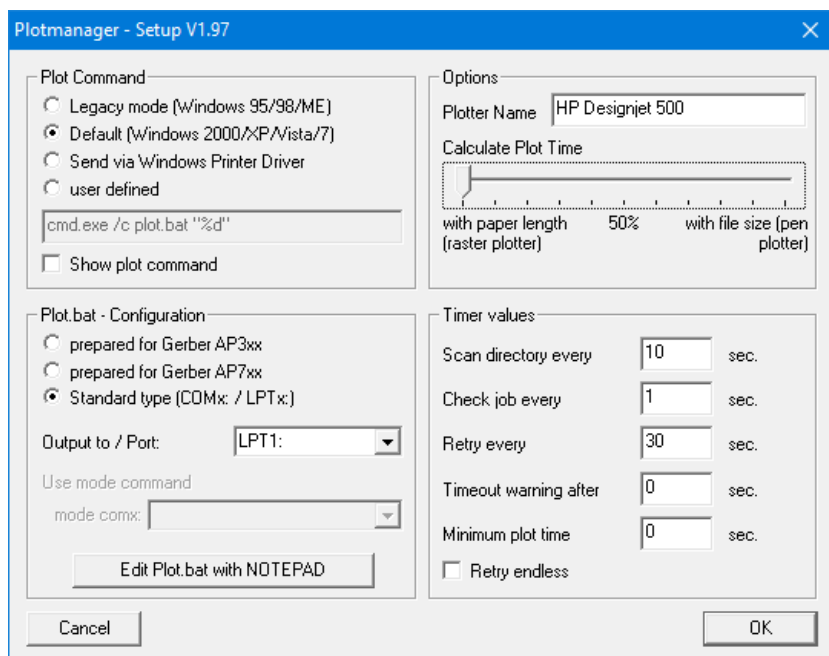
## Installing and Setting up the Plotmanager

The plot manager is a stand-alone windows program. It can be used independently from any GRAFIS installation. This program runs on operating systems Windows XP/7/8 or 10. It can also be used on older PCs.

### Installing the plot manager

The installation is started using the program PLOTMGR!.EXE. This file is found either on the Grafis CD or on the local Grafis workstation in the folder \GRAFIS\HILFEN. Double clicking the \*.EXE file will start the installation.

The plot manager requires an independent directory on the plotter server – e.g. C:\PLOTTER. The plot server is the computer to which the plotter is connected. If the plot server is to be controlled via a network, the directory must be enabled or it should be a directory on the net drive. A target directory is requested at the beginning of the installation.



Picture D-1

After the installation is complete, the plot manager setup will start, see Picture D-1.

Setup the options in the following categories *Plot command*, *Plot.bat - Configuration* and *Options* according to the existing system.

If the plotter is connected to a serial interface COMx:, the following parameters must also be selected: baudrate, parity and protocol. These are found in *Use mode command*.

If the plotter is connected via USB or a network, select *Send via Windows Printer Driver* and activate *Show plot command*.

The scroll bar *Calculate plot time* specifies the criteria which the plot manager uses to calculate the estimated plotting time.

The remaining settings should be left unaltered.

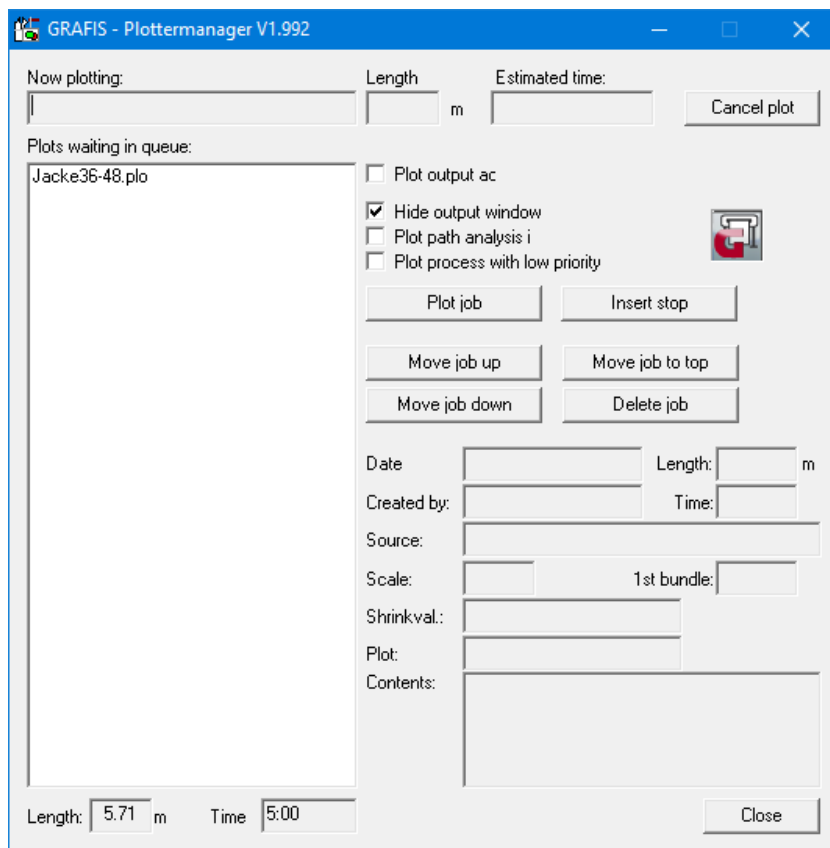
All settings and options are saved in the PLOTMGR.INI file in the current folder. An explanation of each option in this file is to be found at the end of this text.

The installation program adds an icon to the Auto start folder so that the plot manager starts automatically after user login.

The following files are required for setup and use of the program if the plot manager should not or cannot be installed with the installation tool: PLOTMGR.EXE (plot manager program), PLOTCTL.EXE (remote control program), SETUPMGR.EXE (plot manager setup program). These files are copied to a folder for future use as the enabled target folder for plot files in the network. The PLOTMGR.EXE program file should be linked in the Auto start folder for automatic start up. Then, run SETUPMGR.EXE to complete PLOT.BAT setup and software configuration.

## Plot manager options

The plot manager user interface is illustrated in Picture D-2. The options are as follows



Picture D-2

### **Plotting active**

The plot manager is set to stand-by mode. The current directory is scanned every 10 seconds for new plot jobs. If new plot jobs arrive they will be processed automatically.

### **Hide output window**

All plot job commands are issued in a DOS window. At the beginning, it is possible to make this DOS window visible for control purposes by de-activating this option. An intermediate setting for this switch is available which always shows the DOS window without reduction. Thus, the plot process runs with total system load. This option is required if the data does not arrived sufficiently fast at the plotter (only for very slow PCs).

***Plot path analysis in LOG file***

For control purposes, the plot manager runs an automatic log file (PLOTMGR.LOG). This file captures every plot job processed with name, date, time and plot duration. Set this option if further information (total line length, pen up length, number of pen select commands, etc.) is required. This additional information can also be found in PLOTMGR.LOG

***Plot process with low priority***

If the computer is used for other applications as well, it is useful to run the plot process with low system load. For this purposed activate this option. An intermediate state of this switch is available which is reserved for special applications.

***Cancel plot***

The current plot job is aborted.

***Plot picture***

Sends the selected plot file to the plotter.

***Insert pause***

A pause command is inserted in the list before the selected plot job. The plot manager de-activates automatically and waits for user input.

***Move up***

Moves the selected plot job up one position.

***Move to 1st position***

Moves the selected plot job to the first position. It will be executed as the next job.

***Move down***

Moves the selected plot job down one position.

***Delete picture***

Deletes the selected plot job.

Further displayed information:

***Now plotting***

This plot is in process.

**Length**

Length of the plot in meters.

**Estimated time**

Estimated data transfer time - this is the time that the plot manager needs to transfer the data. It is not the actual plotting time. These two values are only the same when the plotter has a small memory i.e. is not able to store the plot file. If the plot manager is in non-stop use, the estimated data transfer time is very close to the plotting time.

The following information is always given for the plot selected on the left of the list.

**Creation**

Date and time of the plot job creation

**Created by (\*)**

The user name of the plot jobs creator.

**Length (\*)**

Plot length in meters

**Time**

Estimated output time

**Source (\*)**

Source file from which the plot was issued

**Scale (\*)**

Scale of the plot (e.g. 1:1 for original size or 1:5 for minis)

**1st bundle (\*)**

If a marker is being plotted, the number of the first bundle in the marker is shown here.

**Contents (\*)**

If a chain of markers is being plotted, the list of the markers is shown here.

(\*) This readout appears only when the Grafis Layplan program generates the job file. These displays are empty if the Grafis Patternmaking program has generated the job files.

At the bottom of the list there are two additional readout displays. These are for the total plot length and the total plot time of the complete list of job files.

### Starting the plot manager

To create plot jobs in the Grafis Patternmaking and Marker making programs, the plot manager does not need to be active. Only the plot manager directory must be available. If this directory is located on a separate PC, it must be running. The plot manager has to be started when plot jobs are to be plotted. The close button (upper right corner) minimizes the plot manager to prevent a shut down during plotting. To shut down the plot manager use the *Close* button in lower right corner. This button is only available when no current job is being processed.

If the plot manager should always be on standby, create a shortcut to the plot manager program in the auto start folder. The installation sets this up automatically.

### Configuring the plot manager in Grafis

In the Grafis plot window, click on the *Settings* button to the right of the selected plotter. Click *Edit* in the new window and enter the target drive and directory in the display *connected to*. End the entry with '\ ' e.g. 'P:\ ' or 'C:\PLOTTER\' if the plotter is connected to the PC. If the option *job file* has been selected, job files are generated for the plot job. This displays more detailed information about the plot job in the plot manager. Click *Edit* again and close this box with *OK*. All plots generated with this plotter setting will be sent to the selected target directory. File names are generated automatically. As each plotter will have own plotter settings you can work with any number of plot managers and therefore any number of plotters. Alternatively, a single plotter with various settings (different tools, velocity, paper width etc.) can also be used.

### Access to the plot manager in a network

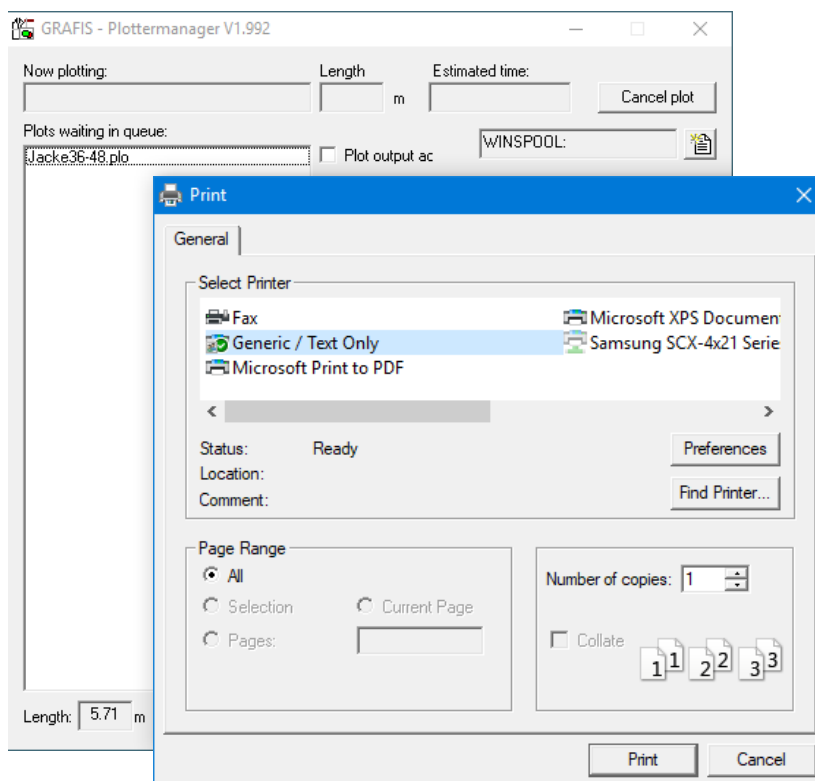
A network plot server PC is recommended in companies with a large number of plots per hour. This can be a simple PC (minimum 133 MHz) with Windows operating system. More than one plotter can be connected to this PC depending on the number of serial and parallel ports available. Each plotter must have its own directory for its own plot manager. This directory can also be located on the network if the server is running around the clock. The advantage here is that plots can be generated even if the plot server PC is switched off. The PC can then be switched on when plotting should start. A remote check of the plot manager can be achieved using PLOTCTL.EXE. This program allows users to check the status (with a slight time delay) of the plot manager from any where on the network. PLOTCTL.EXE must be located in the same directory as PLOTMGR.EXE.

Please note: the plot manager may only be started once. It may only be started on the plot server. The remote check program, on the other hand, can be started as often as required.

### Activating the plotting process using 'WINSPPOOL' for USB plotters or through network (Printerport)

Plotters connected via USB or network (Printerport) do not have the ability for a direct data transfer interface. In this case, Grafis offers the possibility of using the option 'WINSPPOOL:' to relay the plot files through a Windows printer driver. A Windows printer driver for the selected plotter must be installed which supports the PASSTHROUGH of the plot files. Generally the standard plotter drivers from Windows or driver from HP fulfil this requirement.

If the driver does not fulfill this requirement or there is no driver for the selected plotter, install the Windows device 'Generic/Text only' or 'HP/Hewlett Packard HPGL-2-Plotter', see Picture D-3.



Picture D-3

To start the plotting process using 'WINSPOOL:' complete the following sequence:

- Start the plot manager
- Click the button right of the command line.
- Enter 'WINSPOOL:'.
- Click the button right of the command line to save entry.
- A popup window with all available printer drivers appears. Choose the driver for the selected plotter or alternatively 'Text only' or 'Hewlett Packard HP-GL-2 Plotter'.
- Confirm with *OK*.

If the driver does not support PASSTHROUGH, an error message appears. In this case, repeat the above sequence using the printer driver 'Generic/Text only'

### **The PLOTMGR.INI options in detail**

Under certain circumstances, further options of the plot manager in PLOTMGR.INI can be adapted for the plotter or the local situation. Here is a short explanation of options that cannot be changed via the plot manager window.

#### **COMMAND**

Contains the plot command that will be executed with each plot job.

#### **NAME**

Contains the name of the plotter. This name will be shown in the title bar of the plot manager and can be used to differentiate between several plotters.

#### **PLOTBYTES**

The plot manager stores the number of plot bytes processed.

#### **PLOTSECONDS**

The plot manager stores the time in seconds of the plots processed. The two values PLOTBYTES and PLOTSECONDS are used to calculate the estimated plot time.

#### **PLOTMMETER**

The plot manager stores the length in millimetres that have been plotted. The two values PLOTMMETER and PLOTSECONDS are used to calculate the estimated plot time.

#### **TIMECALCBYTES**

Contains the weighting value for the calculation of the estimated plot time. The value range from 0 to 100. 100 calculates the time based on file size only (PLOTBYTES). 0 calculates the time based on plot length only (PLOTMMETER; advantageous for ink jet plotters). A value in between are a mixture of the two.



**PLOTTIMER**

Contains the time interval in seconds for checking the plot directory for new jobs. It is also the maximum pause time between job.

**RETRYTIMER**

Contains the time interval in seconds for the start of a retry after an error message.

**CHECKTIMER**

Contains the time interval in seconds for checking the status of the current job.

**SHOWCMD**

When this is set to '1', the plot command line will be shown in the plot manager window. Then it can be changed from the user interface.

**MINSECONDS**

Contains the minimum amount of time that plot job needs. This command can be used to detect errors.

**RETRYENDLESS**

Raise the retry output to endless. Normally the plot manager stops after three attempts.

**Configuration example: Encad Cadget 2 is connected to a Grafis PC and additional Grafis workstation PCs in the network**

The Encad Cadget 2 is connected to the PC via a parallel port. If an additional printer is needed, the PC requires a second parallel port (LPT2:). The following configuration is recommended:

Create the folder C:\CADJET for the plot manager in the directory C:\. The folder 'Cadget' is a shared folder and has read/write access that can be secured using a password. Copy the file PLOTMGR.EXE to this folder. The PLOTMGR.INI contains following command line:

```
COMMAND=c:\command.com /c copy %d lpt2:
```

In the GRAFIS.INI at this PC add the entry MANAGER=C:\CADJET under the heading [PRINTER]. In the Grafis Layplan program under plotter setup, enter 'C:\CADJET\' in the display field *connected to*.

Now configure the additional Grafis workstation PCs. Search for the 'Cadget' folder and connect to drive P: using a right mouse click. Do not forget the option 'restore connection'. Enter 'P:\' in the display field *connected to* of plotter setup in Grafis at these additional workstation PCs.

The estimated plot time averages a few seconds because the plotter has enough memory to store multiple plot files. It goes with the real plot time only if the plotter is under continuous operation.

**Configuration example: Algotex plotter connected to a separate PC and additional Grafis workstation PCs in the network**

Algotex plotters are supplied with a configured PC or are connected to an available PC (WaveJet and WindJet series). The plotter driven by a self-contained plotter control program that runs on Windows. This program is monitoring a folder for incoming HPGL plot files, e.g. c:\algotex\hpgl. This folder is entered in the setup of the plotter control program.

Create a directory C:\PLOTTER on the plotter PC. Enable this folder as shared folder 'Plotter' in the network. The additional Grafis workstation PCs have access to this folder as described above. Drive P: is connected. Copy the following files to C:\PLOTTER on the plotter PC: PLOTMGR.EXE, PLOTCTL.EXE, the additional help program FILEEXST.EXE (to be found under C:\GRAFIS\HILFEN) and a PLOT.BAT. The PLOT.BAT contains the following:

```
@echo off
copy '%1' c:\algotex\hpgl\plot.hpg
fileexst.exe c:\algotex\hpgl\plot.hpg
```

The program FILEEXST.EXE stops the execution of PLOT.BAT as long as the specified file exists. The Algotex plot program deletes the file as soon as the plot is finished.

Add the following command to PLOTMGR.INI:

```
COMMAND=plot.bat %d
```

Set the value TIMECALCBYTES=0. The estimated plotting time will be calculated based on the plot length in millimetres. This value is comparatively accurate.

Configure the additional Grafis workstation PCs as above. Additionally an icon to the program P:\PLOTCTL.EXE should be added to each desktop so that the workstation user has access to the plot queue to view and change the queue.

**Configuration example: Gerber AP320 plotter connected to a separate plotter PC, additional Grafis workstation PCs in the network and a file server with plot files on drive H:**

Create the folder H:\AP320 on drive H:. Copy the files PLOTMGR.EXE, PLOTCTL.EXE and APCHECK.EXE (to be found under C:\GRAFIS\HILFEN) to this folder. Install the Gerber plot program PLOTGBER to folder C:\GERBTEST on drive C:. Additionally copy the file GBSHIFT.EXE to C:\GERBTEST.

Add the following entries to the file PLOTMGR.INI:

```
COMMAND=plot.bat %d
TIMECALCBYTES=100
RETRYENDLESS=1
```

The PLOT.BAT contains the following:

```
@echo off
copy '%1' c:\gerbtest\plot.0$$
c:
cd \gerbtest
copy gbshift.ini gbshift.ret
gbshift.exe plot.0$$
plotgber.exe plot.0$$ 2
h:
cd \ap320
apcheck.exe
if exist error.log copy
    c:\gerbtest\gbshift.ret c:\gerbtest\gbshift.ini
del c:\gerbtest\plot.0$$
```

Set the value TIMECALCBYTES=100. The estimated plotting time will be calculated based on the size of the plot file. This value is comparatively accurate. Additionally, a special plot driver file (ap320.plt) is required for the Grafis workstations. It contains the exactly determined feed length. This file can be requested from the Grafis Hotline or the Grafis dealer.

Configure the additional Grafis workstation PCs as above. The target directory should be 'H:\AP320\' , where H: is connected automatically on login.

**Configuration example: HP Designjet 510 using the HPGL-2 option connected to a network**

The HP plotter is assigned an IP number automatically during installation. This is used by the PC printer driver to access the plotter. Install the driver included with the HP plotter. Send a test plot to plotter via the Windows driver.

Install the plot manager as described above. Select the option *Show plot command* during the setup (in the SETUPMGR program). After starting the plot manager activate the plot command prompt by clicking the adjacent button. Enter 'WINSPOOL:'. Save the entry by clicking the adjacent button again. A popup window with all available printer drivers appears. Choose the previously installed HP driver (HP Designjet) and confirm with *OK*.

If the HP driver does not support PASSTHROUGH, additionally install the standard Windows driver 'Generic/Text only' to the same network interface as the HP driver. Choose this from the popup window instead of the HP driver and confirm with *OK*.