



Nets



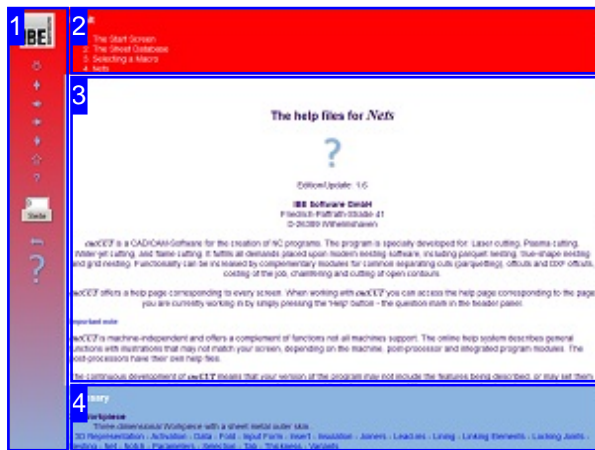
Online help for cncCUT

Nets & Pipe Cutting Macros



Welcome to cncCUT's Net module's help files

General Tips for Navigation of the Program



The screen is split into four frames: The menu to the left [1] with the navigation arrows for navigating the whole help document, and a box for entering a page number.

The top shows the contents list [2] divided into chapters. A glossary [4] of the most important technical terms is shown at the bottom. You can switch between the glossary and an index in this frame. Whichever you choose, clicking key words will link you directly to the most relevant part of the corresponding help page.

Choosing the Control Method:

There are two ways to navigate the help pages for *cncCUT*.

1. Interactive Navigation

This allows you to decide for yourself which texts you need to read. Place the mouse cursor over the rectangles drawn onto the screenshots to get a more detailed description.

interactive

or

2. Continuous Navigation

This mode leads through the document sequentially. All details will be shown one after the other, simply press the 'Next' button (right arrow in the Navigation Panel [1]) to move through the document one step at a time.

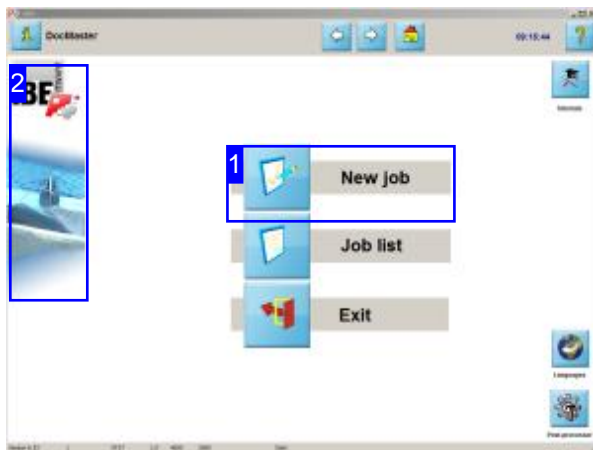
contiguous

Important Note

cncCUT is machine-independent and offers a complement of functions not all machines support. The online help system describes general functions with illustrations that may not match your screen, depending on the machine, post-processor and integrated program modules. The post-processors have their own help files. The continuous development of *cncCUT* means that your version of the program may not include the features being described, or may set them out differently. Please check the edition of your documentation against that of your program. Where necessary, check our [homepage](#) for any updates.

The Start Screen

Start and exit the program, program navigation.



The start screen is your gateway to *cncCUT* .

- o To create a net, start by clicking 'New Job' [1].
- o You can set flags in the post processor to get addition buttons for rapid navigation to the pipe cutting macros.
- o If you are online, click on the IBE logo [2] to open the homepage for IBE Software GmbH.

Nets are a component module of *cncCUT* . You will find a detailed description of the program and its wide-ranging sheet-metal forming functions in the online help files accompanying *cncCUT* . For contact, give us a call, or send an email and we'll always call you back. We also happy to receive visitors through our homepage.

1



Use this button to create a new file - a new NC program.
This is the first step to making your net. Mark the shape of a tube if additional buttons are shown for pipe cutting.



11



It's recommended that you select a profil before starting a new job. The sheet-selection will change in this case and you will forward to the macro-choice in the next step.

2

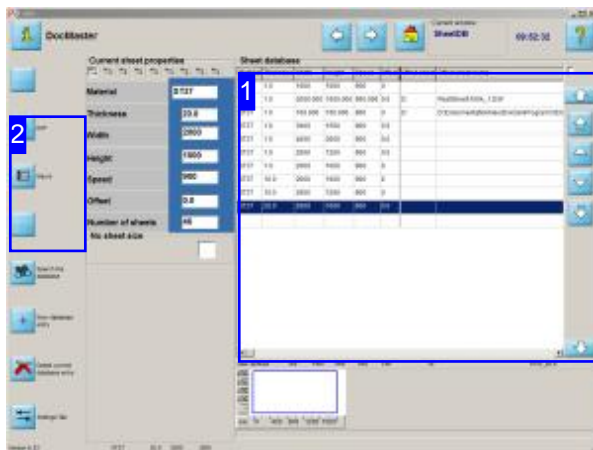


If you are online, click the IBE logo to access IBE Software GmbH's homepage, where you can find out about our range of CNC programming software. We offer nesting software for laser, water, plasma and torch cutting, costing software, job and sheet databases - everything your business needs to run efficiently.



The Sheet Database

Selecting a sheet



Use this screen to select the sheet you'll be using from the sheet database (your stock list).

Access the next screen for creating a net from the page. Press the 'Macro' button in the navigation panel [2] to access macros.

To create a net you will need to select a sheet onto which you will nest its parts.

- o Selecting a sheet from the database:
Use the arrows to the right of the sheet database [1], or select an item directly from the list.

You will find more detailed help for this page in the online help accompanying *cncCUT*.

- o Once you've selected a sheet to work with you will need to select your net's source. Select macros from the navigation panel [2] and select our pre-set nets with variable values.

1 Sheet database

Material	Thickness	Width	Height	Speed	Offset	Offset sheet	Offset sheet name
ST37	1.0	1000	1000	900	0		
ST37	1.0	2000.000	1000.000	900.000	0.0	D	RestSheet1004_1.DXF
ST37	1.0	160.000	160.000	900	0	D	D:\Dokumentation\Neu\DeskGen\ProgrammID\
ST37	1.0	3000	1500	900	0.0		
ST37	1.0	4000	2000	900	0.0		
ST37	1.0	2500	1250	900	0.0		
ST37	1.0	2000	1000	900	0		
ST37	10.0	2000	1000	900	2		
ST37	10.0	2500	1250	900	0		
ST37	20.0	2000	1000	900	0.0		

This screen shows you the sheet database - your stock list.

Use the arrows to the right to navigate the list.

You must select a sheet before leaving this screen.



2

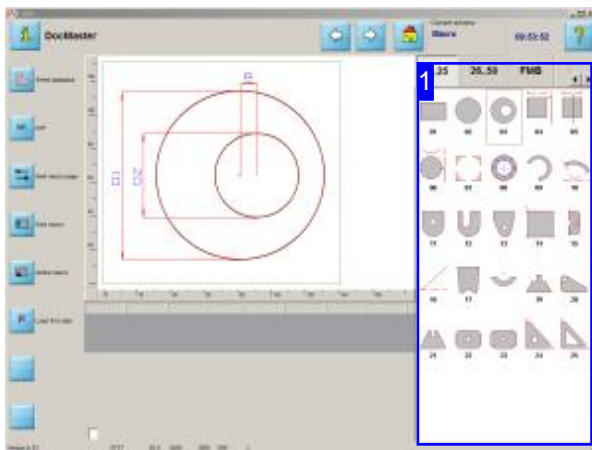


Once you select a sheet, click 'Macro' to work with a macro.



Selecting a Macro

Select a macro from your stock.



This screen shows all macros available from your database. If your computer is capable of processing HTML macros then the relevant tabs will be displayed in the macro selection list. For nets the relevant macros are HTML files; the relevant tabs are 'NetRd' and 'NetSq'.

Some macros are present in duplicate or triplicate to meet varied requirements to correspond. Some macros will therefore have a different division of the part pieces, or rolling additions are attached for working with thick sheet thicknesses.

The macro selection screen allows you to select a macro from your net macro database.

- o The list to the right [1] shows all available nets (from the folder 'MACRO'). The macros are arranged in blocks - switch between them using the tabs at the top of this frame.
- o Once you have chosen a macro, click 'continue' or double-click the macro.

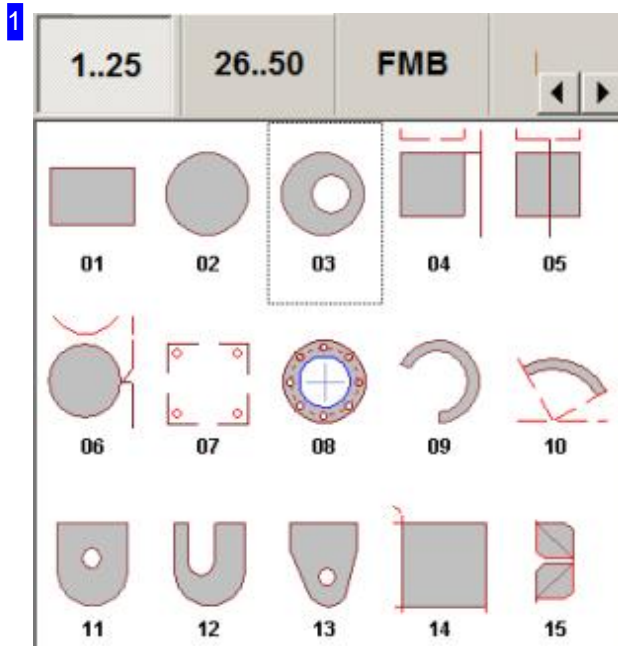
Note: HTML macros are controlled only by the HTML file's content. *cncCUT* has no 'direct control' of these macros. Control is exercised only through the TCP interface or an ActiveX object. For this reason the buttons in the left panel have no effect on HTML macros, you must control them by modifying the HTML files.

If your macros are to be controlled with a TCP interface, your computer must have an active network connection.

16

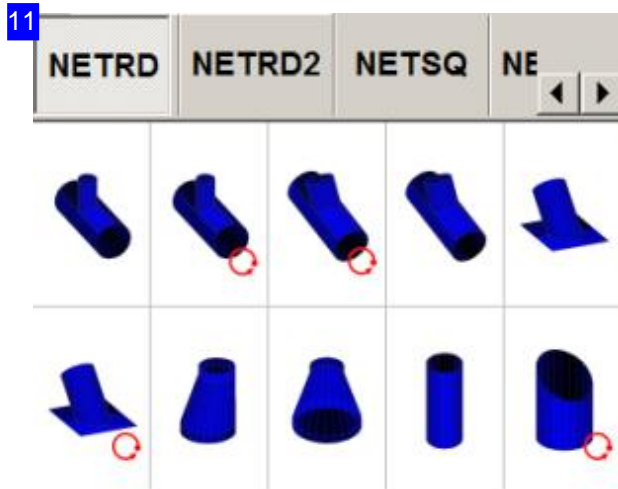


Malros with this symbol are foreseen for the additional processing on a roll. Parts are provided with internal bridges or get rolled additions to obtain a proper form rolling.



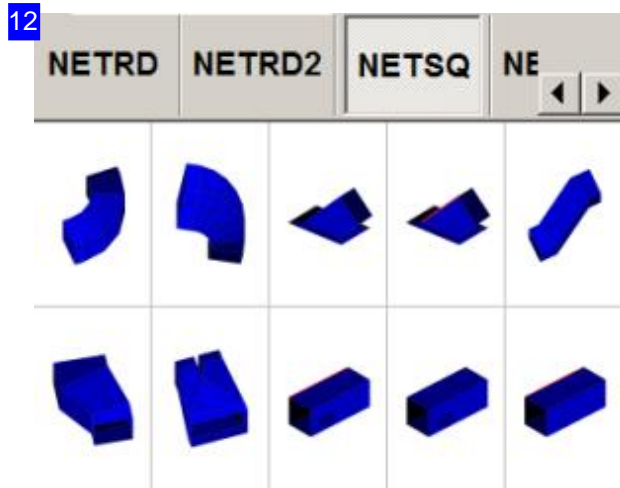
The macros available on your system are shown separated into blocks in this frame. Click the corresponding tab (top) to select a block. There are the tabs 'Net*' where ducts are listed for selection. Select tabs with 'Tube*' for tube cutting.

Here you can see the standard macros 1 to 25. You find the nets for channels on the tabs 'NETSQ/2' and nets for round ducts on the tab 'NETRD/2'. You cut round tubes on the tab 'TubeRd' and square tubes on the tab 'TubeSq'. Use 'TubeSqR' when your square tubes have rounded edges.

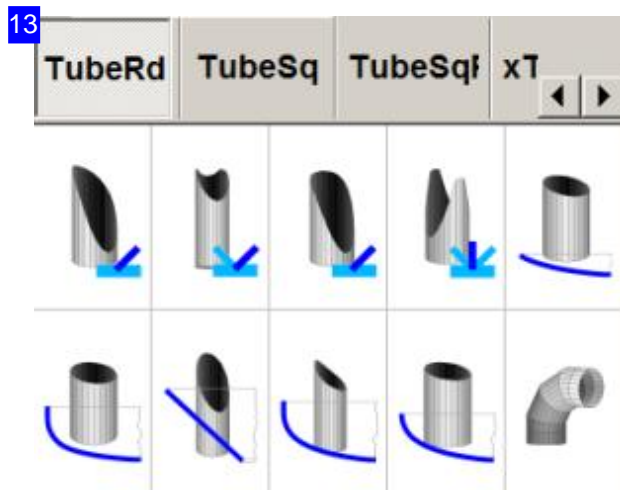


Here are the nests for round ducts. Nets for channels can be found in the 'NetSq' tab; the standard macros can be found in the previous tabs.

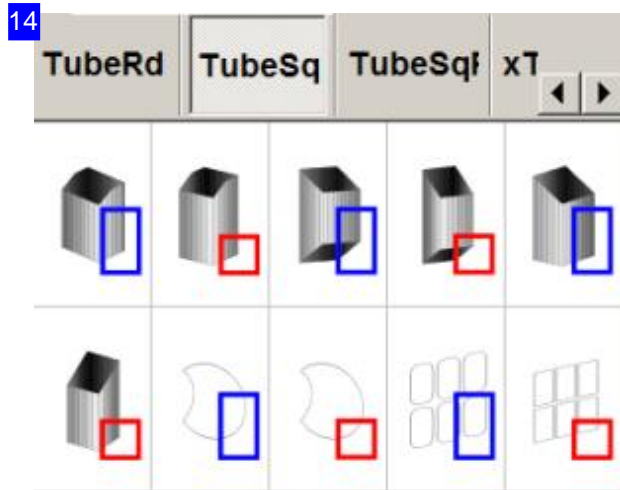
For some parts the macros are listed in varying specifications, this is to allow different construction processes. For example, you can cut arcs in thick sheet with bridges to allow your parts to be rolled together. These macros are specially marked with a 'roll icon'.



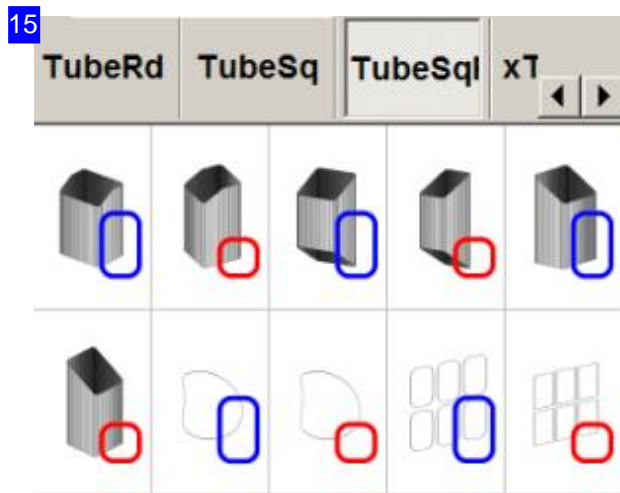
Here we have the nets for channels. There are further nets in the second tab, 'NetSq2'. Nets for pipes can be found in the tab labeled 'NetRd'.



Here you see a choice for tube-cuts. The first four macros are branches (penetrations) and the following five cuts are made for end caps of vessels. You can see cuts for square tubes on the 'TubeSq' tab.



These are cuts for square tubes, whereby rectangle and square tubes are different. This distinction is important, because the profile has to be the same, when cumulating holes. The hole-cuts below can be cumulated and added to a basic tube. You can see cuts for rounded, square tubes on the 'TubeSqR' tab.

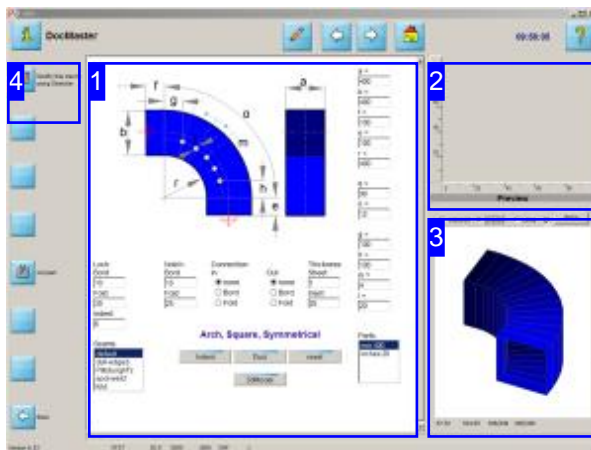


These are cuts for rounded, square tubes. The same conditions apply for these as for square tubes. You can see cuts for round tubes on the 'TubeRd' tab.



Nets

Working with Nets (HTML macros)



This screen allows you to give your component the required form yourself, or select a pre-made part from the list.

Click the top button in the left navigation panel after generating to transfer a component's parts to the Sketcher module, where you can make precise adjustments to the component.

Nets can be transported through your computer's TCP/IP interface, or as an ActiveX object. The transport method is set in the template file, where the default is to send as an ActiveX object.

To send or receive a net via TCP/IP you must first start an installed server.

Next, enter the net's values and click the '3dModel' button to calculate it. If the model seems to look well, click the middle button to send the data for part generation. The component will be generated with the given values and shown in the preview window [2].

Note: to make sending larger amounts of data secure, the server is programmed to send using the 'POST' method. The form being sent must use this method!

To use HTML macros for nets, you will need to have cookies enabled on your machine!

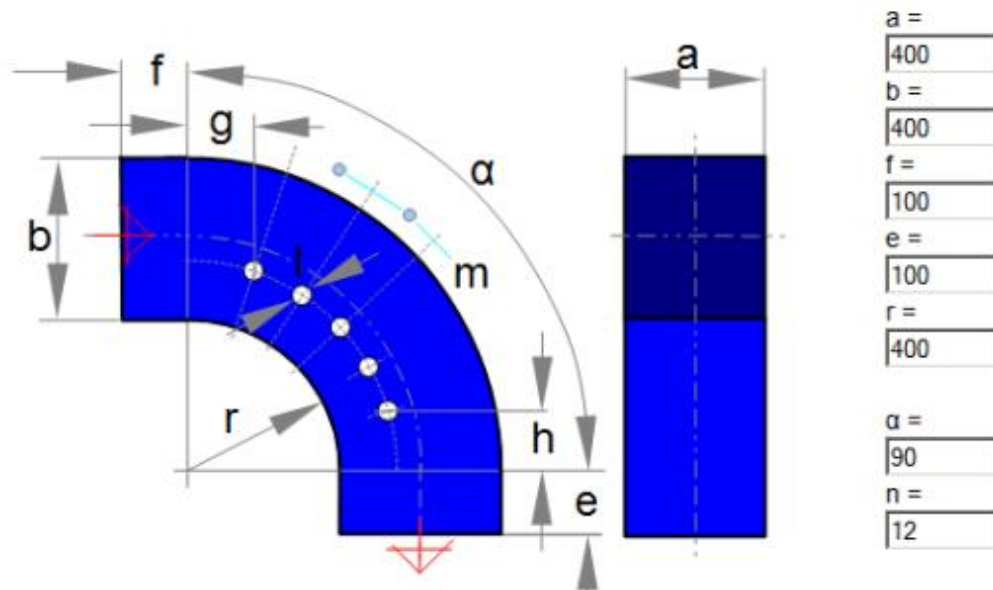


Click the top button to transfer the component's parts to the Sketcher module, where you can individually adjust them.

The Separation of large parts is an important function of the Sketcher. This function allows you to automatically place a tab joint at the break line.



1



This frame shows you the basic form of the part and its variables. Select a part from the List, or enter the required values in the form and press the button to send the data. All dimensions are outside dimensions.

The content of this frame is set by your macro. Each macro has a different form for its net, as the variables are different.

11

Arch, Square, Symmetrical

Parts:

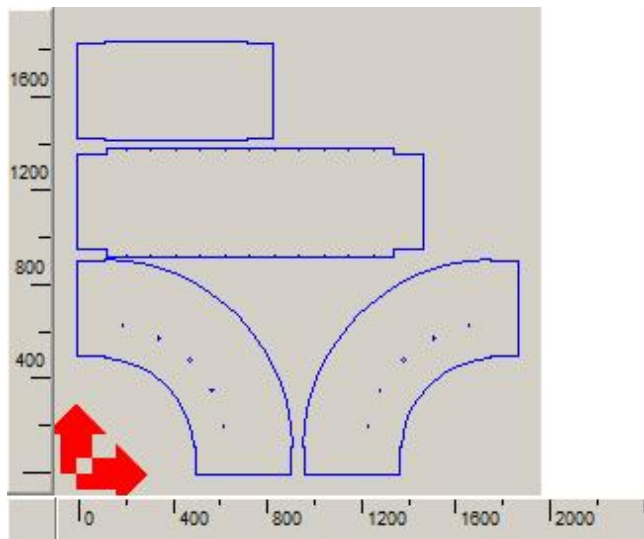
- mm 400
- inches 20

The list to the right shows the pre-made components from the XML file. Select a part from this list or enter the values for an individually customized part, and click the middle button to send the macro to *cncCUT*.

The left button generates an insert for the part as defined by its variables. For example, an insulation or lining. The insert will be cut such that it fits when taking sheet thickness into consideration. Click the bottom button to generate a 3d model of the part, calculated with the entered values. The model is displayed at the bottom right frame [3] in the window.



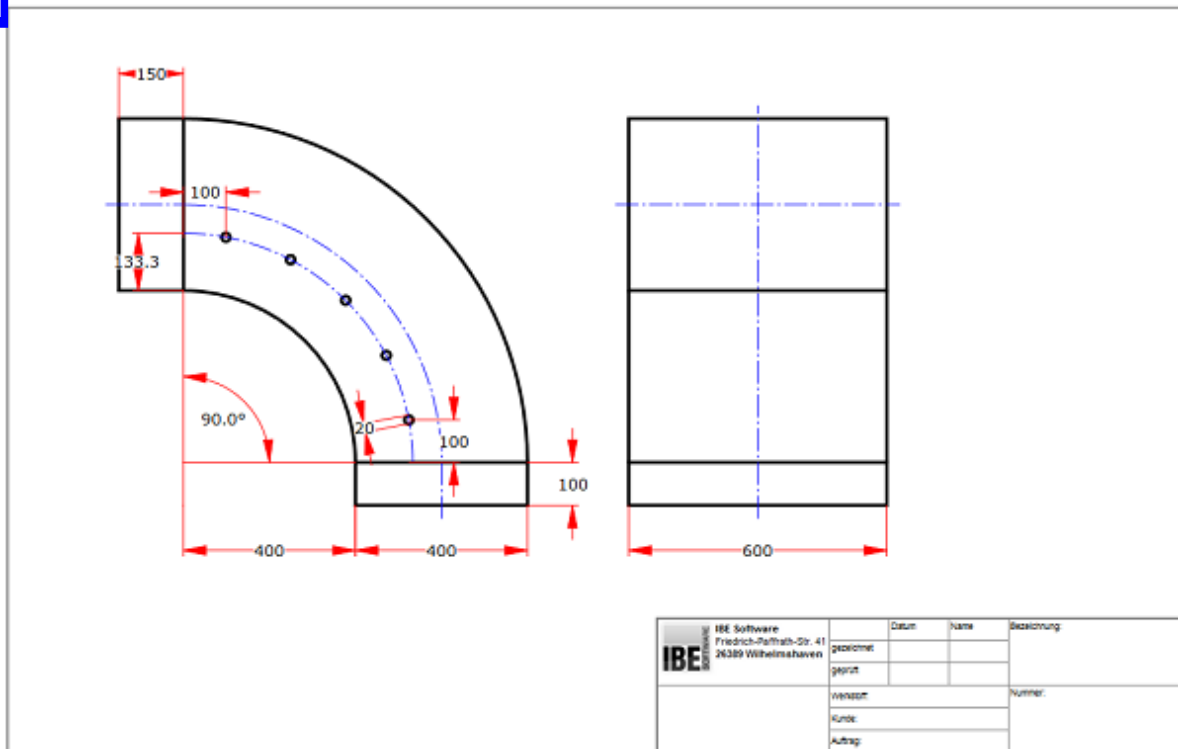
2



This is a preview of the component's net corresponding to the values you entered in Macro [1].

The duct macros of *IBE Software GmbH* automatically writes a drawing of the part produced in SVG format in an additional HTML file.

21

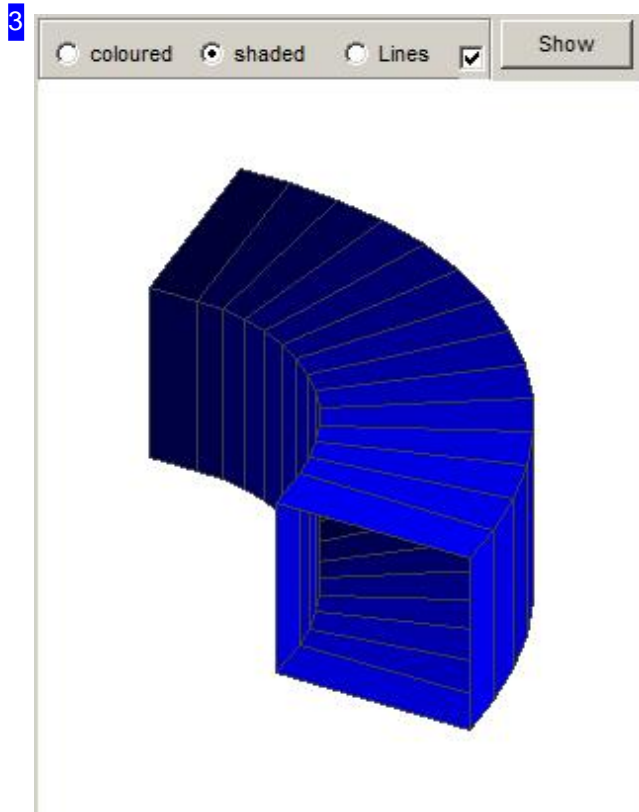


When generating a net of a workpiece, a drawing of the part is created automatically in SVG format and written in an additional HTML file. This file always has the name of the part with the addition '3dPart'; 'myNet' becomes 'myNet3dPart.html'. The drawing is structured such that the full page is displayed in landscape mode in the print preview of a browser when there all margins are set to '0'. The fields in the title block at the bottom right can be filled out in the browser prior to printing. The two left fields are filled with images that must be in 'CoAdrLabel.PNG' and 'CoAddLabel.PNG' in the macro folder.

Note: The drawings are snapshots only and each macro call regenerate them. Do you want to keep a



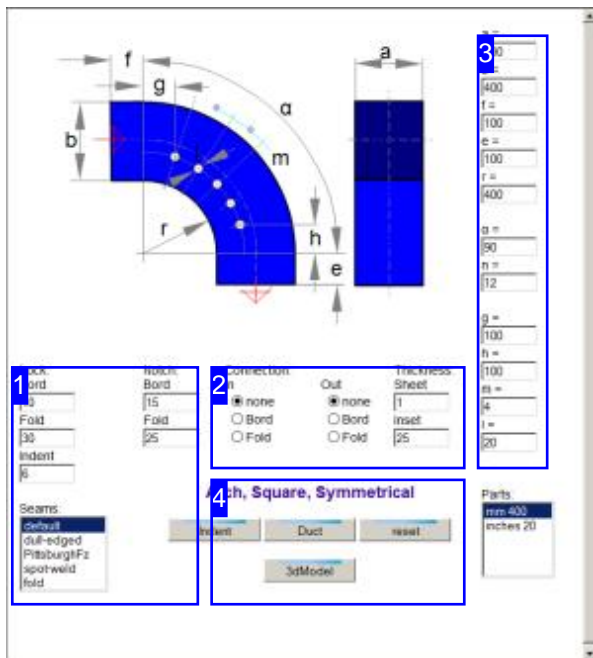
drawing possibly for documentation purposes, you must save them before a new macro call.



This frame shows a 3D-part, calculated with the given values. This file is always re-created by a simple click on the button '3dModel', as a result of a model calculation with the values entered. Click into the window that receives the mouse control. Now you can turn the model with the MT. Use the mouse wheel to zoom the model or move the image with the right MT within the window.



The Input Form.



To make the displayed part, select a pre-defined set of values from the list or enter the values anew. Pay attention that the values you enter are plausible, as only a limited check is made by the macro module. You will be advised of incorrect values through pink highlighting of cells containing such values. These errors are however not necessarily the (only) causes of discrepancies.

The representation of the 3D model is an indication of correct values. If there is no model, there is probably a value not usable. Use the part in the illustration as a wireframe (lines) for the control of construction.

Each part has its own HTML macro with a form for entering its variable parameters. The values are contained within the macro itself by default, or can be placed in an XML file for each part. The parts defined in this XML file can then be selected from a list.

The parts can also be customized individually. Please take care that only plausible values that can create real nets are entered.

The designating labels in the form can be customized in the template file.

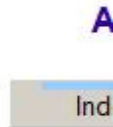


1

Lock:
 Bord
 Fold
 Indent

Notch:
 Bord
 Fold

Seams:
 default
 dull-edged
 PittsburghFz
 spot-weld
 fold



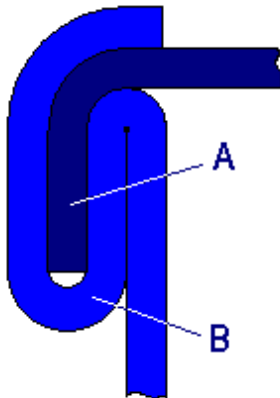
Enter the heights of the extra metal to be used to join parts here. There is a difference for the extensions used for the fold and the tab .

You can make a notch at each side of the extension; enter the value for notch length in the fields on the right side. It's important that if you have combined lines (eg. arcs) the length of the notch is shorter than the part of the line it sits on. This is also important for shorter straight lines.

The selection list contains various click-selectable notches listed in an XML template file. The values in the template file are freely editable.

The sheet data for a notch can be allocated lead-ins to make re-placing the sheet easier and to avoid throwing it over.

11



To join sheets using a 'rebate', you will need to allow additional material for the sheet thickness both on the rebate (B) and the tab(A). This preview shows the example of a Pittsburgh lock.

2

Connection:
 none
 Bord
 Fold

Out
 none
 Bord
 Fold

Thickness:
 Sheet
 Inset

For connecting to other pipes, the form of the connections can be freely selected. Mark the check boxes for entry and exit on your component.

Enter the thickness of the sheet or insert (insulation, lining) under 'Thickness'.

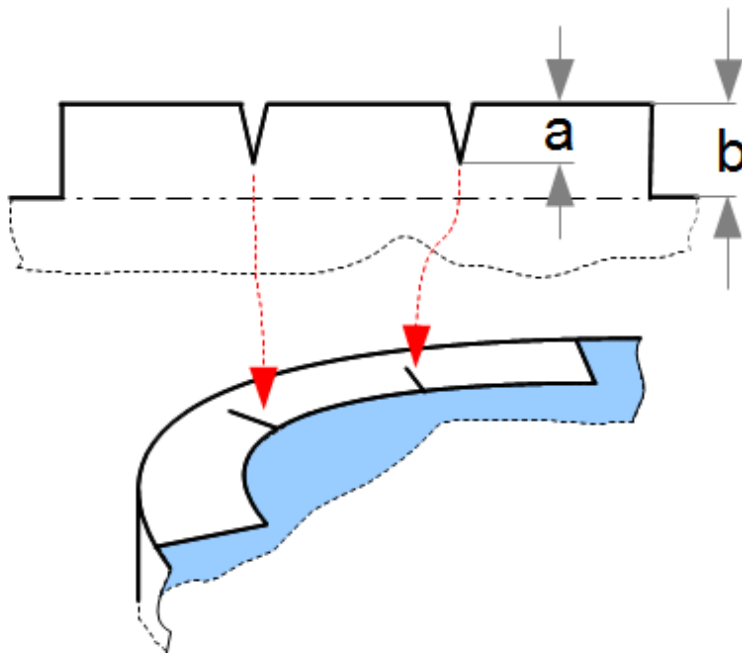


21



A joint can be butted (A) or folded (B). For a fold you will need to allow extra material. For a fold the allowances will be different on the fold (b) and the tab (a) to allow a locking joint. An einigen geradflächigen Teilen können rechteckige und runde/ovale Ausschnitte angebracht werden. You can allow a notch at the corners, which may be different for butt and fold joints, such that the parts can be joined tightly.

22



You can add cuts to help avoid distortion when bending your folds into arcs. The cut depth (a) is variable and should always be smaller than the fold height (b), so that the joint seals when finished.



3

a =

 b =

 f =

 e =

 r =

 α =

 n =

This panel of input fields is for entering the individual parameters of your drawing. You can select values by loading a pre-defined part, or enter the values anew.

The labels 'n' and 'c' are used primarily for the resolution of lengths or angles (pipes) if they are not shown in the drawing.

4

Arch, Square, Symmetrical

Parts:
 mm 400
 inches 20

Once you have entered all the required values, or selected a pre-defined part, click the middle button to calculate the macro and send the result to *cncCUT*. For some divergent parts you can use a second connection. You can place rectangular and round/oval cut-outs on some flat-faced parts.

Click the left button to calculate the nets for an insert, eg an insulation layer or lining, and send the plan to *cncCUT*. The insert will be cut such that it fits in the pipe, taking its material thickness into account.

The list to the right shows pre-defined parts in your XML file. Select a part from this list, and proceed as above.

Click 'reset' to return all macro values to default.

'3dModel' indicates the calculated model.



41

Indent Duct reset

2. Nozzle

3dModel

Some divergences allow for a second connection. Check the "2nd nozzle" flag and click the button to generate your part.

42

Indent Duct reset

2 Parts

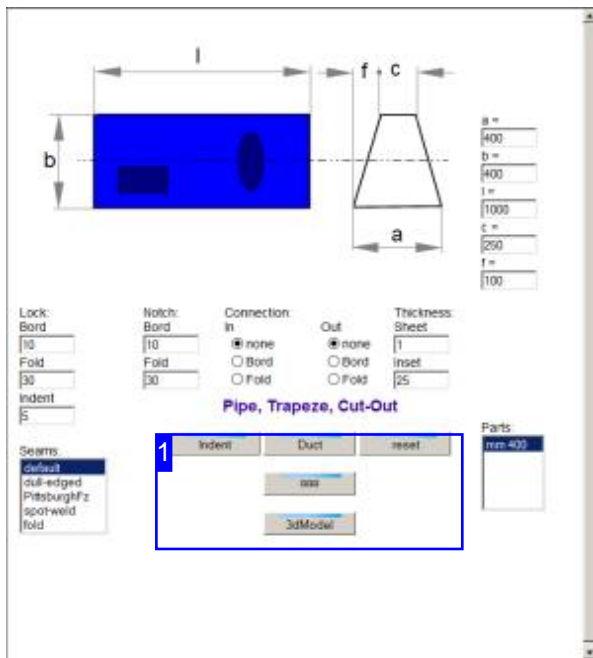
3dModel

You can place rectangular and round/oval cut-outs on some flat-faced parts. Click the bottom button to jump to an input form for the relevant settings.

There are some nets which consist of 4 parts, which can be reduced to 2 parts. Mark the "2 Parts" checkbox to do this.



Cut-outs in Nets.



Some parts allow you to define cut-outs, which can then be transferred onto the net. The cut-outs are cumulative and can only be applied to sheet metal parts.

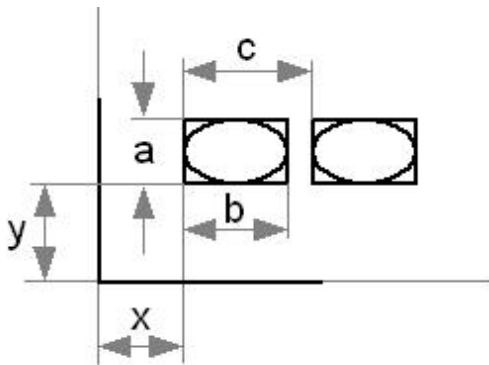


You can make rectangular and round/oval cut-outs on some flat-faced parts. Click the bottom button to access a form for entering the cut-out's properties. You can call this form multiple times to add successive cut-outs to your parts.

You can re-generate the net once you have added all your cut-outs. Once you have re-generated the net, the cut-outs' definitions are integrated, and would have to be re-entered if changes were required.



11

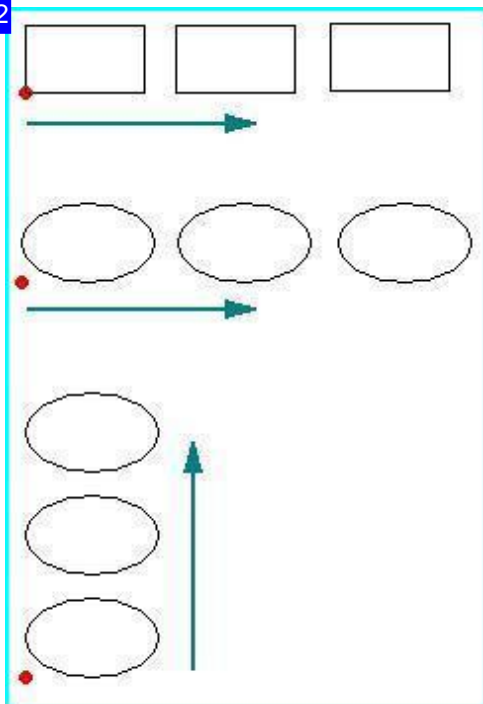


x = a = sqr c = horz
 y = b = rnd n = vert

You can add more cut-outs to your net each time you call this form. The definitions are only temporary as they are integrated once you generate your net.

Cut-outs can be placed repeatedly vertically or horizontally . Enter the start-point at the bottom-left and set the cut-out's size. Select the form - rectangular or round. To repeat the cut-out, enter the number required, direction of travel and offset to each subsequent hole.

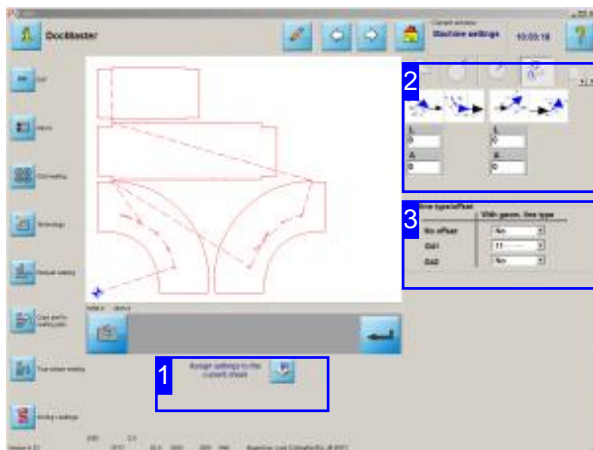
12



Multiple cut-outs can be placed repeating either horizontally or vertically. The start-point is always bottom-left; enter the number of and offset between repetitions.



Setting the Technology Data for Open Contours



The cutting path can lie exactly on the contour, or be assigned a cutting-tool corrected path. The corrected path can lie to the left (G41) of the contour, or the right (G42). With a normal closed contour the routine will automatically decide where to set the cutting path relative to the contour, but with an open contour you must decide, since both options are possible.

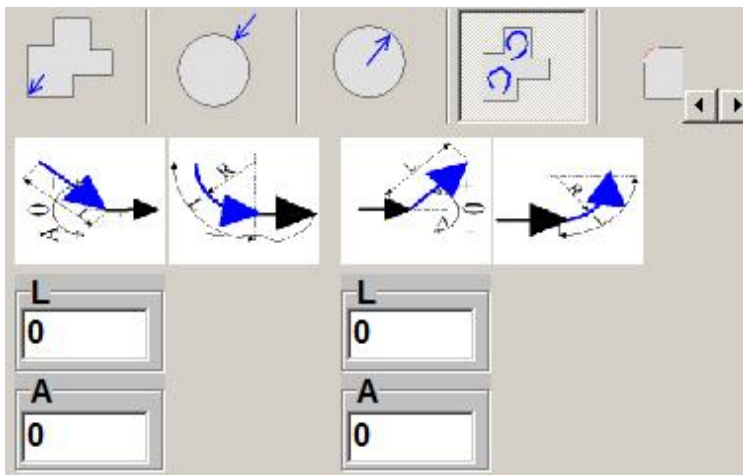
For nets which are to be cut with open contours, you must set the technology values for the sheet before selecting a sheet!



The settings for lead-ins and cutting tool path correction must be assigned to the sheet. After making all settings, click this button. Then go to the nets module and use the sheet with these set values.



2

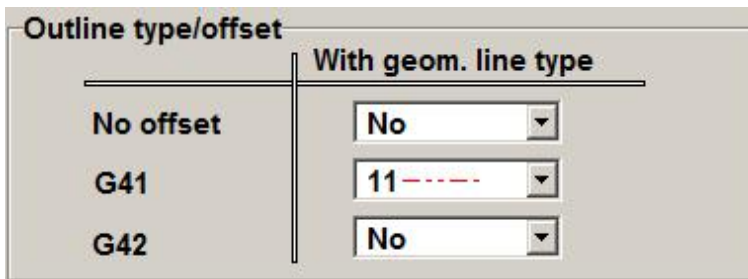


This frame allows you to set the size and form of lead-ins and lead-outs.

Click on an icon to activate or deactivate the lead-in. When you've decided on a lead-in type, a panel will appear for you to enter its parameters.

Choose straight lead-ins for any open contours in your nets. Set the lead-in lengths. Set the lead-in length to 0 for open contours which should be cut with cutting bridges!

3



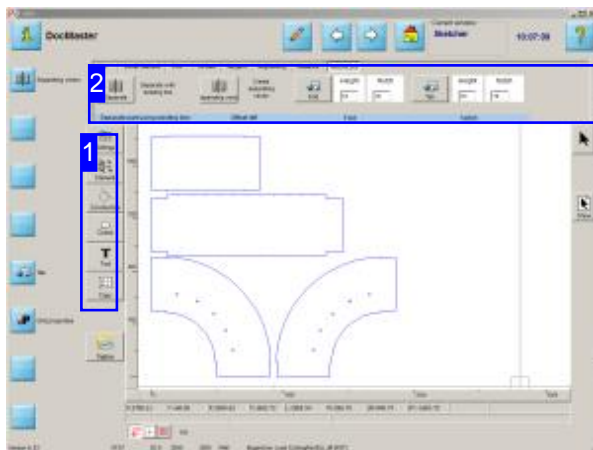
Pay close attention to net and cutting direction when setting the path correction for the open contours.

You can lay the cutting-path exactly onto the contour (no offset) or allocate the a tool-corrected path. The correction can take the path left (G41) or right (G42) of the contour.



Separating Large Parts

Separating Large Parts with the Sketcher



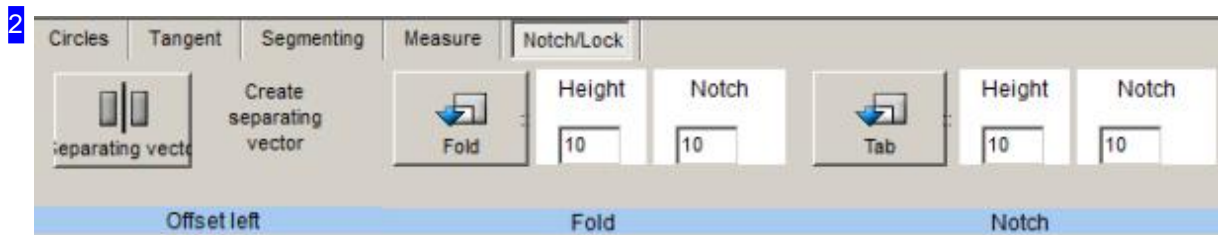
Click the top button in the navigation panel to take a part to the sketcher. This opens the Sketcher where you can edit parts to meet your specification.

- o Select 'Construction' [1].
- o Select 'Notch/Tab' [2].

This offers an elegant solution for separating large parts into smaller individual parts. Take a net to the Sketcher to separate it. The 'Notch/Tab' tab allows you to place separating cuts on your net, and automatically adds material for later adding a locking joint.



Click 'Construction' to activate the construction elements in the top frame [2].

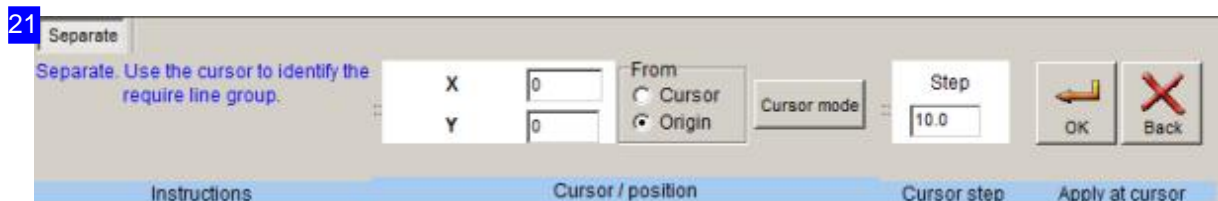


Select 'Notch/tab' from the construction elements. This allows you to place separating cuts on parts which will automatically be allocated extra material for the creation of a locking joint at a later time. You can also explicitly specify your tabs and folds on existing contour elements. Click the corresponding button and mark the contour element the extra material should be added to.

Enter the values of a piece to be added automatically when separating here.

Click 'Separating vector' to create a separating cut. This will jump to the 'Separating vector' screen.

You can also separate direct on an existing line e.g. on an open contour. To do this, click 'Separate'.



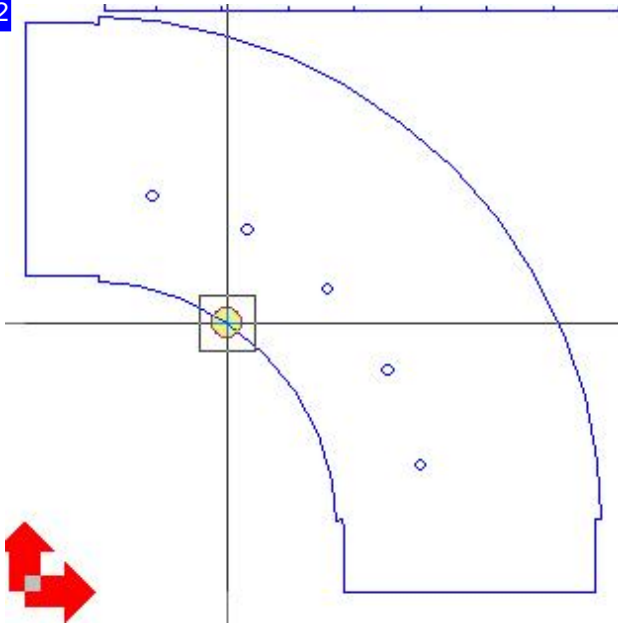
Set your separating vector here. Set a Start position on an existing contour then define the End position on an element on the opposite side of your part.

The part will be separated, the part on the right hand side (on a line from the start to the end point) will be moved along, and both parts will have an extra section of the specified length added. The left part gets a fold, the right part a tab. This means that the direction you draw the line in is of some consequence.

Since only one section will be moved, you must pay attention to the order you separate parts in if you need to use multiple separating cuts. Please check you have enough room to make these cuts! You can also move individual parts with the Sketcher's tools if required.

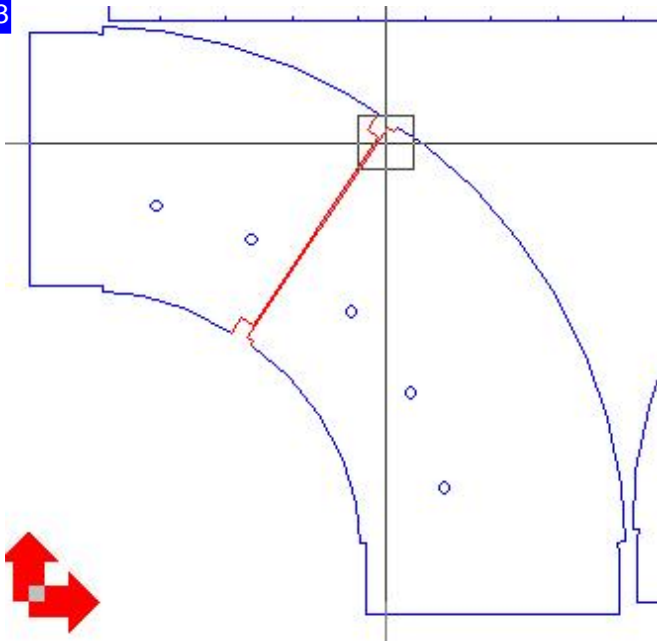


22

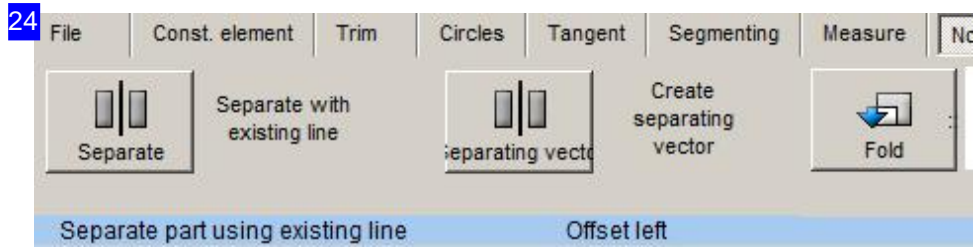


Set a start point on an existing contour, then set an end point on the part's opposite side.

23



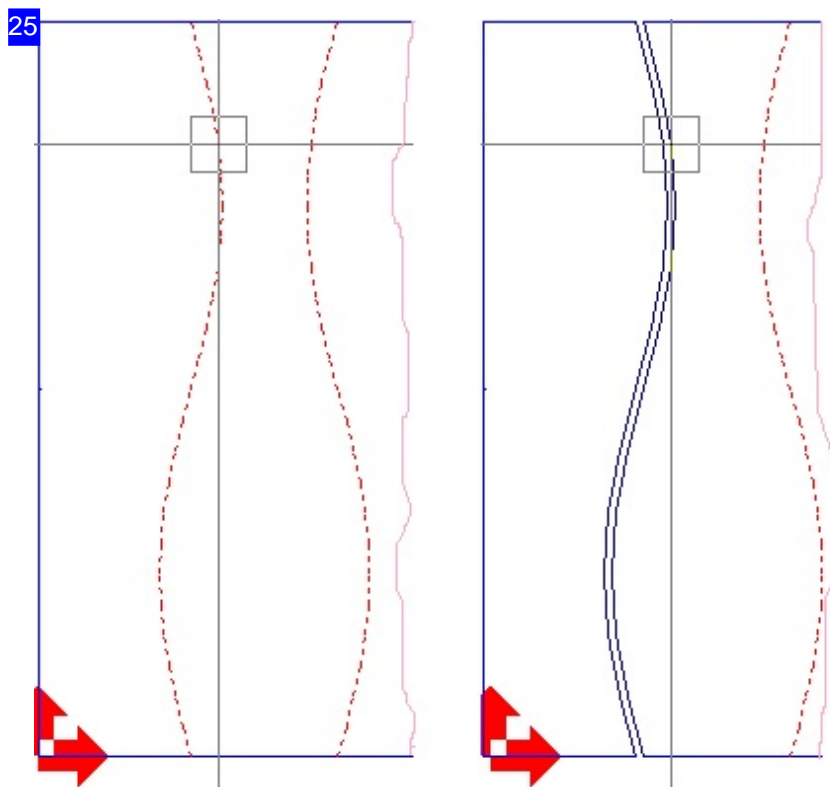
Once your end point is fixed the separating vector can be created and extra material added according to your settings in the 'Notch/tab' screen.



A separating vector can also be placed directly on an existing line e.g. an open contour. The part will be separated and the separate part will be moved left. Due to this, you should always pay attention to work from right to left across the drawing. Insure that the separating vector ends at a contour so that the contour can be closed at the line after separating.

Since only one part can be separated at a time, you must pay attention to the separating sequence if working with multiple parts that need to be split.

Click to begin drawing, then drag a line across your drawing .

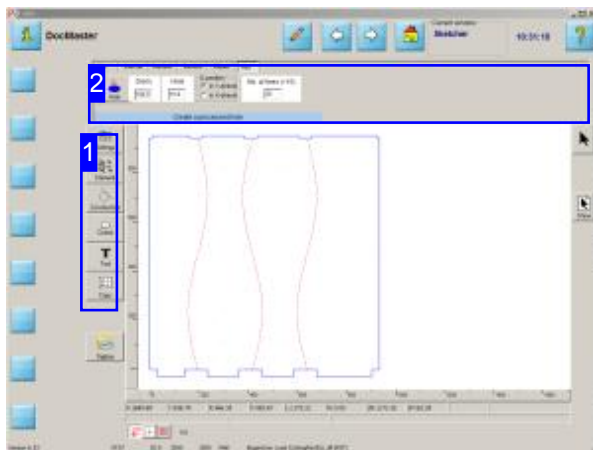


The left image shows open contours in a workpiece. After separating, the leftmost segment is pushed left, the contour is duplicated, and both segments will be closed as shown in the rightmost image.



Cutting Hand- and Manholes

Positioning and Cutting Holes on Pipe Axes



Click the top button in the navigation panel to take a part to the sketcher. This opens the Sketcher where you can edit parts to meet your specification.

- o Select 'Element' [1].
- o Select 'Pipe' [2].

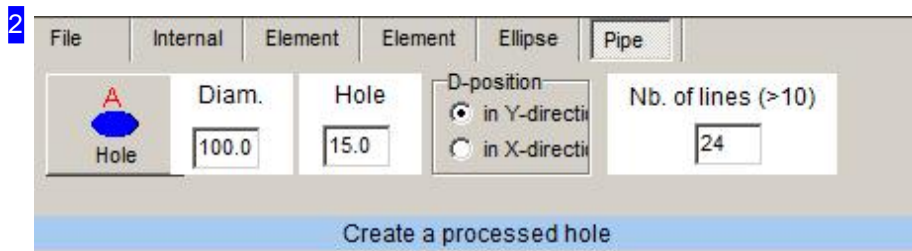
Virtual points are created by the macros in segmented nets (fishes) that can be used for positioning the cut-outs, to make it easy, always to put holes on the segment center point and axis.

There is a special function in Sketcher that calculates a round cut-out at the basis of the pipe and put it onto the net. Thus it is possible to cut hand- or manholes in round ducts.

This feature must be enabled in the postprocessor.



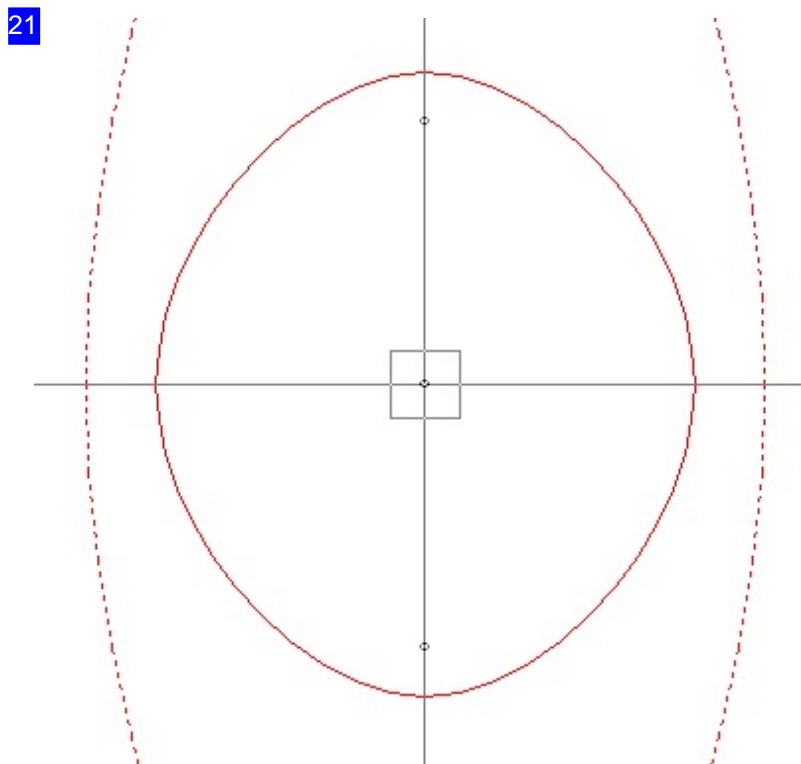
Click 'Element' to activate the construction elements in the top frame [2].



Select 'Pipe' from the construction elements. This allows you to place round cut-outs on round ducts. Enter the diameter of the pipe and the hole and select the roll direction of the pipe, thus the cut can be made in the right direction.

Click 'Hole' to create an cut-out. This will show you the 'Cursor positioning' screen.

A hole may be positioned at any desired location. You can use virtual axis points to place the hole at a defined position if these are available.

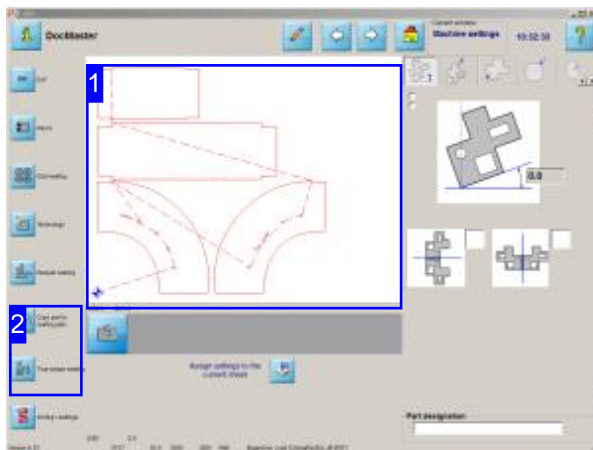


Insert a cut-out with a simple click on the middle of a segment and the pipe axis, when virtual axis points are available.



Nesting the parts

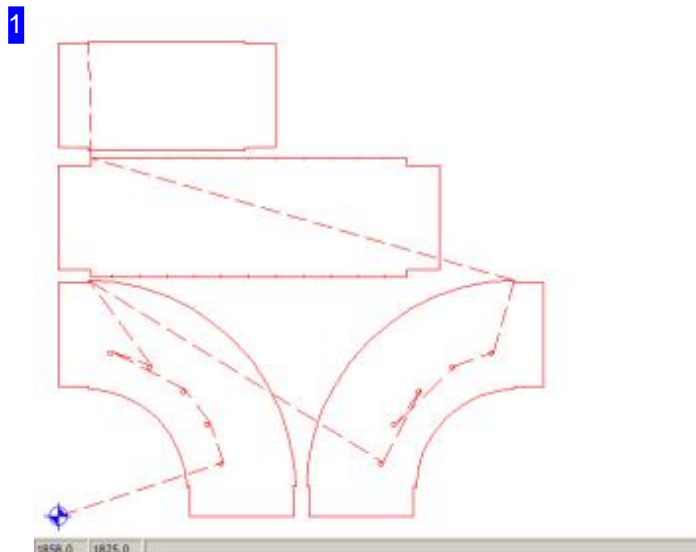
Organising parts into a nesting plan



The components consist of various faces, which may be grouped together when nesting. This is recommended and allows classification of each face's contour to a part.

- o Place the faces in a nesting plan.
- o Group the parts with a name.
- o Select further parts and add them to the nesting plan.
- o Select true-shape nesting to nest your parts.

To nest your parts you first have to put them in a nesting plan to instruct the program to nest them onto your sheet. This allows you to nest different nets onto one sheet, or bundle whole jobs onto one sheet.

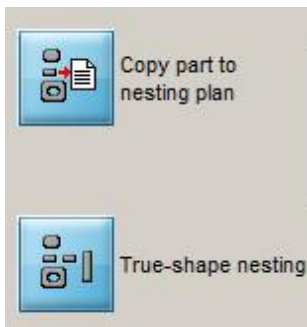


This frame shows the various faces of your component.

These parts, when grouped together, constitute a whole component. To allow you to bind the parts together you can enter a group name, as well as a part name when adding the parts to the nesting list.



2



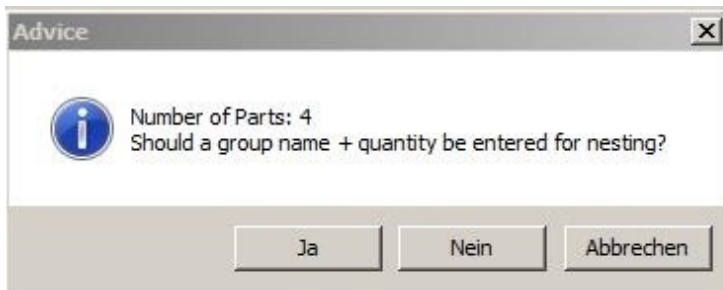
To put the parts in a nesting plan, click the top button. A dialog will open for entering a group and part name, and the number of parts that make up that group.

To add further components just go back one step and repeat the process.

Once you have all your parts in the nesting list, click the bottom button to go to true-shape nesting.

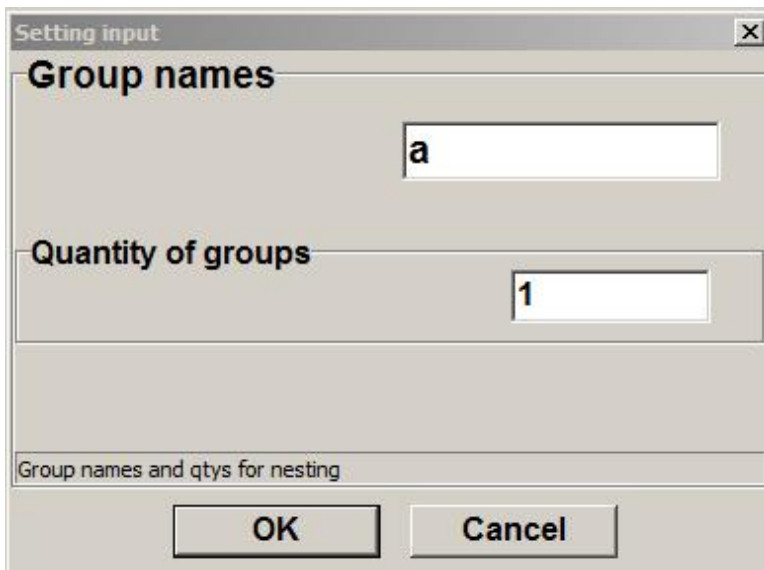
All subsequent steps are the same as normal use of *cncCUT* and you can find more details in the help files accompanying the main program.

3

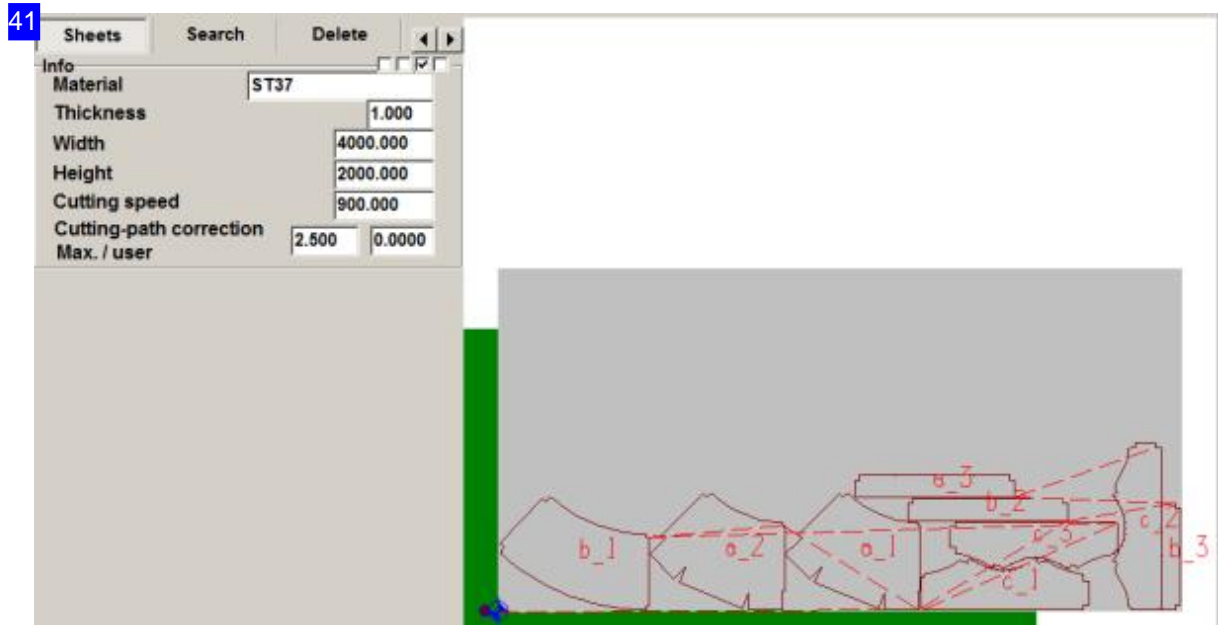


This frame allows you to choose whether to allocate your parts a part name. Click 'yes' to open an input dialog or 'no' to put your parts directly into the nesting plan.

4



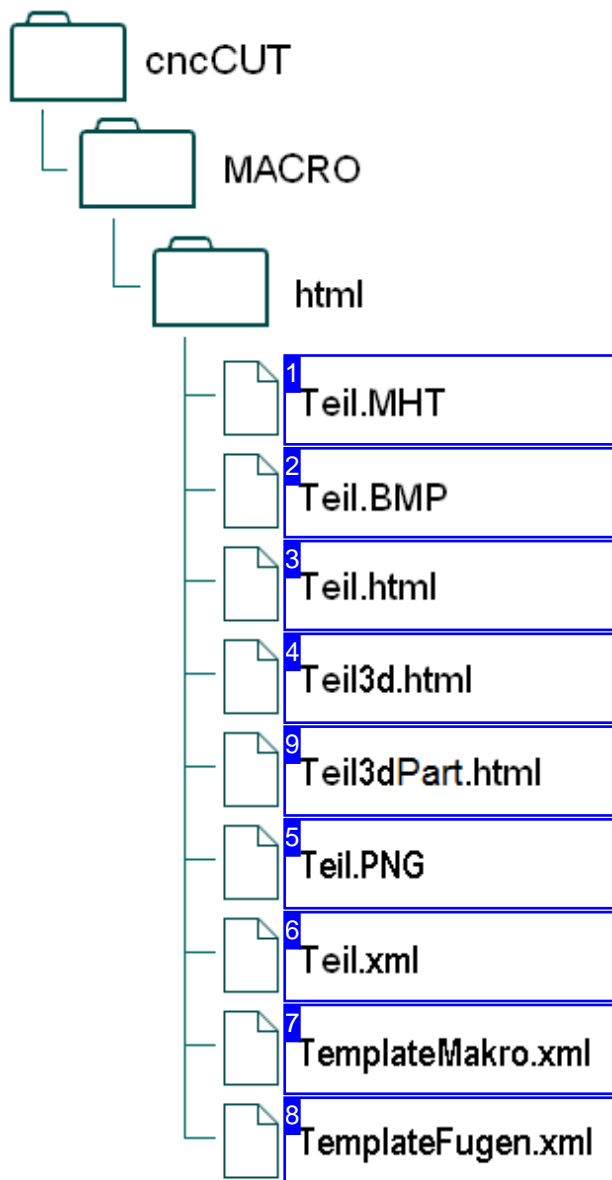
Enter a name for the group of parts and the parts. Set how many groups are to be nested. The part's pieces will be numbered within their group name. For example, the 4 pieces of part xyz_ will be saved as xyz_1, xyz_2, xyz_3 and xyz_4. These can then be displayed and printed on the job's documentation.



The group name can be shown in the job list. The part's pieces are numbered consecutively from 1. Identical pieces will be given the same number. For example here: part a_ with 2 pieces a_1 and a_2; part c_ with 3 pieces c_1, c_2 and c_3; and part b_ with 3 pieces b_1, b_2 and b_3. Check the 3rd checkbox to show the tags.

Files

The file structure.



The sub-folder 'html' within 'MACRO' contains an adapter file with extension '.MHT' for every HTML macro. This allows your nets to be recognised as HTML macros by *cncCUT*, and listed in the macro summary.

The adapter file contains the paths for component's sketch BMP and an HTML file viewable in a browser.

The HTML file contains the macro with a drawing of the component and a form for entering the values for calculating the net's dimensions. A message is generated at the end which will allow you to make the part with *cncCUT*.

See the chapter 'Data Transfer' for a description of the interface.

HTML macros offer the opportunity to program your own macros for use with *cncCUT*. The above-named files are used for nets.



1



The '.MHT' file is an adapter containing the names of the picture files HTML files for your macro. Two picture files are included for each macro. The 'BMP' file is the preview picture, the 'SMALLBMP' file is the thumbnail to use in the macro summary.

There is a second HTML file for a general 3D view of your net. An integrated program DLL allows you to turn the part in the viewing window. This file is designated 'PART'.

Example:

```
BMP=TeilABC.BMP
SMALLBMP=TeilABCklein.BMP
SMALLPNG=TeilABCklein.PNG
MAK=TeilABCMakro.html
PART=TeilABCMakro3d.html
```

2



The picture file is used by *cncCUT* to give a display of the macro for selection purposes, and in the input-form frame. The pictures must be saved as bitmaps (.BMP). The connection to the files names 'BMP' and 'SMALLBMP' is through the adapter file (.MHT).

3



The actual HTML file containing the form for entering your macro's variables and then calculating its values. These values are taken and turned into a message sent to *cncCUT*'s TCP macro server, or sent as an ActiveX object.

4



This HTML file contains the data for giving a 3D representation of your part through a program-dll. The file is generated from the set values each time you click on the button '3dModel'.

9



A drawing is automatically created in a SVG file when a workpiece is generated. This file contains the drawing and can be displayed directly in a browser and to be printed. The file must be saved



manually if necessary.

5



Each form will be shown with a graphic to help you visibly assign each variable its function. This file contains that graphic in the format given in the macro file (.html), which can be .PNG, .GIF or JPG.

6



Each component can have up to 5 variants which will be listed in the form. This file contains those variants, and can be edited with a normal text editor.

The number of variants can also be increased, note that the list in the macro file must also be extended by the corresponding number of entries.

7



The file 'MakroTemplate.xml' contains the variable designators (labels) for the form. This allows individual customization of the form, including into other languages.

8



The file 'TemplateFugen.xml' contains various preformed edge forms, as shown in the form's selection list. You may enter dimensions here that will be inserted into the form upon selection of the edge.



Variants in the XML file.

```

<?xml version="1.0" encoding="ISO-8859-1"?>
<parameter>
1 <title>kanal</title>
  <duct>
2 <name>mm 400</name>
3 <value>400</value>
4 <value>400</value>
   <value>1000</value>
   <value>10</value>
   <value>30</value>
   <value>6</value>
   <value>30</value>
   <value>10</value>
   <value>1</value>
   <value>25</value>
  </duct>
  <duct>
    <name>inches 20</name>
    <value>20</value>
    <value>16</value>
    <value>50</value>
    <value>0.5</value>
    <value>1</value>
    <value>0.2</value>
    <value>0.5</value>
    <value>1</value>
    <value>0.04</value>
    <value>1</value>
  </duct>
</parameter>

```

A component can be created with several variations, which can be selected from a list in the form.

This allows you to build up your own individual database of macros, re-usable whenever they are required.

Fields [2] through [4], enclosed by <duct> tags, each describe one variant of the part.



1



The component's 'title' name. The name you enter here is shown as the tile in the form screen.

2



The variant's name. This name is listed in the form for selecting a pre-made variant.

3



The saved variant's parameters. These will be written into the form when you select the variant. These values will then be calculated from, and the results sent to *cncCUT*.

4



These top four parameters are for the dimensions of tabs (notch length and height, indents). The bottom two lines are for sheet thickness and insert (insulation).



Form templates as XML files.

```

<?xml version="1.0" encoding="ISO-8859-1"?>
<template>
1<thickness>
  <name>Dicke:</name>
  <sheet>
    <name>Platte</name>
    <value>1</value>
  </sheet>
  <inset>
    <name>Einsatz</name>
    <value>20</value>
  </inset>
</thickness>
<lock>
  <name>Verschluss:</name>
  <border>
    <name>Bord</name>
    <value>10</value>
  </border>
  <fold>
    <name>Falz</name>
    <value>30</value>
  </fold>
  <indent>
    <name>Einschnitte</name>
    <value>5</value>
  </indent>
</lock>
<seams>
  <name>Fuge:</name>
</seams>
<connections>
  <name>Verbinder:</name>
  <in>
    <name>Eingang</name>
    <select>ohne</select>
    <select>Bord</select>
    <select>Falz</select>
  </in>
  <out>
    <name>Ausgang</name>
    <select>ohne</select>
    <select>Bord</select>
    <select>Falz</select>
  </out>
</connections>
  <notch>
    <name>Ausklinkung</name>
    <border>
      <name>Bord</name>
      <value>10</value>
    </border>
    <fold>
      <name>Falz</name>
      <value>30</value>
    </fold>
  </notch>
  <parts>
    <name>Teile:</name>
  </parts>
  <buttons>
    <insetTx>Einsatz</insetTx>
    <ductTx>Röhre</ductTx>
    <reset>reset</reset>
  </buttons>
2<flags>
  <xmit>aX</xmit>
</flags>
</template>

```

The input form for macros can be individually customized through its designators. This allows you to translate a macro into another language.

There is a tag containing the name and base value for each column present in the form.

It is important that if you change the tags, you also change the macro to suit. Any changes to tags affect only the tags as they are displayed, not the macro.



1



There is a tag containing the name and base value for each column present in the form. If changing the structure or the tags themselves, you must change the macro to suit.

2



The <xmit> tag defines how the macro will be communicated to the program. Default setting is as an ActiveX object, but you may for example also use 'TCP' to send to another computer. This must be considered while using the program.



Edge Template as an XML File.

```

<?xml version="1.0" encoding="ISO-8859-1"?>
<fugen>
  <title>Fugen</title>
  <lock>
    <name>stumpf</name>
    <value>0</value>
    <value>0</value>
    <value>0</value>
    <value>0</value>
    <value>0</value>
  </lock>
  <lock>
    <name>PittsburghFz</name>
    <value>8</value>
    <value>30</value>
    <value>4</value>
    <value>0</value>
    <value>35</value>
  </lock>
  <lock>
    <name>punkten</name>
    <value>0</value>
    <value>20</value>
    <value>10</value>
    <value>0</value>
    <value>0</value>
  </lock>
  <lock>
    <name>falten</name>
    <value>30</value>
    <value>30</value>
    <value>4</value>
    <value>0</value>
    <value>30</value>
  </lock>
  <lock>
    <name>SchnappFz</name>
    <value>10</value>
    <value>35</value>
    <value>0</value>
    <value>0</value>
    <value>30</value>
  </lock>
</fugen>

```

This file allows you to predefine edges, which will then be displayed in a selection list in the input form. The values from the template will be copied into the form upon selection.



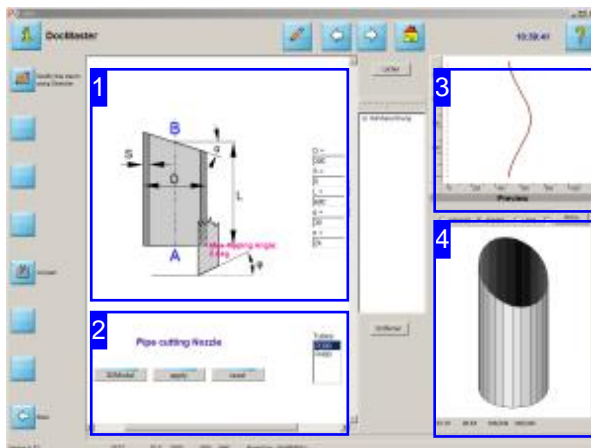
1



There is a tag for each edge. The top lines describe the fold and lead-in length, the bottom lines contain the values for the tab. The name you enter will appear in the form's selection list.

Pipe-Cuts

Pipe-Cuts like Nets



Pipe-cuts are made by HTML-Macros, where the cuts are nets on the pipe's surface. This screen allows you to give your cuts the required form yourself, or select a pre-made tube from the list.

The individual cuts are selectively and also to impose chamfers. The cutting system needs a corresponding bevel head for cutting correct cuts. Important note: The values for the tubesheet thickness must be set to 0 (zero) in case of cutting without bevel head.

You can add different incuts to a tube, select the additional macros.

The conditions for executing macros are the same as for nets.

Select a pre-defined tube from the list [2], to make the displayed pipe-cut.

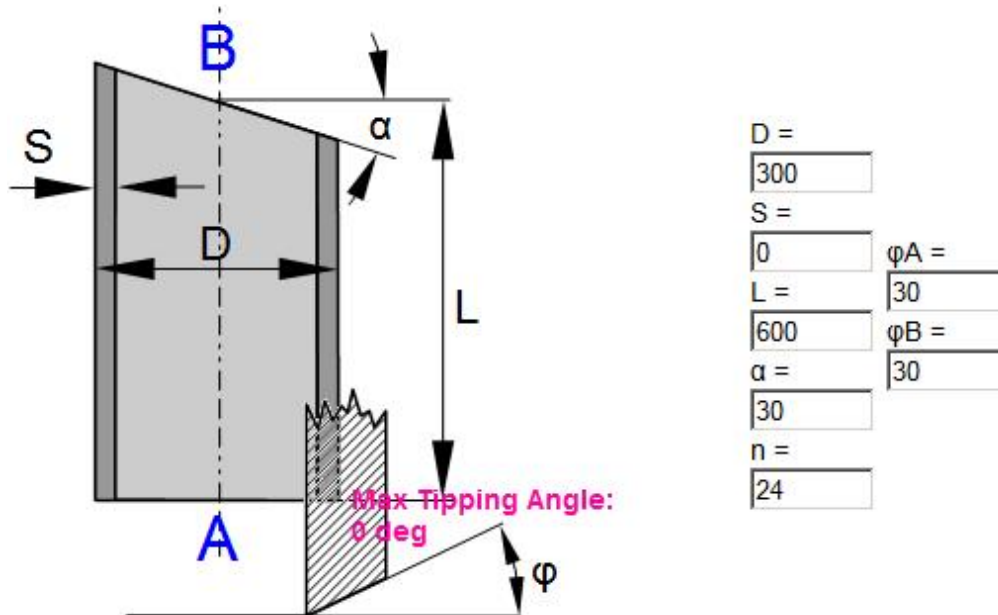
Change the values in the form [1] according to your needs and click '3DModel' [2]. Check the tube in the 3D representation [4], and adjust the values accordingly. You can control the individual facets well in the wire frame representation [4].

If the tube has the desired shape, click on 'apply' [2] to send the data to *cncCUT*. The cuts are shown as open contours in the preview [3].

You can add different holes in the extended representation of the macro when the tube has it's correct form. Double click on 'Preview' [3], to open the macro's extension.



1



This frame shows you the basic form of the tube and its variables. Select a tube from the List, or enter the required values in the form and press the button to send the data.

The content of this frame is set by your macro. Each macro has a different form for its net, as the variables are different. In this case 'n' defines the net's resolution for the mathematic model. Enter the bevel angle for the input (A) and the output (B) in the fields to the right. The maximum tipping angle of chamfer angle and cutting angle is displayed for information.

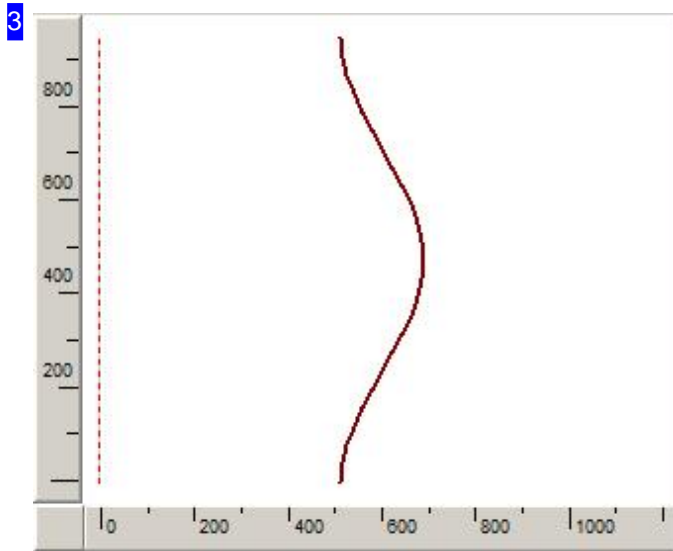
2

Pipe cutting Nozzle

- Tubes:
- R300
 - R400

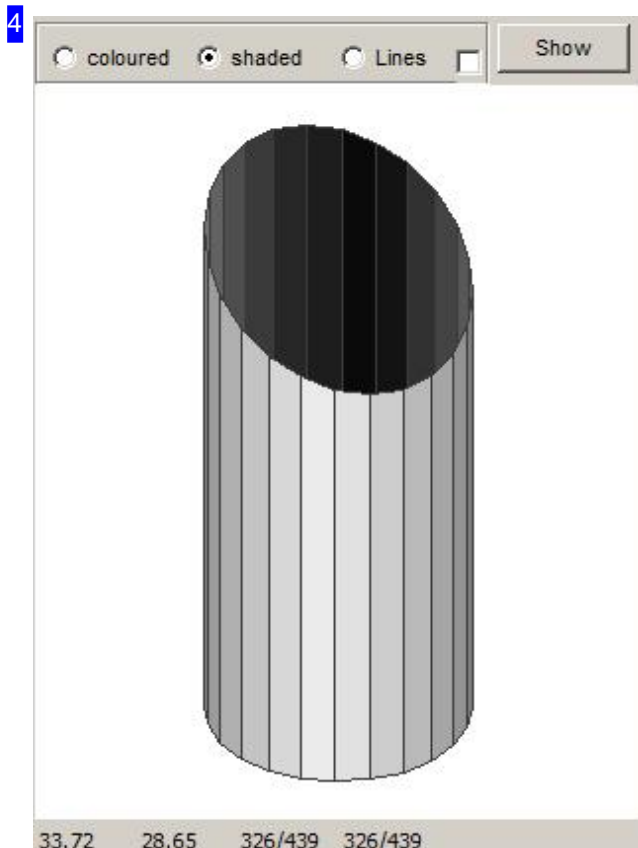
The list to the right shows the pre-made tubes from the XML file. Select a tube from this list or enter the values for an individually customized tube, and click the middle button to send the macro to *cncCUT*.

Click the left button to generate a 3d model of the tube, calculated with the entered values. The model is displayed at the bottom right frame [4] in the window. This approach is recommended for the development until the model has the desired shape before transferring the data to *cncCUT*.



This is a preview of the tube's net corresponding to the values you entered in Macro [1], after data transfer to *cncCUT*.

Double-click on 'Preview' to display an additional frame where you can add several pipe-cuts and holes. You can find more in the following chapter.



The content of this frame is dependent on a supplementary HTML file, designated 'PART' in the control file.

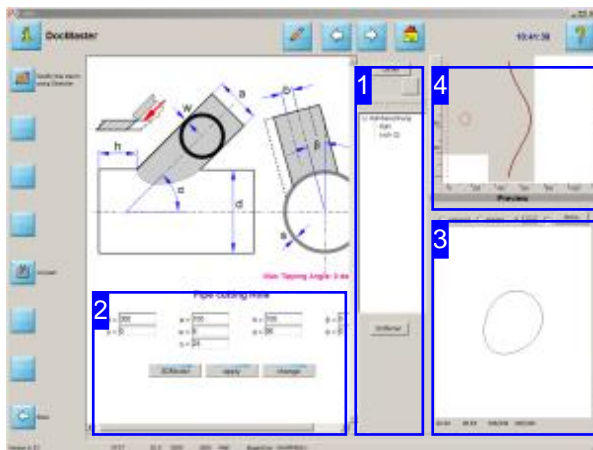
For pipe cutting this file is always re-created by a simple click on the button '3dModel', as a result of a model calculation with the values entered. Click into the window that receives the mouse control. Now you can turn the model with the MT. Use the mouse wheel to zoom the model or move the image with the right MT within the window.

You can change the color for the shaded representation and the grid view. Click the right MT at the given label to open a popup menu for selection.

Note: It is recommended to use the grid view (lines) for development because there are no covered cuts.



Pipe sections supplemented with holes.



Put addition cuts on a tube as holes or incisions. These pipe-cuts are unwinded as inner contours or open contours on the tube's surface. You always need a tube to add additional cuts. This tube is the base. The holes are cut by additional macros and will be accumulated in a list. The conditions for the holes depend on the respective hole macro.

Important note: The values for the tubesheet thickness must be set to 0 (zero) in case of cutting without bevel head.

First select a tube to cut holes on it. This is always your first step. Look therefor the previous section.

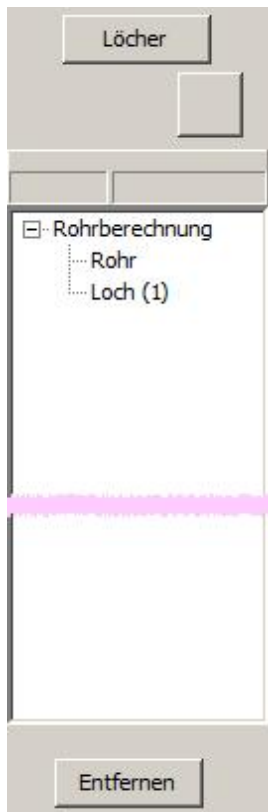
Select the desired macro for the additional holes [1].

Change the values in the form according to your needs and check the holes in the 3D display [3]. Adjust the values accordingly. Select the grid representation for the development of the tube where you can control the individual holes well.

If the holes have the desired arrangement, click 'apply' [2] to send the data to *cncCUT*. The holes are set as internal/open contours, added in the list and displayed in the preview [4].



1



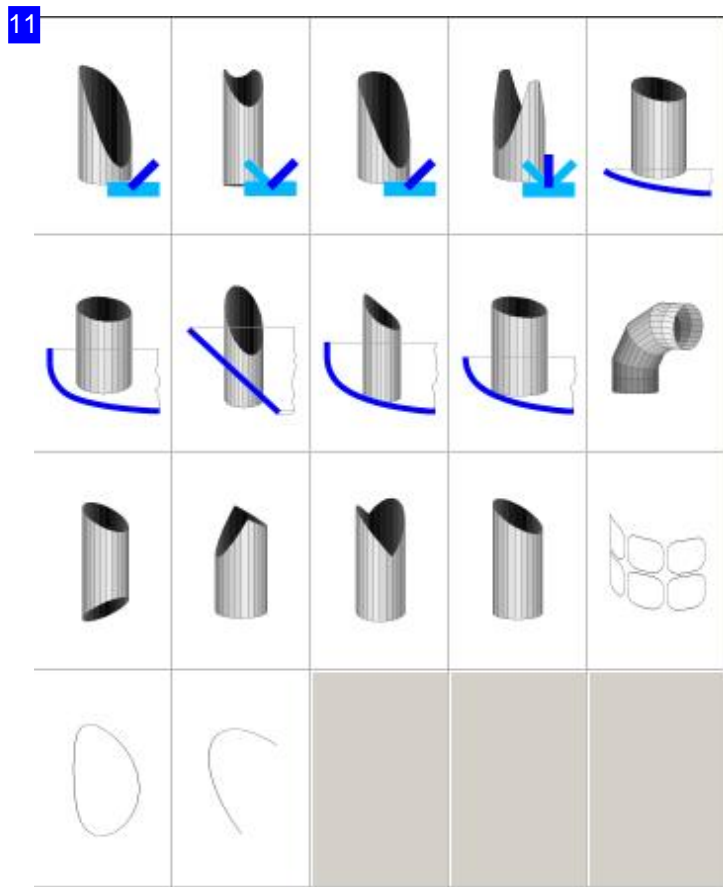
This frame shows the accumulated holes and incisions as inner or open contours to a tube. Prerequisite for the construction of the list is always a tube which has to be determined in a first step.

Click on the button 'holes', to add a hole. You get the next screen for selecting a hole macro from the macro assortment. The list will expand by the additional pipe-cut if it is transferred to *cncCUT*. To do this press 'apply'.

The list is a stack that is continuously increased (push). The button above right is an 'undo' and undoes the last input, the stack is reduced (pop). Mark the list item with the right MT and select 'delete', to remove a macro from the list.

Select a list entry and the associated pipe-cut is displayed in the preview. Click on 'Pipe calculation' and the whole package is displayed.

A simple Click 'Delete' removes the entire list, then you can restart with the selection of a pipe.



The pipe cutting macros are macros for base pipes and hole macros or open incisions (lower row). The latter are additional macros and can be called multiply. They are cumulated in a list as inner contours and open contours in addition to a base tube.

2

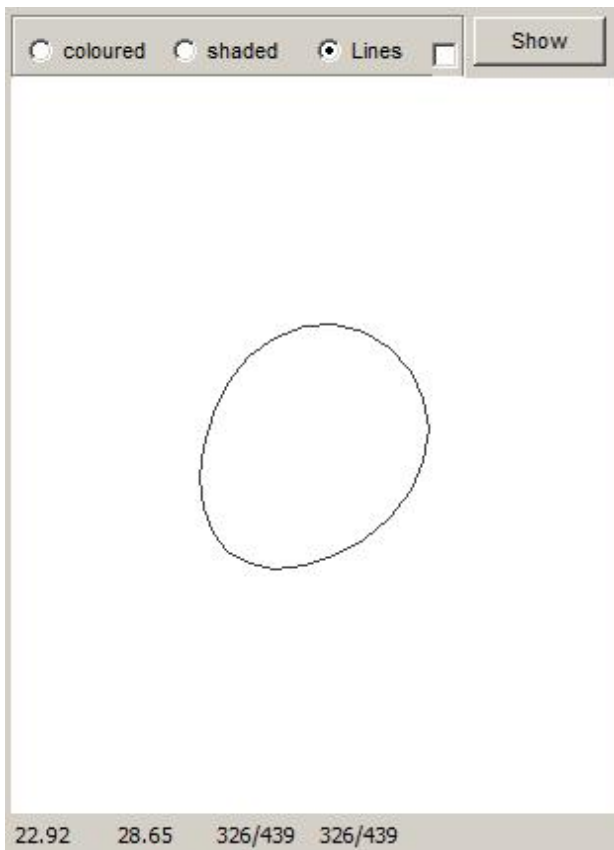
d = <input type="text" value="300"/>	a = <input type="text" value="100"/>	h = <input type="text" value="100"/>
s = <input type="text" value="0"/>	w = <input type="text" value="6"/>	α = <input type="text" value="90"/>
	n = <input type="text" value="24"/>	

Enter the desired values into the input fields. Click the left button to generate a 3d model of the tube, calculated with the entered values. The model is displayed at the bottom right frame [3] in the window. This approach is recommended for the development until the model has the desired shape before transferring the data to *cncCUT*.

A macro from the list can be assigned with new values via the right button. Select the macro in the list and adjust the values accordingly. Click 'edit' to apply the new values.



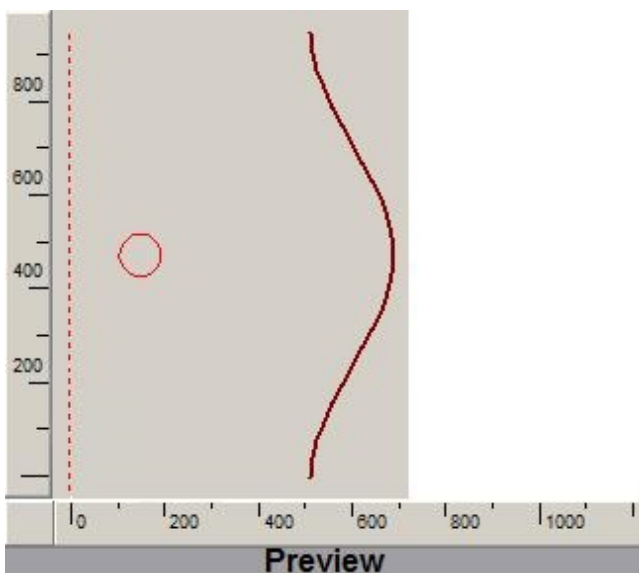
3



The presentation in this frame depends on the working process. Normaly the actual work [2] is shown here. Also the tube or the complete package can be shown, depending on the appropriate actions.

Functions in this frame see the previous chapter.

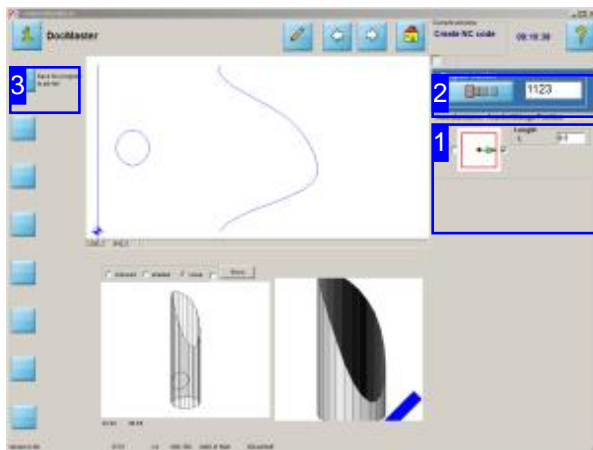
4



This is a preview of the tube's net or a contour selected from the list [1]. Click on 'Preview' to display the complete package.

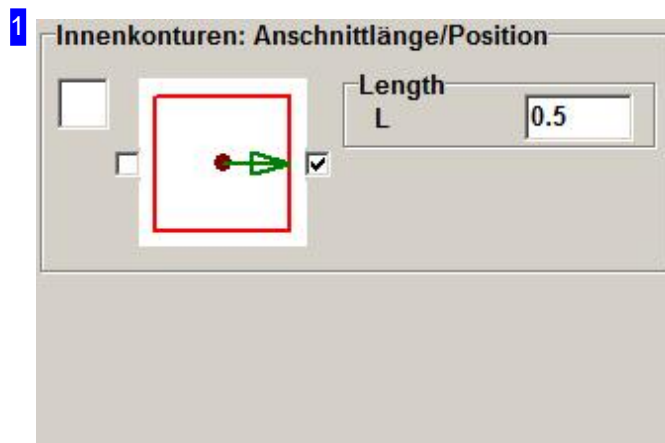


Applying lead-ins for holes.



You can apply here [1] lead-ins for inner contours in tubes. Enter a name or a number for your job, under which you want to retrieve the job in the job list later.

You can apply lead-ins in holes of tubes, that only may lay on the tube-axis.
Here you can define a job-number and put the job into the joblist.



You can set lead-ins for inner contours (holes) in pipe-cuts. Enter the cut's length and the direction on the tube-axis.



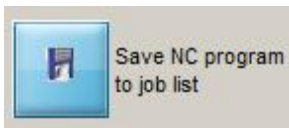
2



The screenshot shows a blue-bordered window with the title 'Program number'. Inside the window, there is a light blue panel containing three small rectangular buttons. To the right of this panel is a white text input field containing the number '1123'.

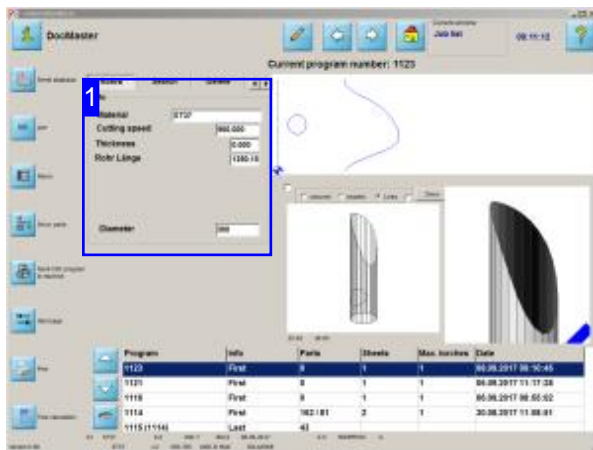
Enter a job-number here, under which you want to retrieve the pipe-cut in the job list.

3



You can put the job specific into the job-list or simple go one step forward.

Pipe-Cuts in the Joblist.



Select the Pipe tab to get all information about the tube that should be cut. You see all the cuts in a settlement above. The frame left shows you a 3D-view and on the right, the Macro-selection for this job.

Pipe-cuts are handled especially and displayed as a settlement on the tube's surface.

An available tube is a requirement for pipe-cuts. The Pipe tab shows you all information about the needed tube.

The thickness should always be set to 0.0, if no chamfer is cut.



1

Rohre	Search	Delete	◀	▶
Info				
Material	<input type="text" value="ST37"/>			
Cutting speed	<input type="text" value="900.000"/>			
Thickness	<input type="text" value="0.000"/>			
Rohr Länge	<input type="text" value="1250.15"/>			
Diameter	<input type="text" value="300"/>			

This frame shows you the settings for the needed tube to do the job.

Data Transfer

The Interface between Browser and cncCUT.

```

?Msg=%22%3A+NEWMACRO+1079.936+942.478%22%2C%22%3A+NOSORT%
%22%2C%22%3A+PIPECUT%22%2C%22%3A+PENLT+1+6%22%2C%22%
3A+M+906.731+0+1%22%2C%22%3A+D+906.731+0+300+0+51.206%22%
2C%22%3A+D+909.682+39.27+300+0+50.759%22%2C%22%
3A+D+918.333+78.54+300+0+49.399%22%2C%22%
3A+D+932.096+117.81+300+0+47.068%22%2C%22%
3A+D+950.032+157.08+300+0+43.692%22%2C%22%
3A+D+970.919+196.35+300+0+39.218%22%2C%22%
3A+D+993.333+235.619+300+0+33.69%22%2C%22%
3A+D+1015.748+274.889+300+0+27.35%22%2C%22%
3A+D+1036.635+314.159+300+0+20.706%22%2C%22%
3A+D+1054.571+353.429+300+0+14.489%22%2C%22%
  
```

HTML-macros are executed in a browser and the data will be transmitted to *cncCUT* by the rules of HTTP-servers. Possible protocols are ActiveX, TCP/IP und HTTP, ActiveX is used as default.

The data have to be in a correct syntax, to use them in proper wise by *cncCUT*

Important is, that only the writer of a HTML-macro is responsible for the correct processing and a correct display, also in an extern window.

The following descriptions are in regard to macros, written by *IBE Software GmbH* for ducts and pipe-cuts.

Note: To send an HTML net via your TCP/IP interface, you must activate a server which can process the macro. The TCP addresses and the port number must be used as server addresses when sending a macro.

At the execution of HTML macros a telegram (message) is generated that contains the instructions (Commands) for *cncCUT*. The result is shown in a preview and a second HTML-file is generated and displayed in a second, integrated preview. The HTML-file has the same name as the entry in the adapter-file under the key 'Part' with the extension '.MHT' e.g. 'PART=name3d.html'. This file is a text file in HTML format for *cncCUT* by perceiving the key word 'DOCTYPE' in the first line '<DOCTYPE HTML PUBLIC ...'.

Normaly the file contains a 3D-view of the generated part to see in the title of the file <title>Calculated 3D-Model</title>. But the file can contain other informations written in HTML format e.g. a datasheet or a drawing.

An other file can be generated in addition with the extension 'Extern' in the title <title>Calculated 3D-Model Extern</title>. This file gets the name with the addition 'Part'. The name 'name3d.html' expands to 'name3dPart.html'.

See the duct macros from *IBE Software GmbH* for example, which generates a drawing of a part and save it in a specific file. These files need HTML5 for correct viewing.

```

1 ?Msg=%22%3A+NEWMACRO+1079.936+942.478%22%2C%22%3A+NOSORT%
22%2C%22%3A+PIPECUT%22%2C%22%3A+PENLT+1+6%22%2C%22%
3A+M+906.731+0+1%22%2C%22%3A+D+906.731+0+300+0+51.206%22%
2C%22%3A+D+909.682+39.27+300+0+50.759%22%2C%22%
3A+D+918.333+78.54+300+0+49.399%22%2C%22%
3A+D+932.096+117.81+300+0+47.068%22%2C%22%
3A+D+950.032+157.08+300+0+43.692%22%2C%22%
3A+D+970.919+196.35+300+0+39.218%22%2C%22%
3A+D+993.333+235.619+300+0+33.69%22%2C%22%
3A+D+1015.748+274.889+300+0+27.35%22%2C%22%
3A+D+1036.635+314.159+300+0+20.706%22%2C%22%
3A+D+1054.571+353.429+300+0+14.489%22%2C%22%
  
```



The telegram to *cncCUT* is constructed by commands, with the drawing-instructions.

The commands are:

- o "C: NEWMACRO b h" (b = Width; h = Height)
- o "C: PENLT l t" (l = Line; t = Type <0:inner, 5:G41 lft, 6:G42 rght, 7:GNO central, 9:virtual, 10:Ref. Edge>)
- o "C: NP 'Txt'" ('Txt' = Name)
- o "C: M x y z w n" (Move x = X-Position; y = Y-Position)
(optional z = Z-Position; w = Y-arc-position; n = Contour Number)
- o "C: D x y z w a b" (Draw x = X-Position; y = Y-Position)
(optional z = Z-Position; w = Y-arc-position; a = Arc A; b = Arc B)
- o "C: T d x y" (Transform d = direction <0:off, 1:x, 2:y> x = X-Position; y = Y-Position)
- o "C: A xB yB xE yE xM yM" (Arc x = X-Position; y = Y-Position {Beg, End, Middle})
- o "C: C x y R d" (Circle x = X-Position; y = Y-Position R = Radius d = Direction)
- o "C: IT x y Ht 'Txt'" (Infotext x = X-Position; y = Y-Position Ht = Textheight 'Txt' = Literal)
- o "C: GT x y Ht 'Txt'" (Gravur-text - Parameter as IT)
- o "C: H h" (Height h = Material/Thickness)
- o "C: NOSORT" (Prevents the sort of contours)
- o "C: PIPECUT d l s a b r" (Sets the conditions for fixed cuts)
(d = Diameter; l = Length; s = Thickness)
(optional a = Edge A Length; b = Edge B Length; r = Radius Edge Rounding)
- o "C: ENDMACRO"
- o "C: ST x y z w" (Starting point x = X-Position; y = Y-Position)
(optional z = Z-Position; w = Y-arc-position;)
(Starting point is a virtual reference point from which a post-processor can calculate a relative position.)
- o "C: VP x y" (Virtual Point x = X-Position; y = Y-Position)

The browser forms the command well before putting them to the server (look above). Some characters are changed to hex-code like '%22', '%2C' oder '%3A' and spaces are set to '+' by transmission. This is important in case of writing the characters in original by *cncCUT*. Therefor the following syntax can be used. *cncCUT* will process '#' as '' and '@' generates a linefeed.



Glossary

3D Workpiece

Three-dimensional Workpiece with a sheet metal outer skin..

3D Representation

Activation	10
Data	34
Drawing	12
Fold	15
Input Form	13
Insert	17
Insulation	17
Joiners	15
Lead-ins	16
Lining	17
Linking Elements	15
Locking Joints	15
Nesting	28
Net	17
Notch	15
Parameters	17
Selection	11
Tab	15
Thickness	15
Variants	34

Chamfer

A chamfer is a beveled surface at an edge.

Bevel Angle	42
Bevel Head	43
Definition	42
General	40
Tipping Angle	42

Cut-outs

Polygonal and elliptical cut outs in your nets.

Entry	18
Handholes	26
Input Form	20
Manholes	26
Selection	18

Data Transfer

Data Description to the Interface.



Commands	52
General	51
Message	51
Special Characters	52
Files	
Files required for generating your 3D component.	
Adapter File	33
Drawing	33
Images	33
Linking Elements	38
Macro File	33
Structure	31
Templates	34
Variants	34
Groups	
All of a component`s Nets can be associated together.	
Dialog	30
Name	30
Quantity	30
Interfaces	
Sending your Files to cncCUT.	
ActiveXObject	9
Default	9
Message	51
TCP/IP	9
Template	38
Test Outputs	10
Macro	
Programs for quickly making Nets of predefined 3D components.	
Files	31
General	3
Introduction	5
Nets	7
Selection	5
Standard	7
Templates	34
Nets	
Unravalled geometric representations of Three-dimensional Workpiece.	
Calculation	17



Input Form	13
Macros	7
Nesting	28
New Job	2
Parameters	17
Preview	12
Processing	9
Sending	9
Separating	22
Sheet Database	3

Open Contours

Contour cuts which serve as common separating cuts when using fishes.

Axis Points	26
Definition	21
Joining	21
Lead-in Lengths	22
Open Contours	20
Path Corrections	22

Pipe Cuts

Unwinded contours on the tube's surface.

3D Modell	42
Basic Tube	43
Chamfer	42
Extension	43
General	40
Hole Makro	46
Holes	43
Lead-ins	47
Pipe Cuts	40

TCP/IP

Sending your Nets to cncCUT.

Activation	10
Addresses	13
Port	13
Server	13
Settings	13
Template	38

Template

Settings for the Input Form.

ActiveXObject	38
Columns	38



Default	38
General	36
TCP/IP	38



Index

3	3D Modell (Pipe Cuts)	42
A	Activation (3D Workpiece)	10
	Activation (TCP/IP)	10
	ActiveXObject (Interfaces)	9
	ActiveXObject (Template)	38
	Adapter File (Files)	33
	Addresses (TCP/IP)	13
	Axis Points (Open Contours)	26
B	Basic Tube (Pipe Cuts)	43
	Bevel Angle (Chamfer)	42
	Bevel Head (Chamfer)	43
C	Calculation (Nets)	17
	Chamfer (Pipe Cuts)	42
	Columns (Template)	38
	Commands (Data Transfer)	52
D	Data (3D Workpiece)	34
	Default (Interfaces)	9
	Default (Template)	38
	Definition (Chamfer)	42
	Definition (Open Contours)	21
	Dialog (Groups)	30
	Drawing (3D Workpiece)	12
	Drawing (Files)	33
E	Entry (Cut-outs)	18
	Extension (Pipe Cuts)	43
F	Files (Macro)	31
	Fold (3D Workpiece)	15
G	General (Macro)	3
	General (Data Transfer)	51
	General (Pipe Cuts)	40
	General (Chamfer)	40
	General (Template)	36
H	Handholes (Cut-outs)	26
	Hole Makro (Pipe Cuts)	46
	Holes (Pipe Cuts)	43
I	Images (Files)	33
	Input Form (3D Workpiece)	13
	Input Form (Cut-outs)	20
	Input Form (Nets)	13
	Insert (3D Workpiece)	17



	Insulation (3D Workpiece)	17
	Introduction (Macro)	5
J	Joiners (3D Workpiece)	15
	Joining (Open Contours)	21
L	Lead-in Lengths (Open Contours)	22
	Lead-ins (3D Workpiece)	16
	Lead-ins (Pipe Cuts)	47
	Lining (3D Workpiece)	17
	Linking Elements (3D Workpiece)	15
	Linking Elements (Files)	38
	Locking Joints (3D Workpiece)	15
M	Macro File (Files)	33
	Macros (Nets)	7
	Manholes (Cut-outs)	26
	Message (Interfaces)	51
	Message (Data Transfer)	51
N	Name (Groups)	30
	Nesting (3D Workpiece)	28
	Nesting (Nets)	28
	Net (3D Workpiece)	17
	Nets (Macro)	7
	New Job (Nets)	2
	Notch (3D Workpiece)	15
O	Open Contours (Open Contours)	20
P	Parameters (3D Workpiece)	17
	Parameters (Nets)	17
	Path Corrections (Open Contours)	22
	Pipe Cuts (Pipe Cuts)	40
	Port (TCP/IP)	13
	Preview (Nets)	12
	Processing (Nets)	9
Q	Quantity (Groups)	30
S	Selection (Cut-outs)	18
	Selection (3D Workpiece)	11
	Selection (Macro)	5
	Sending (Nets)	9
	Separating (Nets)	22
	Server (TCP/IP)	13
	Settings (TCP/IP)	13
	Sheet Database (Nets)	3
	Special Characters (Data Transfer)	52
	Standard (Macro)	7
	Structure (Files)	31
T	Tab (3D Workpiece)	15



TCP/IP (Interfaces)	9
TCP/IP (Template)	38
Template (Interfaces)	38
Template (TCP/IP)	38
Templates (Files)	34
Templates (Macro)	34
Test Outputs (Interfaces)	10
Thickness (3D Workpiece)	15
Tipping Angle (Chamfer)	42
V Variants (Files)	34
Variants (3D Workpiece)	34



Table of Contents

Welcome to cncCUT's Net module's help files	1
General Tips for Navigation of the Program	1
The Start Screen	2
Start and exit the program, program navigation.	2
The Sheet Database	4
Selecting a sheet	4
Selecting a Macro	6
Select a macro from your stock.	6
Nets	10
Working with Nets (HTML macros)	10
The Input Form.	14
Cut-outs in Nets.	19
Setting the Technology Data for Open Contours	21
Separating Large Parts	23
Separating Large Parts with the Sketcher	23
Cutting Hand- and Manholes	27
Positioning and Cutting Holes on Pipe Axes	27
Nesting the parts	29
Organising parts into a nesting plan	29
Files	32
The file structure.	32
Variants in the XML file.	35
Form templates as XML files.	37
Edge Template as an XML File.	39
Pipe-Cuts	41
Pipe-Cuts like Nets	41
Pipe sections supplemented with holes.	44
Applying lead-ins for holes.	48
Pipe-Cuts in the Joblist.	50
Data Transfer	52
The Interface between Browser and cncCUT.	52
Glossary	54
Index	58