NC Express e^3

Software version release: 22.2

07. October 2022

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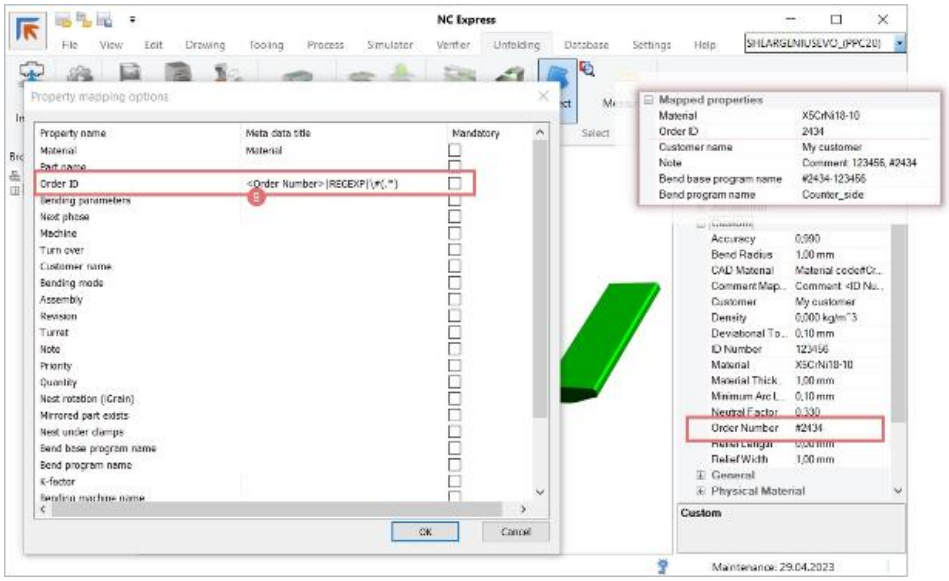
Unfolding

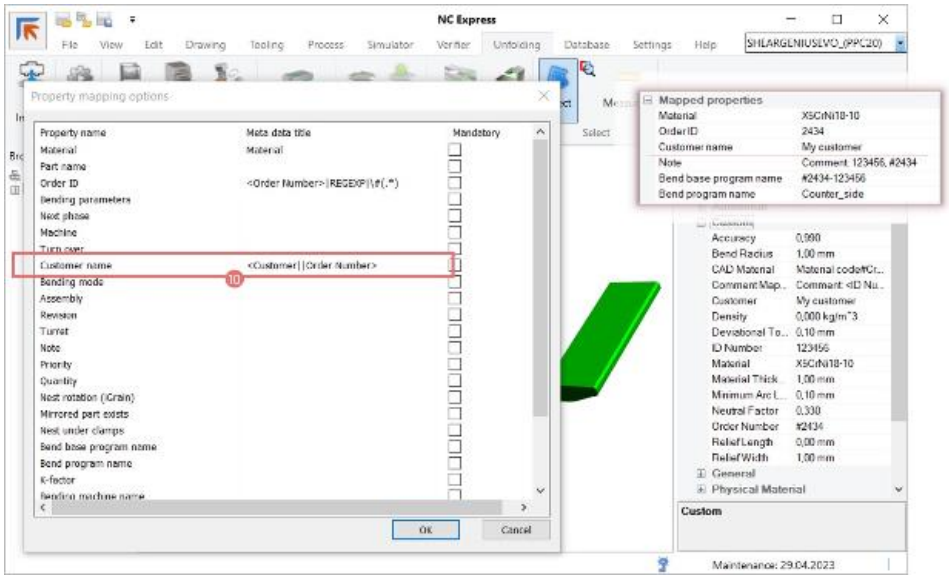
Property mapping enhancements

PREMIUM

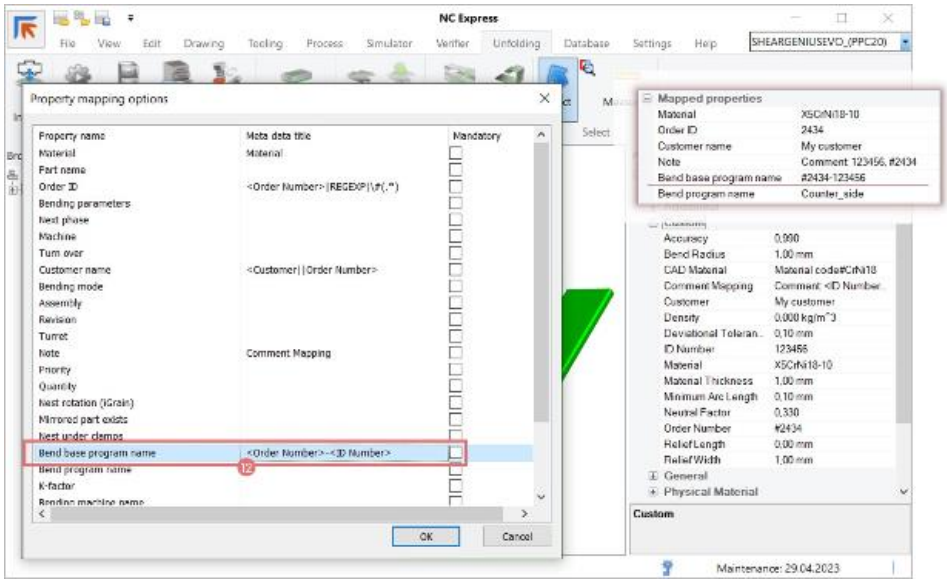
Use the Regular Expression (REGEX) to split the data as needed. This function allows separating the metadata field and using only a part of it as a mapped property. For example, the mapped Order number will be 2434 instead of #2434 (9). Follow this link to read more about how to use REGEX: https://en.wikipedia.org/wiki/Regular_expression



It is possible to define alternative titles using the ‘’||’’ character between the tags. If alternatives are set, the first one found in the model will be applied (10).



It is possible to combine multiple metadata fields by placing them in < > brackets (12). Free text can be added between the brackets.

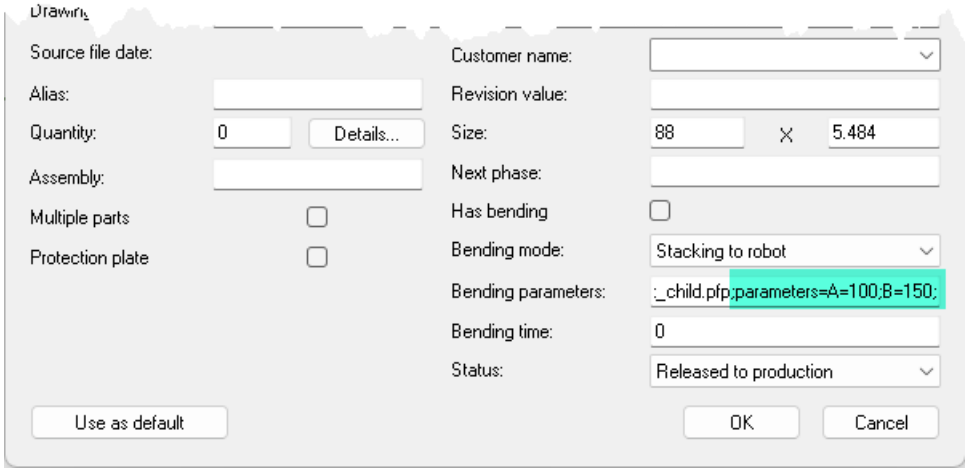


Bending parameters with any optional parameters

PREMIUM

In ***Bending parameters*** field you can give optional parameters also and pass them through to Master BendCAM parametrics service.

```
Part.BendParams =
"BaseProgName=mother.pfp;ProgName=child.pfp;parameters=A=100;B=150;"
```



Supported 3D formats and versions

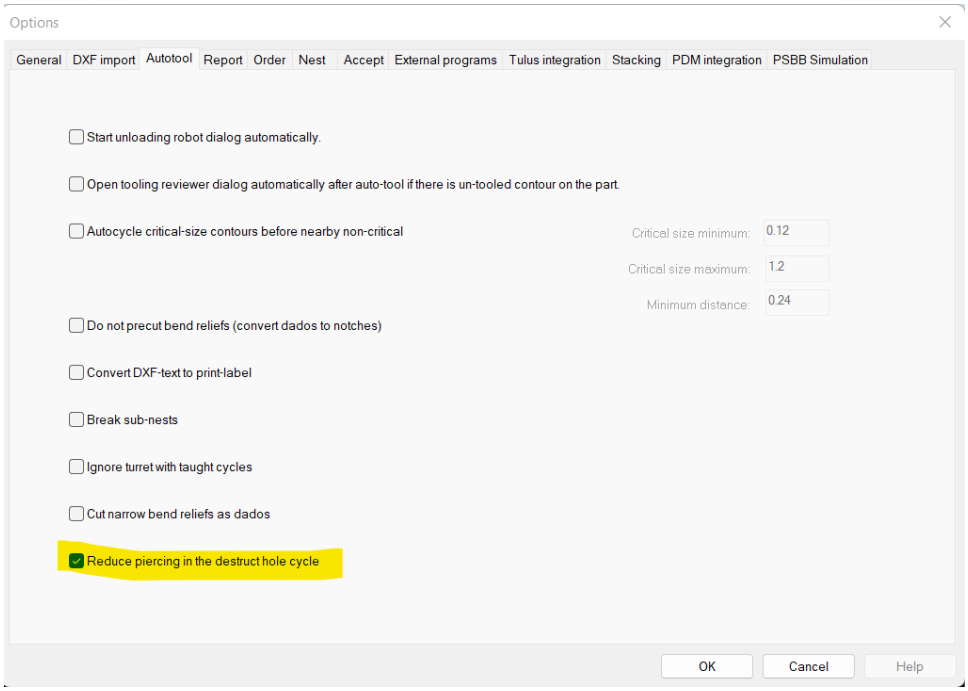
- Autodesk Inventor (*.ipt, *.iam), up to 2023
- SolidWorks (*.sldprt, *.sldasm), up to 2022
- Solid Edge (*.par, *.psm, *.asm), up to 2022
- Siemens JT (*.jt), up to 10.7
- Siemens NX (*.prt), up to 2027
- PTC Creo (*.prt.x, *.asm.x), up to 9.0
- Catia (*.catproduct, *.catpart), V4 (4.15 to 4.26) and V5 (R10 to R32), V6
- IGES (*.igs, *.iges), up to 5.3
- STEP (*.stp, *.step), AP203 (E1, E2), AP214 (up to E3), AP242 (E1, E2, BO XML), AP209
- Spatial Acis (*.sat), up to 2021 1.0
- Parasolid (*.x_t, *.x_b), up to 34.1

The LASER machines

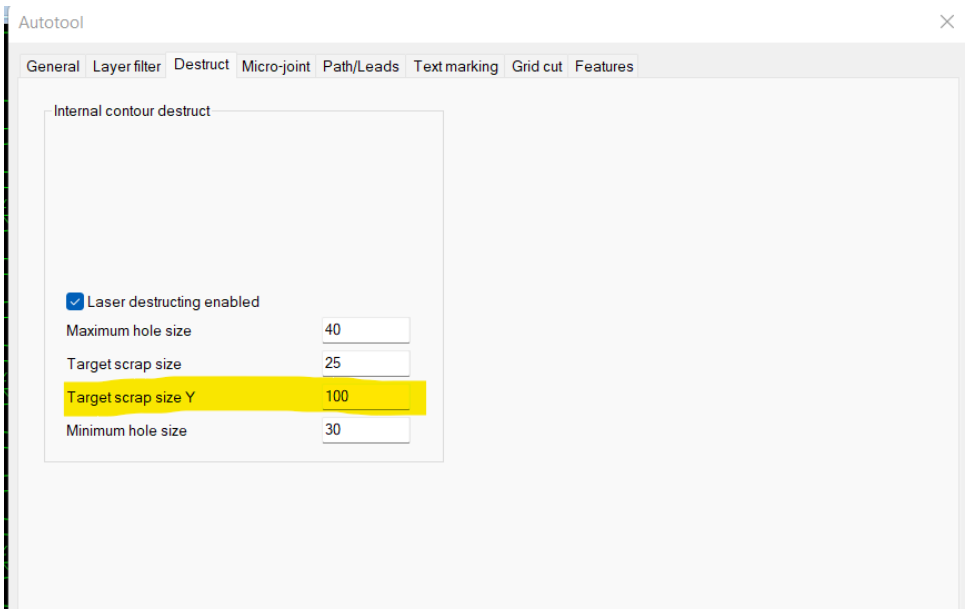
Laser hole destruct with separate X/Y size

Laser hole destruct routine has been upgraded to allow the setting of minimum scrap size values separately in the X and Y directions. Now we have clearly less piercings.

New version can be enabled through the options dialog:



Minimum scrap size in Y direction can be set on Autotool page:

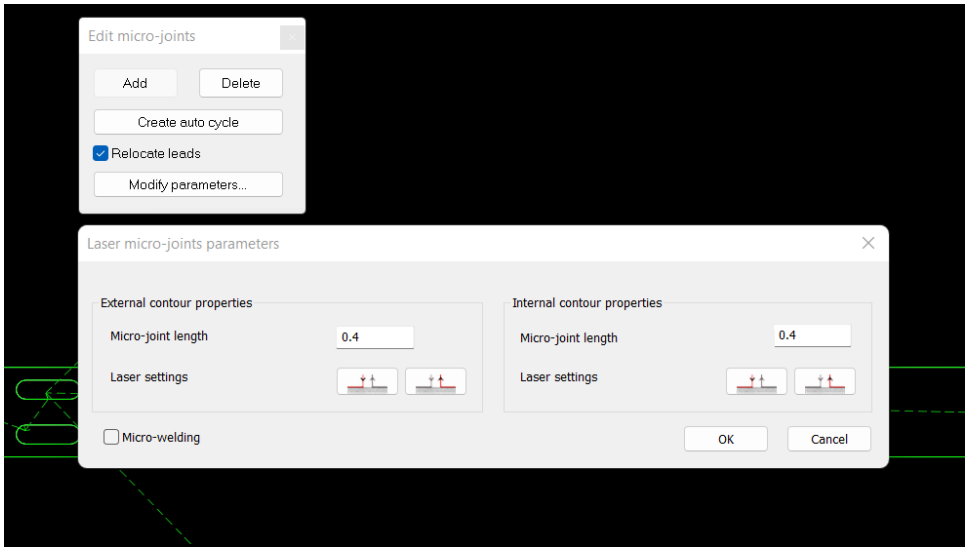


Find a better lead-in position on narrow holes

The algorithm for placing leads in Autotool was improved to avoid placing leads in narrow corners.

Sort cycle in Interactive micro-joints

Interactive micro-joints placing dialog has been significantly enhanced and now allows setting the MJ parameters and the option to reorder the hole cutting sequence (cycling) including leads relocation.



Prevent lead-in and micro-joint too close to a corner

When a lead-in or a micro-joint has a distance from a corner less than the laser beam width, Tulus-Open machine can get an alarm, and it stops the execution of the NC-program.

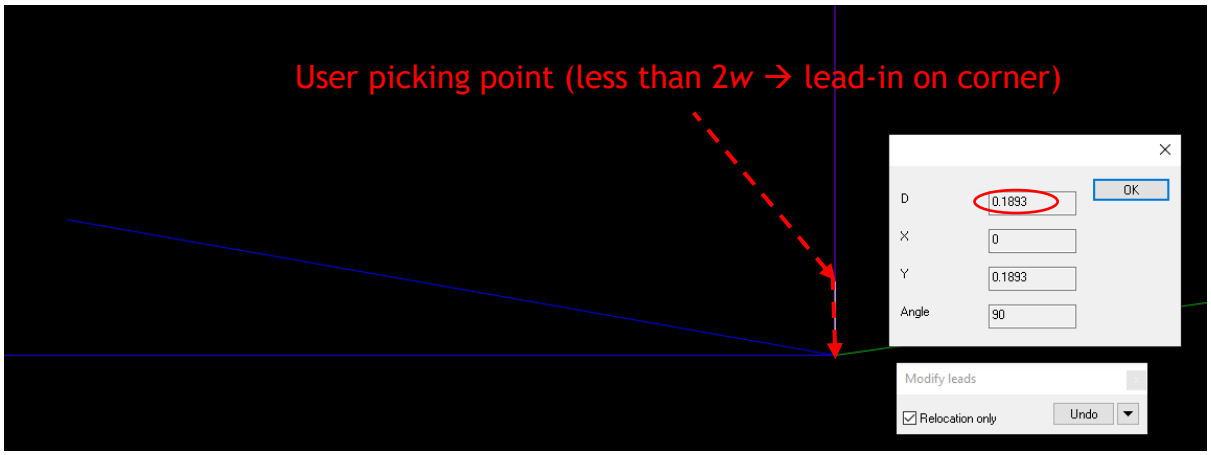
When user adds micro-joints and lead-ins manually, this situation is now avoided.

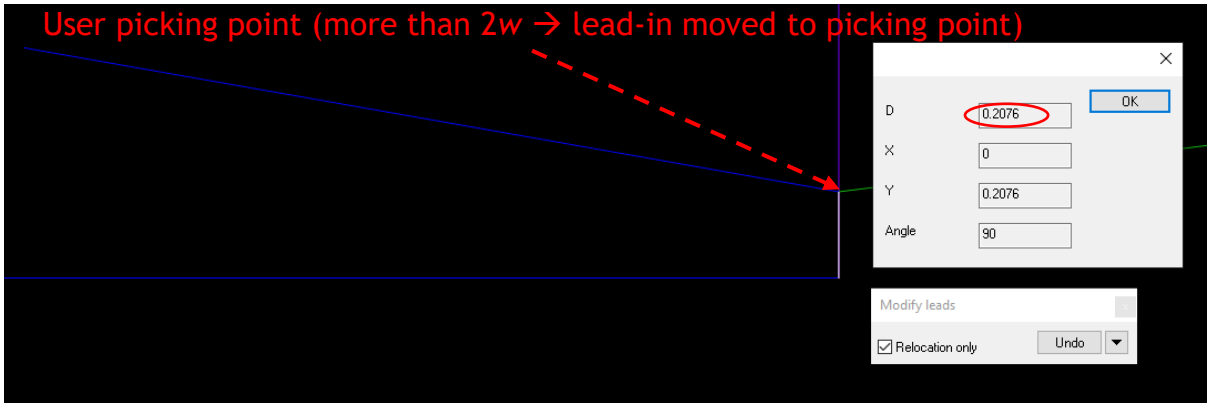
The operability is a bit different between micro-joints and lead-ins.

About lead-ins

When user picks a point with distance from the corner less than 2 times the nominal width of the laser beam, the lead-in is moved on the corner automatically.

The following picture shows two example cases about the reallocation of an internal lead-in when the nominal width of a laser beam (*w*) is 0.1 mm. The first case shows a corner reallocation, the second the relocation to the picking point.



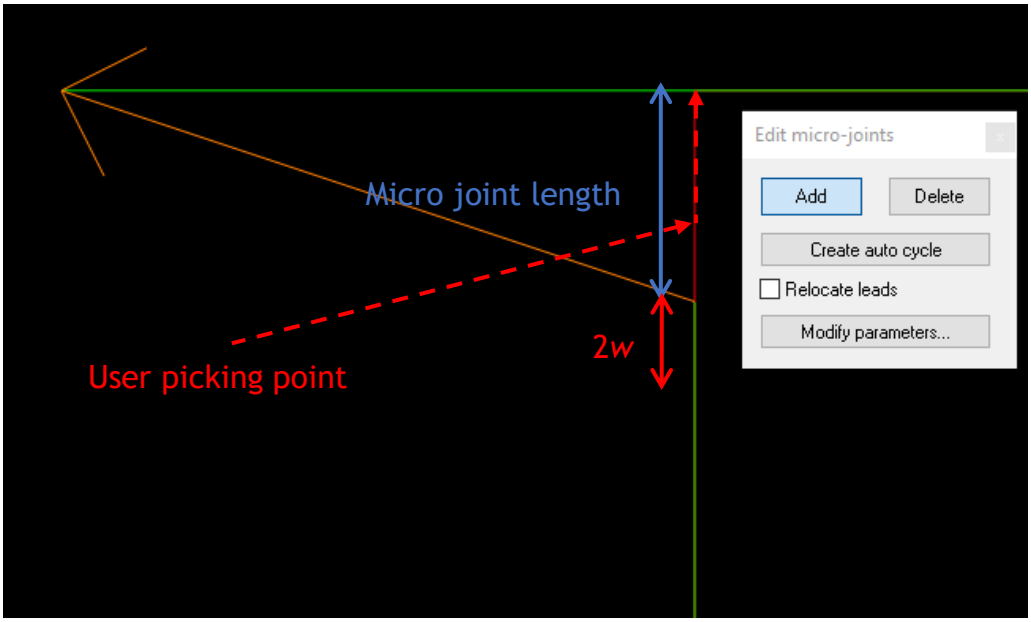


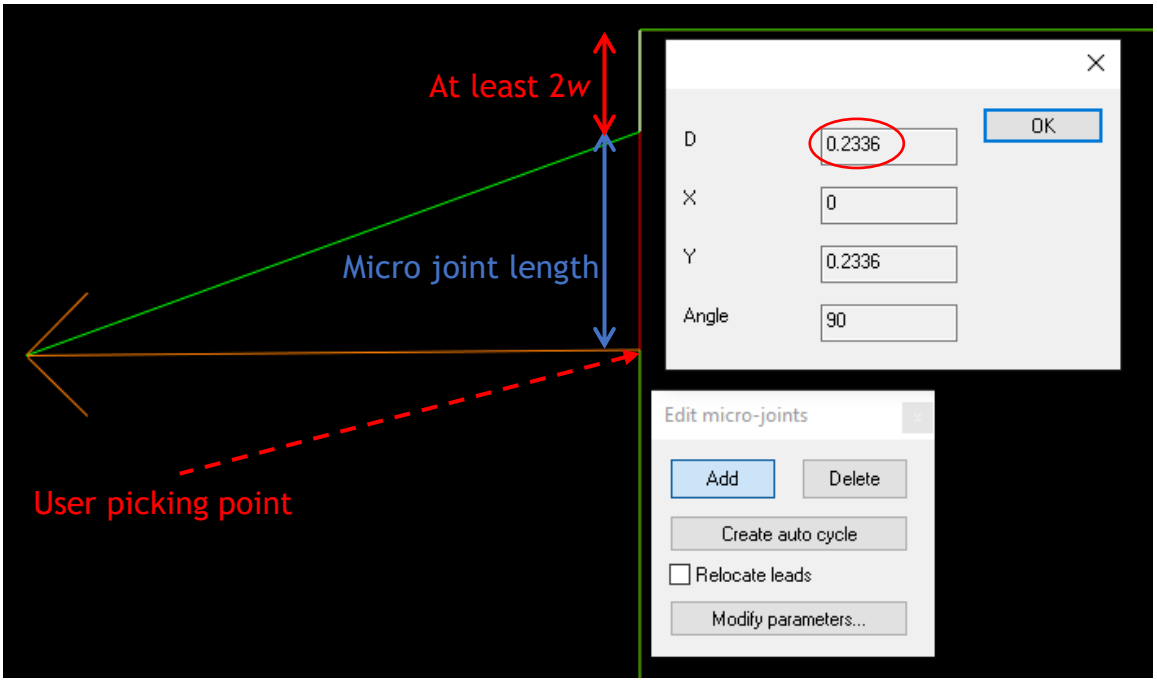
About micro-joints

The check about the picking point of micro-joint considers micro-joint's length that is bigger than the laser beam width.

When user picks a point with distance from the corner less than 2 times the nominal width of the laser beam plus the micro-joint's length, the lead-in is moved on the corner automatically.

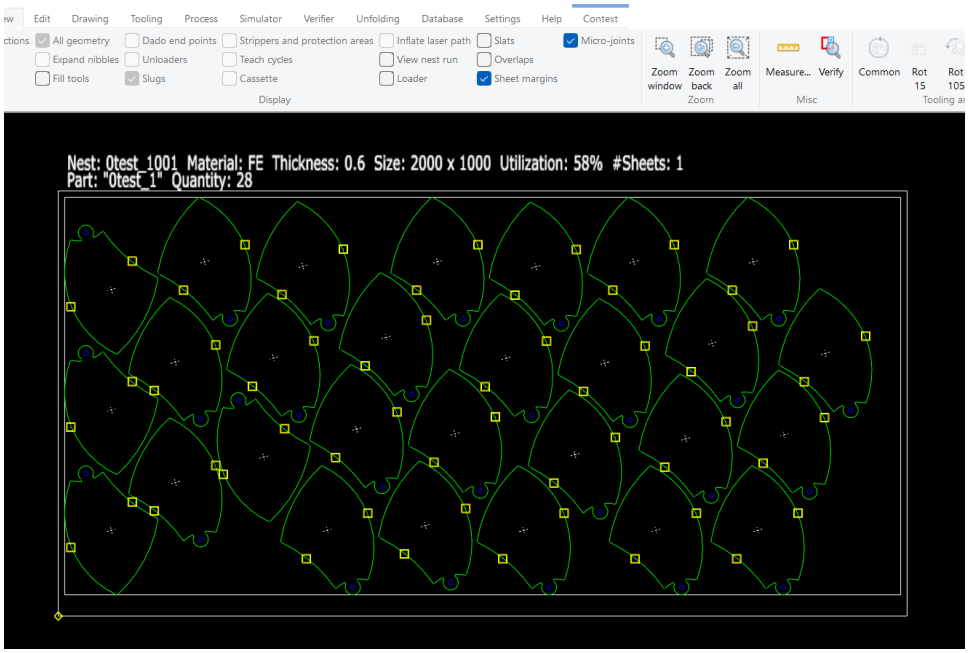
The following picture shows two example cases about the micro-joint's definition when the nominal width of a laser beam (*w*) is 0.1 mm. The first case shows a corner micro-joint, the second the relocation to the picking point.





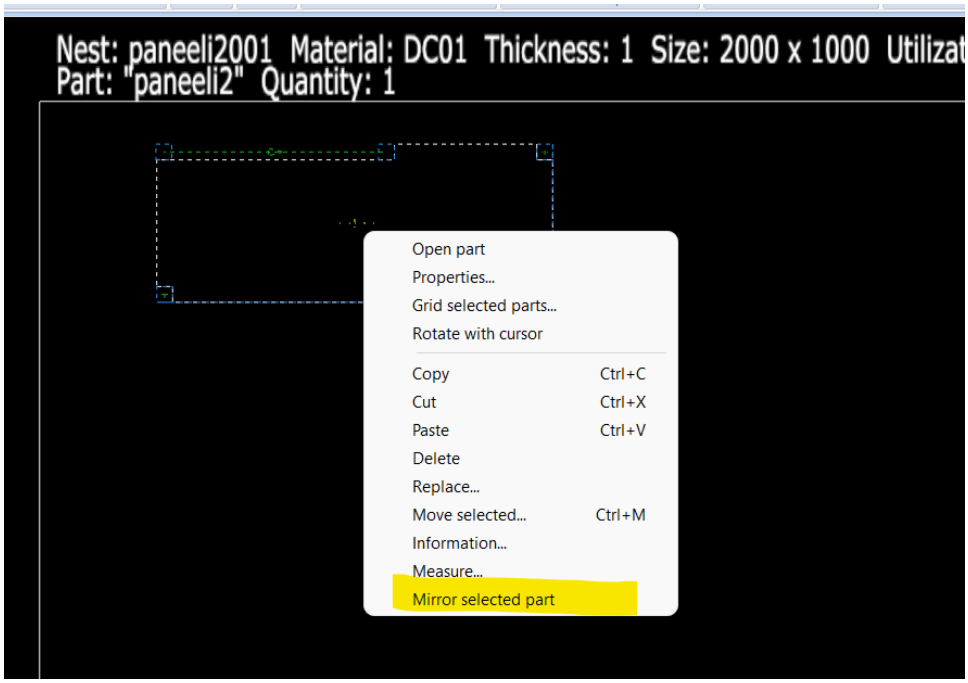
Draw sheet margins and highlight micro-joints

Sheet viewing options have been expanded and now include displaying the sheet margins and positions of micro-joints

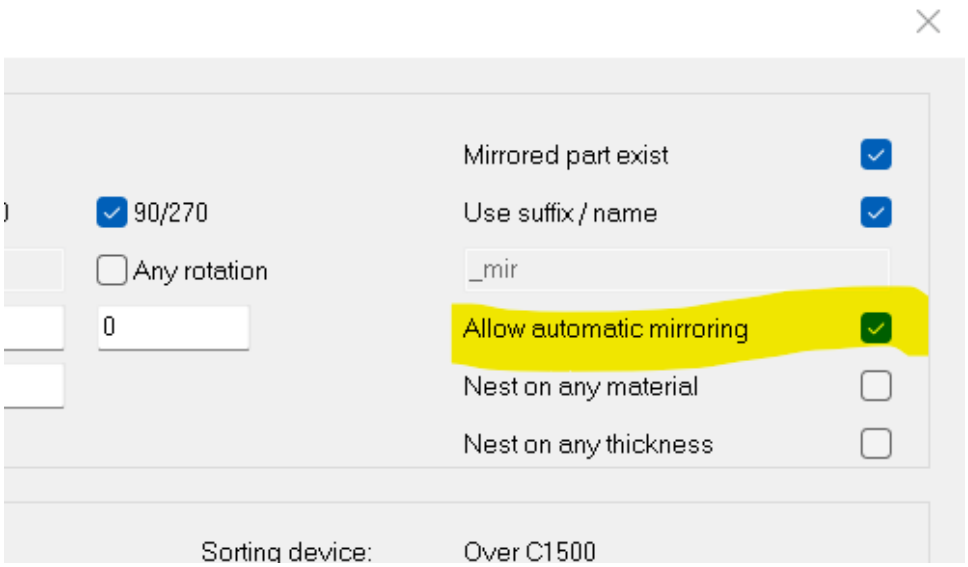


Mirror selected part

New menu item ***Mirror selected part*** was added to the interactive nesting menu:

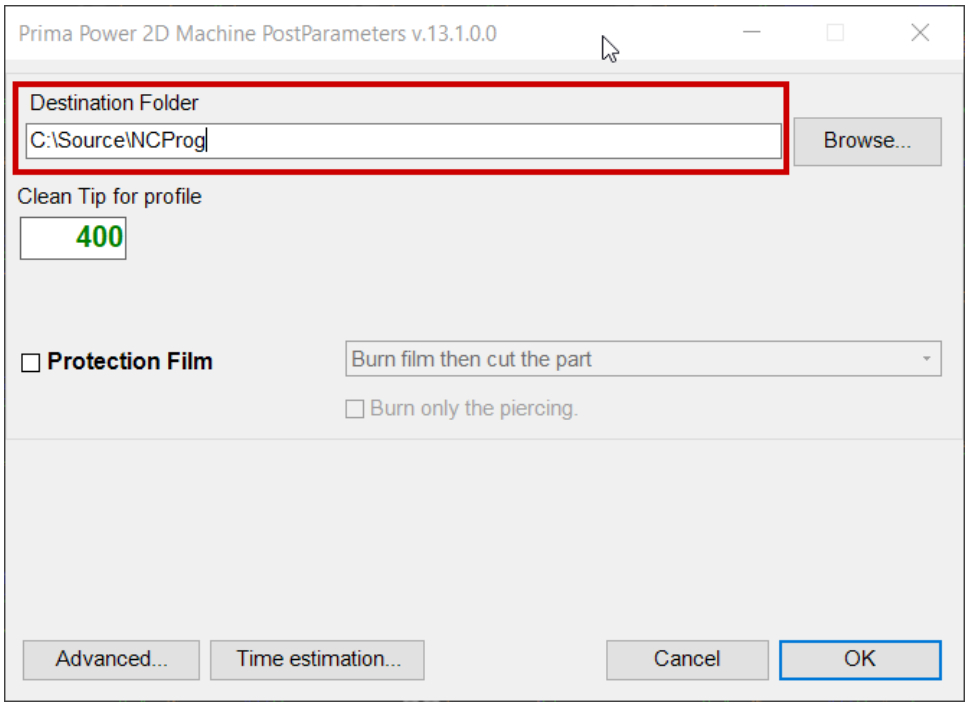


It works on parts if ***Allow automatic mirroring*** checkbox was checked in part properties:



Editable post processing folder in the postprocessor dialog

It is possible to edit the destination folder or NC-program inside the Post Processor Dialog in addition to the selection inside the file system pressing *Browse...* button.



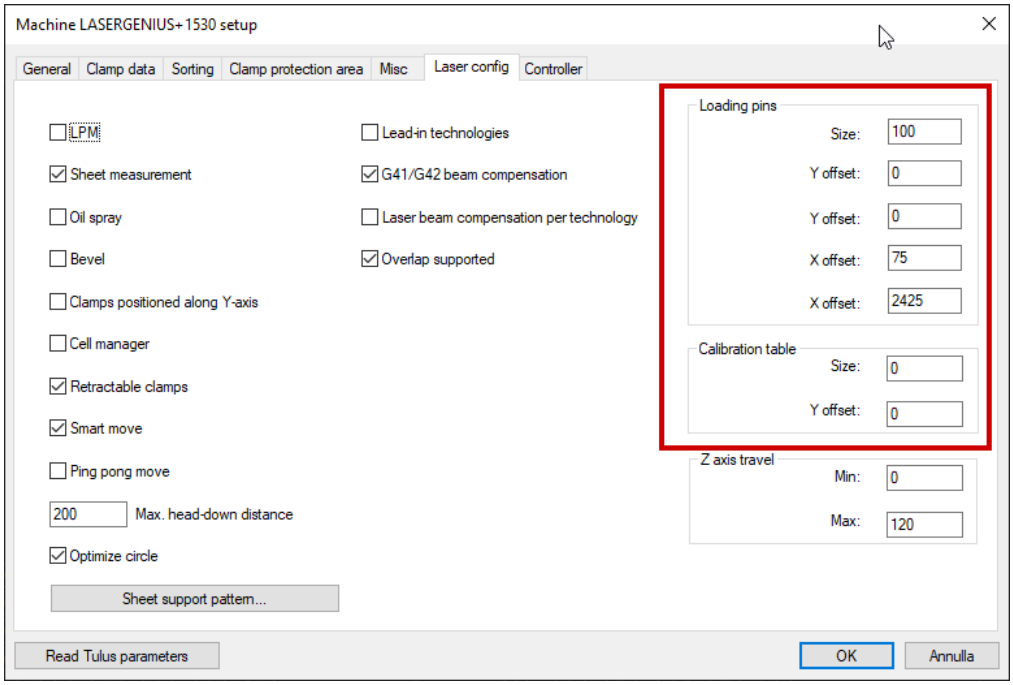
When the directory does not exist, an error icon appears when pressing *OK* button.

Moving the mouse on the error icon, the error description appears as tooltip.

Select an existing destination folder to close Post Processor Dialog correctly.

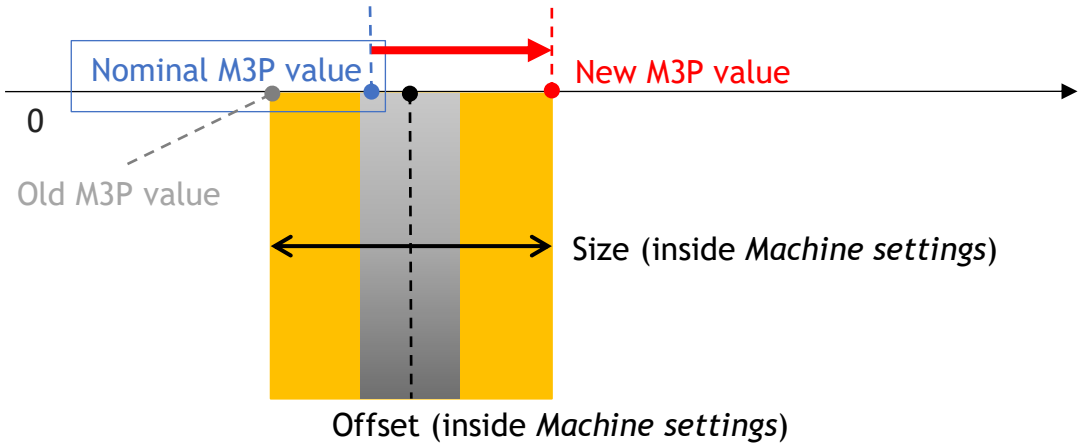
Prefer sheet measurement on the right side of pin

NC Express e³ can update the nominal M3P values automatically. Pins or the calibration table can cause collision during M3P procedure. Shifted values depend on the safe area defined inside the *Laser config* tab of *Machine Settings* dialog.



If M3P procedure fails the first measure, the machine updates the measure position increasing it by 25mm. Then it executes the measure again. This can cause collision because the new point can be inside the safe area.

NC Express e³ increases the position of a measuring value instead of decreasing it as before.

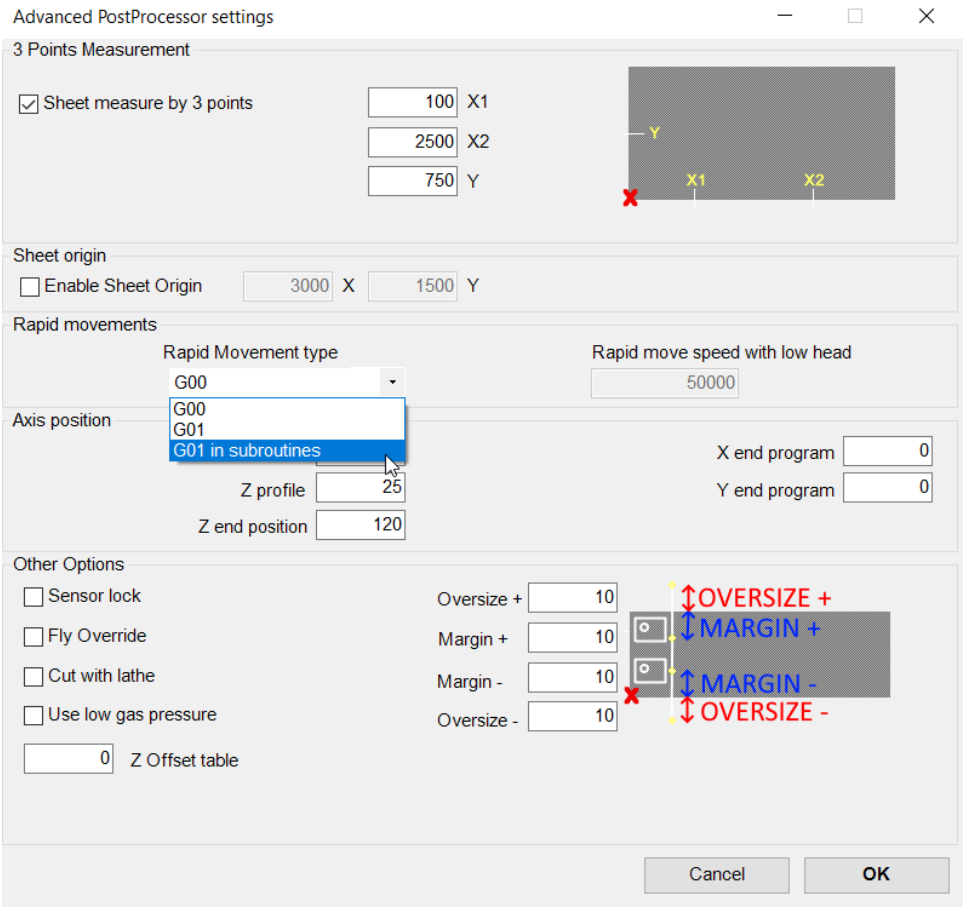


Force G01 motions inside subroutines

There is now a new setting available about rapid movements for P30L or P20L laser machines:

- G00 rapid motions inside NC-program MAIN section
- G01 rapid motion inside NC-program SUBROUTINE sections to cut parts.

This setting is available inside Advanced Post Processor Setting Dialog.



This means that inside the instructions of the NC-program Rapid motion:

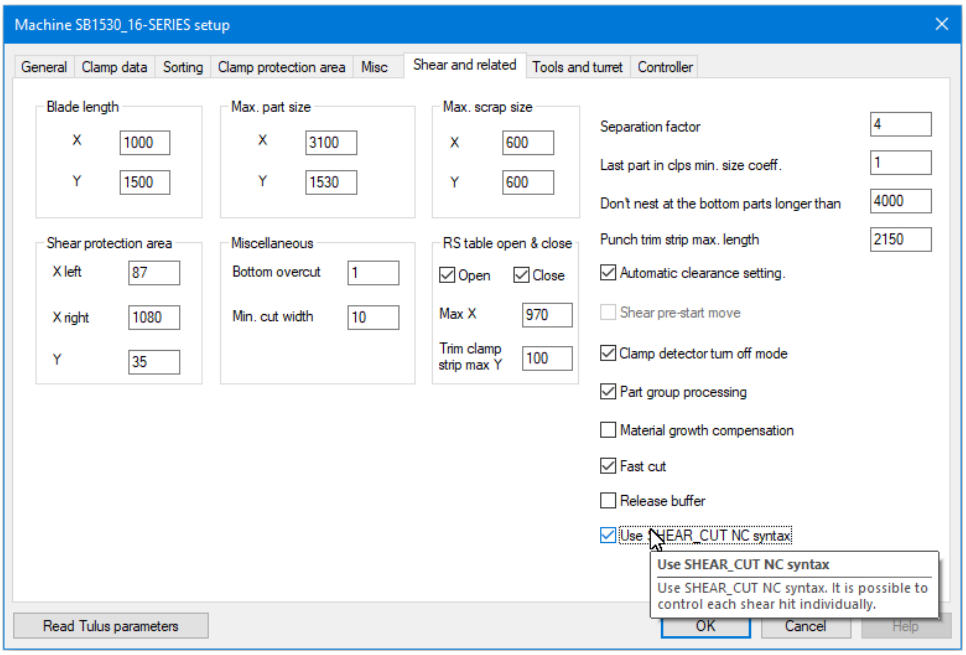
- Are G00 inside Main section
- Are G01 inside Subroutine sections between WORK_OFF and the following WORK_ON.

The COMBI, Punch-Shear machines

Support for new shearing NC syntax

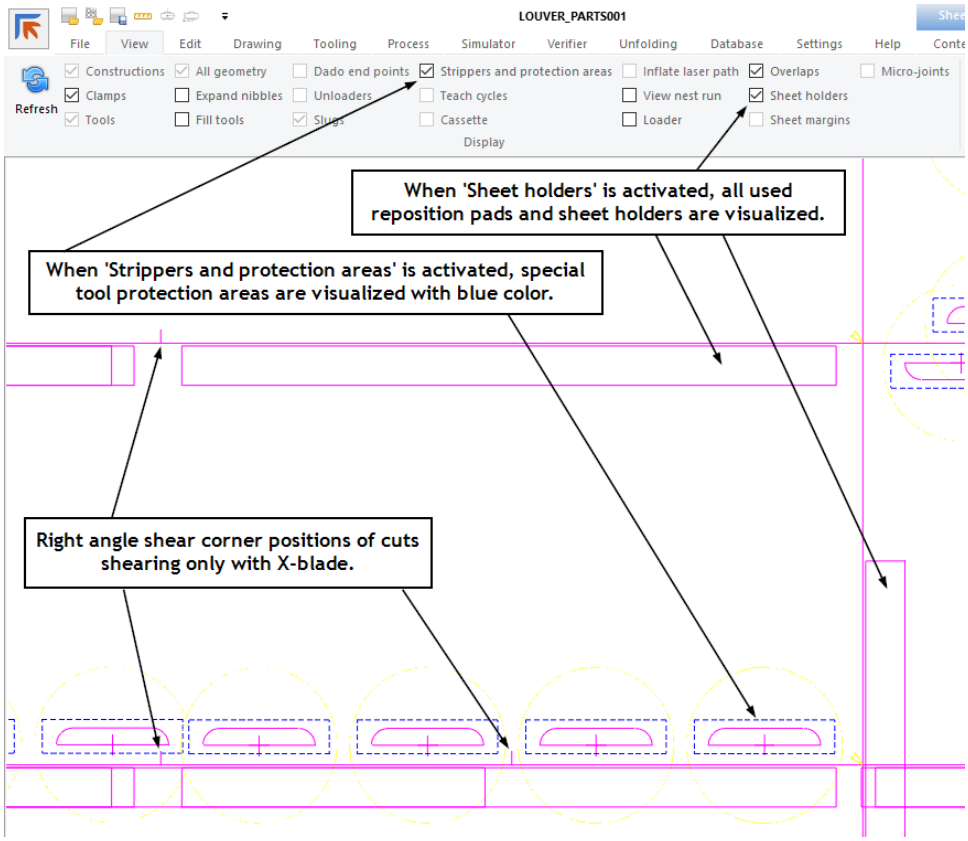
Now NC Express can output new shearing NC syntax. With new shearing syntax, it is possible to control all shear cuts and sheet holders individually.

It is possible to activate post processing of new shearing NC syntax for specific new machines in '***Settings***'-'***Machine***'-'***Machine settings***'-tab '***Shear and related***'-'***Use SHEAR_CUT NC syntax***'. New syntax is used as default if the new machine 'Shear Brilliance 16.32 series' is selected on the tab '***Controller***'. To output new NC syntax, re-optimization of existing sheets is required.

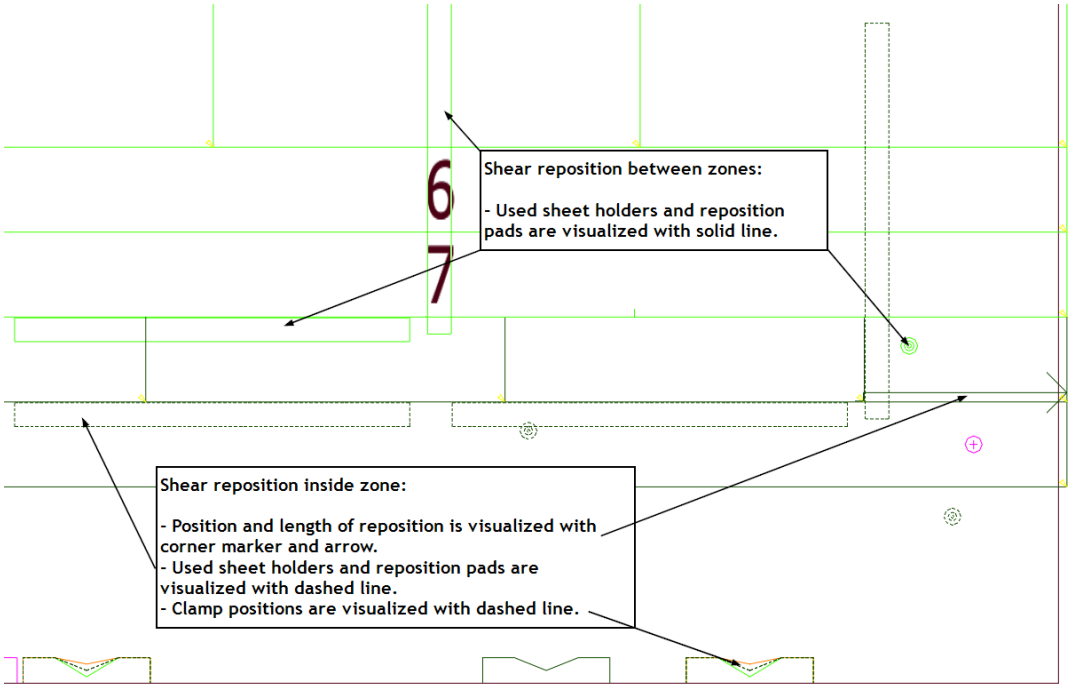


On an optimized sheet, the right angle shear corner positions of each shear cut are visualized with a short solid line sticking up from a shear tool element. These markers show positions of half-cuts which are shearing a sheet only with X-blade (the length of each cut is not visualized, it can be visually seen in the '***Verifier***').

The used reposition pads and sheet holders of all individual shear cuts, are visualized when option '***View***'-'***Display***'-'***Sheet holders***' is activated. Now option '***Strippers and protection areas***' also visualizes special tool protection areas with blue color.



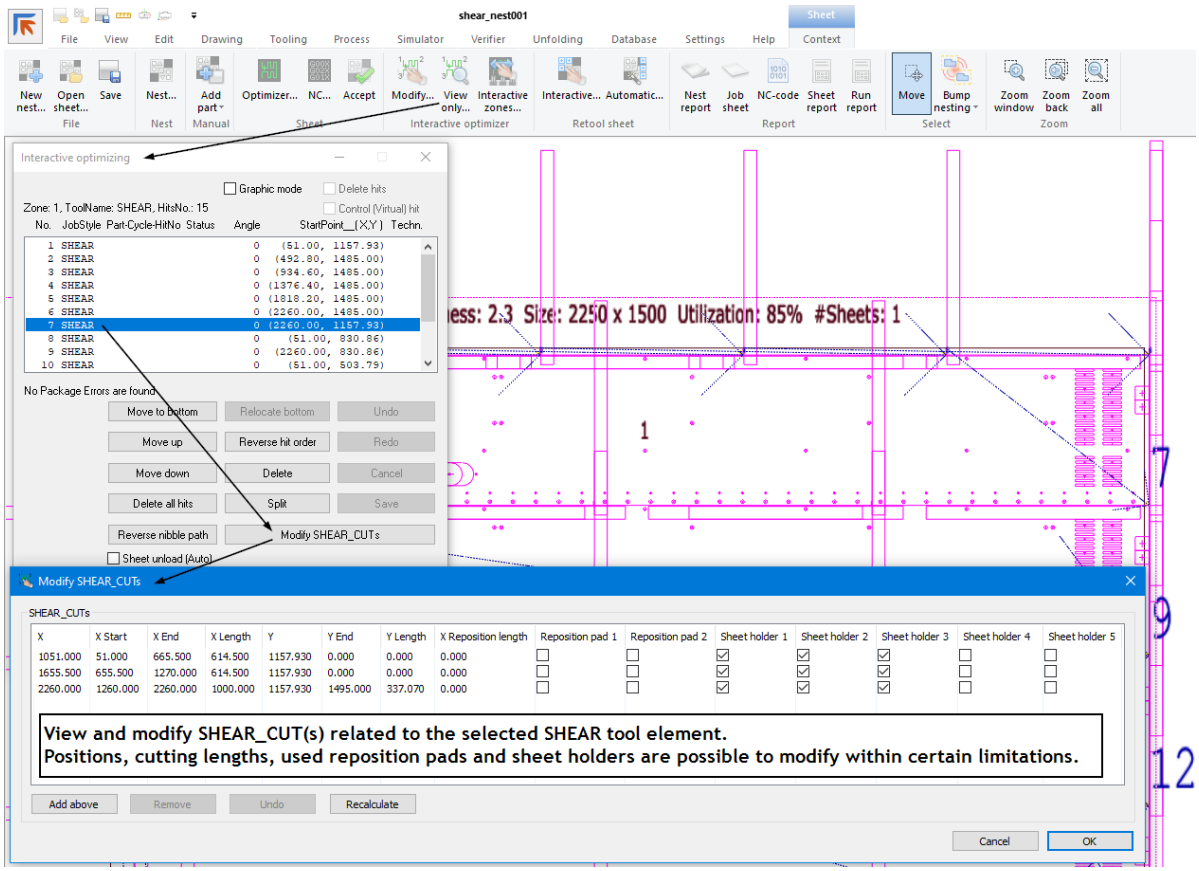
Positions of shear repositions (repositions made by using sheet holders of right angle shear) inside a zone are visualized with the right angle shear corner marker and an arrow, which length corresponds to the length of reposition. For repositions inside a zone, clamps and used reposition pads and sheet holders are visualized with a dashed line. For shear repositions between zones, used reposition pads and sheet holders are visualized with a solid line.



For cuts longer than X-blade of the shear, the optimizer divides the length of needed half-cuts (cuts shearing only with X-blade) evenly. Overlap of cuts in X-direction is minimized to prevent “hairs” which can occur when the same segment is cut twice.

Reposition pads and sheet holders on top of special tool protection areas are automatically deactivated. Cuts are calculated so that Y-blade of the shear should not deform formings, when a special tool protection area is set and ‘***Forming height***’ of a tool is known. Special tool protection area of a tool can be set in ‘***Settings***’-‘***Tool library***’-tab ‘***Special tool***’-‘***Additional tool features***’.

On an optimized sheet, the parameters of each shear cut can be viewed and modified with ‘***Context***’-‘***Interactive optimizer***’-‘***Modify***’-‘***Modify SHEAR_CUTs***’. Select a SHEAR tool element and view the parameters of shear cuts related to the element.



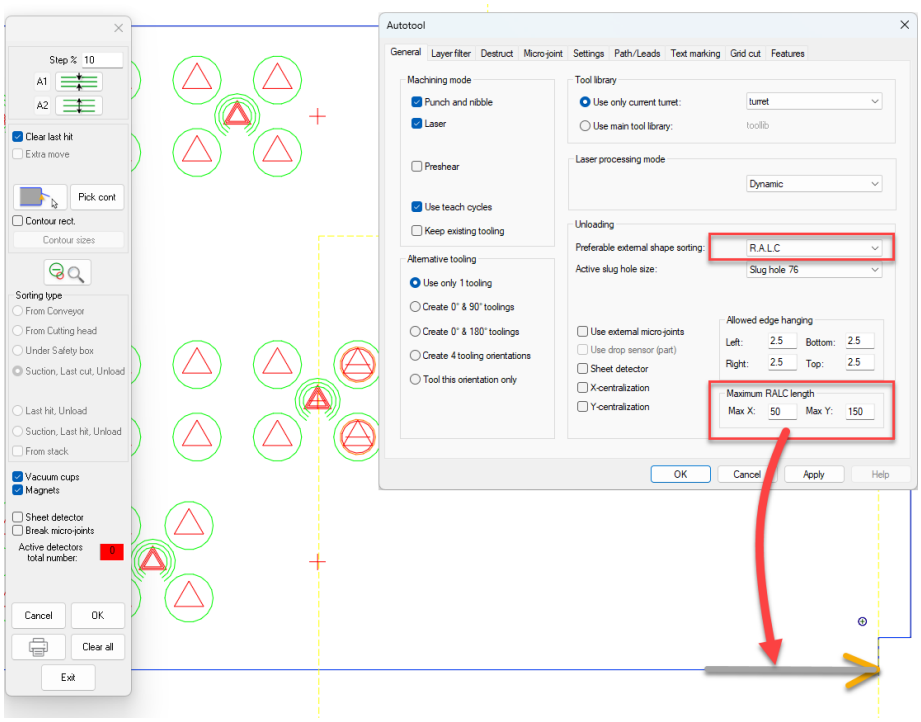
In new shearing NC syntax, all existing shearing commands are substituted with new commands. See comparison table below. '***Verifier***' supports the new NC syntax. Parameters of each SHEAR command can be seen in the Verifier. Verifier visualizes used reposition pads and sheet holders with a darker color.

New (SHEAR) command	**Existing (RS) command**
SHEAR_CUT	SINGLE_CUT, SINGLE_CUT_REP, LONG_CUT, LONG_CUT_REP, LONG_CUT_REP_REL, X_CUT
SHEAR_START	RS_START
SHEAR_END	RS_END
SHEAR_REPOSIT	RS_REPOSIT
SHEAR_LAST_PART	LAST_PART
SHEAR_TABLE_OPEN	RS_TABLE_OPEN
SHEAR_TABLE_CLOSE	RS_TABLE_CLOSE
WAIT_SHEAR_TABLE_CLOSING	WAIT_RS_TABLE_CLOSING

The COMBI, Punch-Laser machines

Set RALC length in Autotool

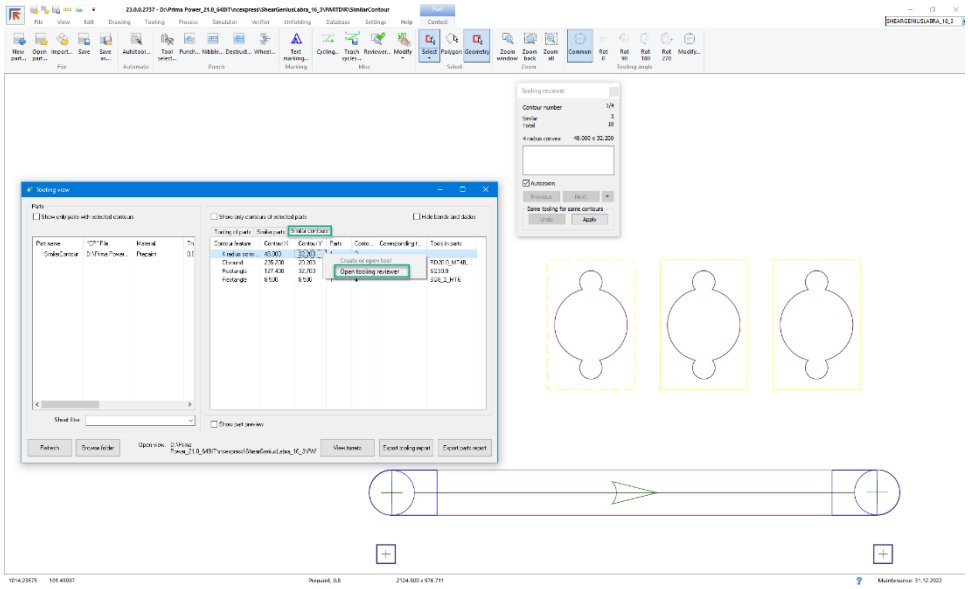
It is possible to set ‘Robot Assisted Last Cut’ (RALC) length in ***Autotool*** - ***General***-dialog. This value is saved per material & thickness and default value is read from ROB-file.



Other usability enhancements

Search common geometry

Tooling view dialog has a new page ***Similar contours***. It can be used to find parts which have the same inside contours. This can help the user to use the same tooling for all similar inside contours in the parts. The ***Tooling reviewer*** opens with a right mouse click which can be used to apply the same tooling for all found similar contours. This can help to reduce the different tool usage because the tool changes to the turret can be reduced.



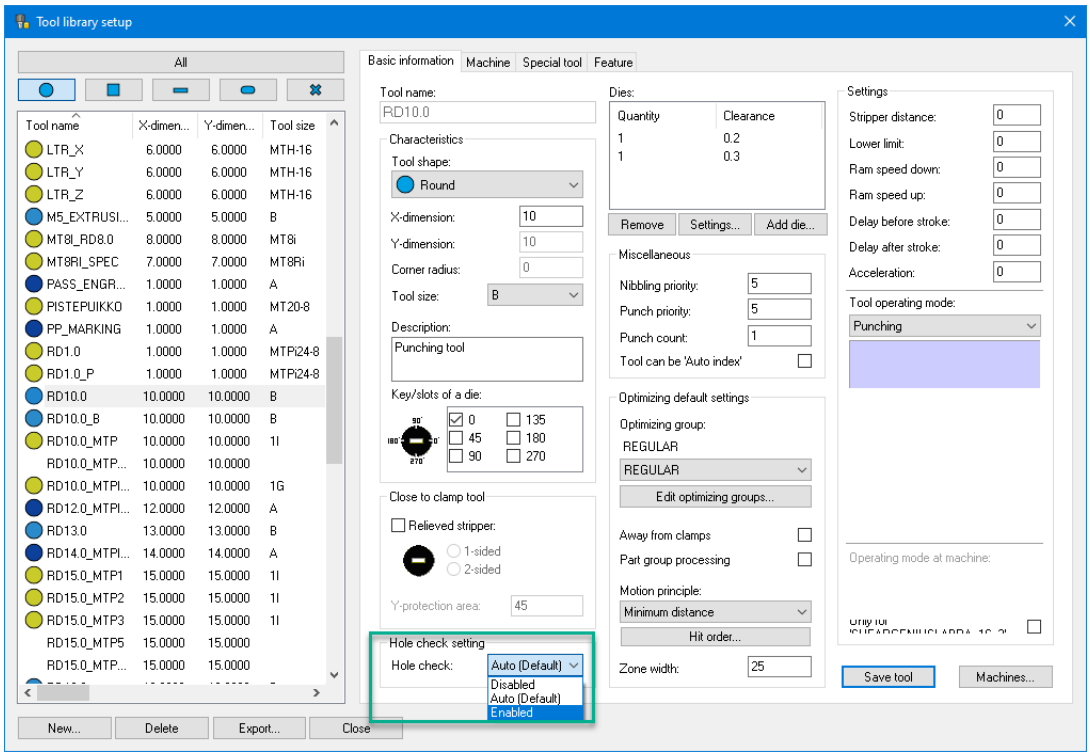
Hole check in Tool library

Tool specific hole check activation can be done now from the tool library. There are three choices:

Disabled: Hole check is not done with this tool

Auto (Default): Hole check is done with size settings from machine settings

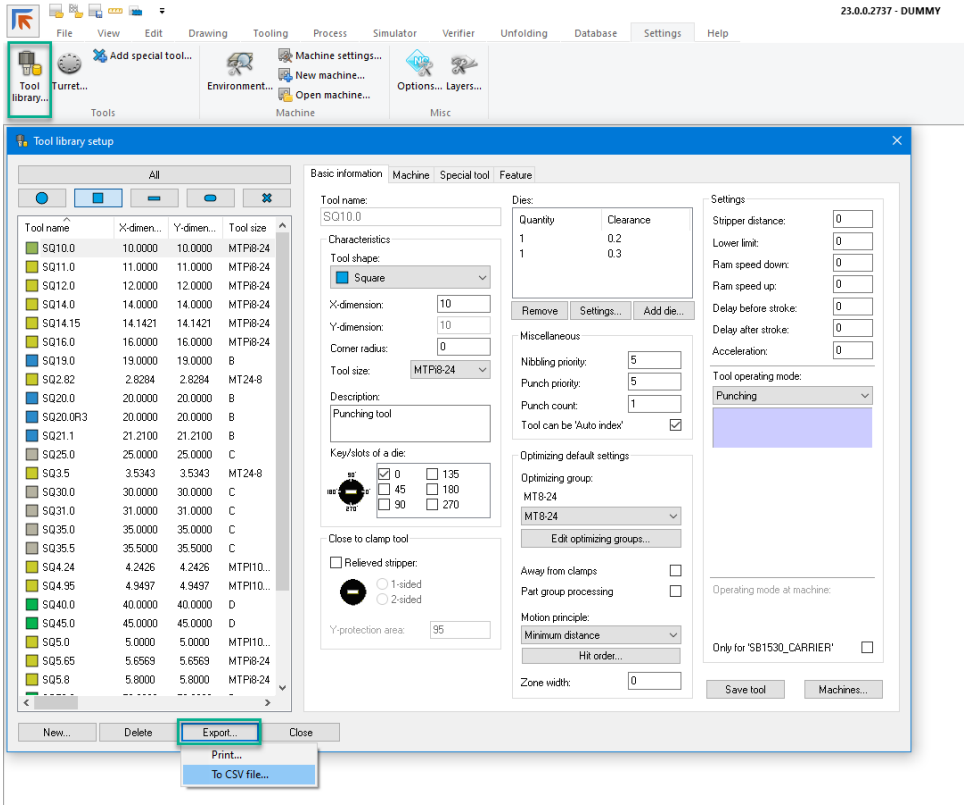
Enabled: Hole check is done always with this tool



Print tools from Tool library

You can print or export with a CSV-file the selected tools from your tool library.

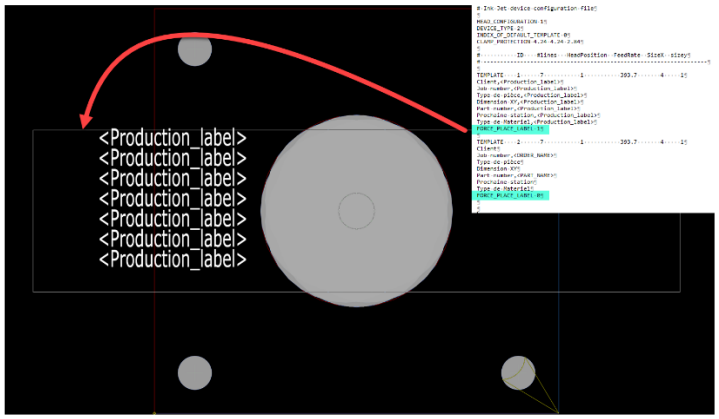
You can open a CSV-file in Excel and modify the tool list according to your needs.



Force label on part

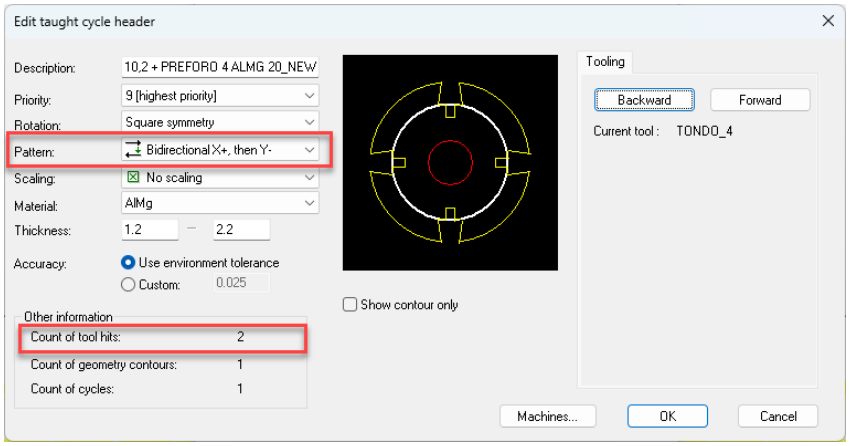
Autotool normally wouldn’t place label/inkjet/laser marker extending over a part edge. However, sometimes it is needed and this can be configured in the INK-file for each template separately by adding the entry below:

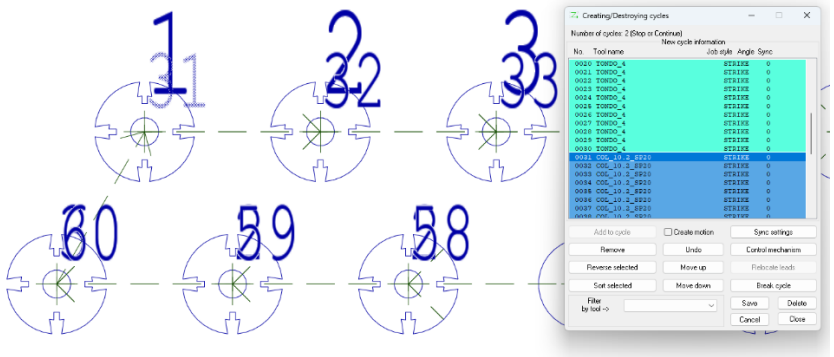
```
FORCE_PLACE_LABEL 1
```



Teach cycle with patterns tool by tool

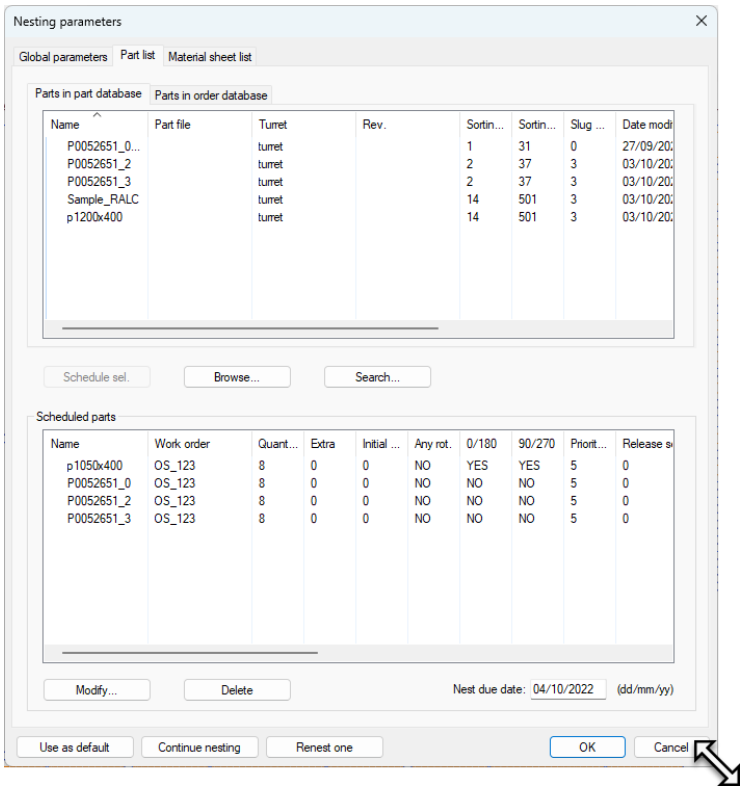
A teach cycle with ***Pattern*** now makes a cycle different as before, all same tool hits are executed in one go, making the cycle clearly faster. The cycle needs to be ‘soft’ (***Sync*** OFF) for this new logic to get activated.

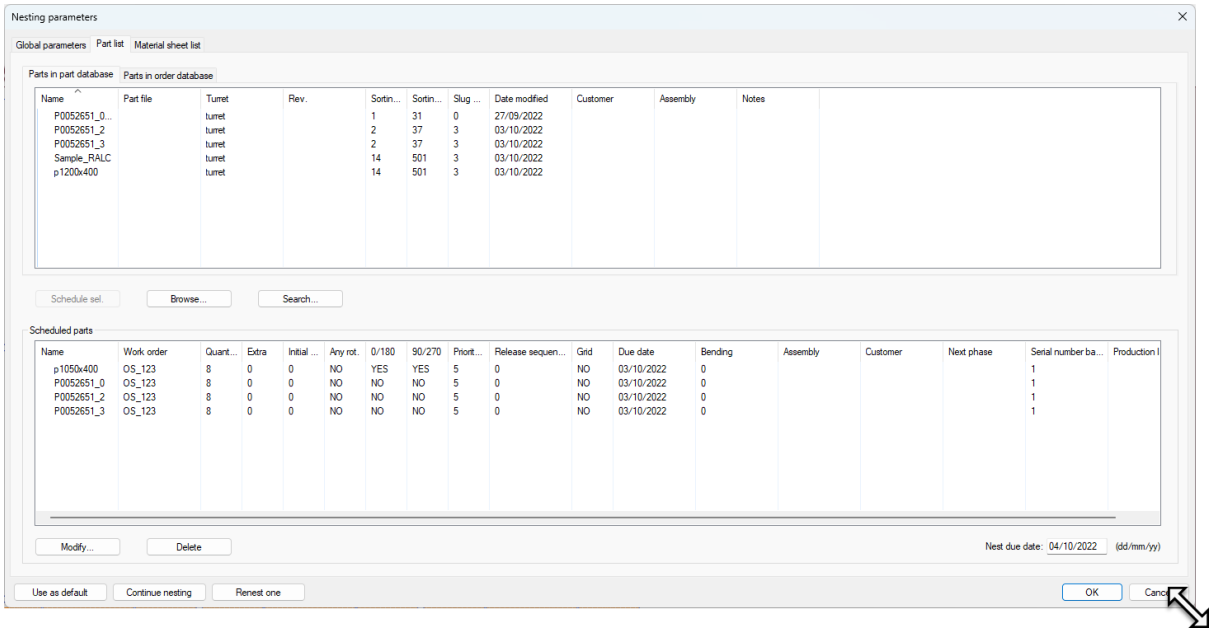




Resizable Nest-dialog

User can resize ***Nesting parameters*** dialog. The size is maintained because it is saved inside INI-file.



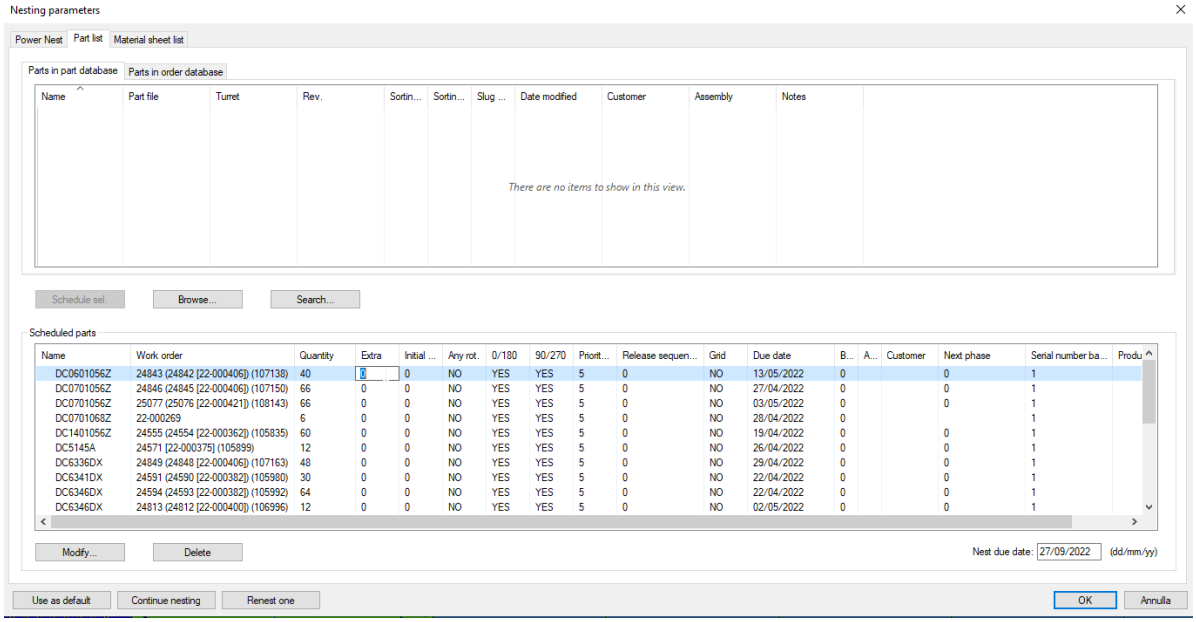


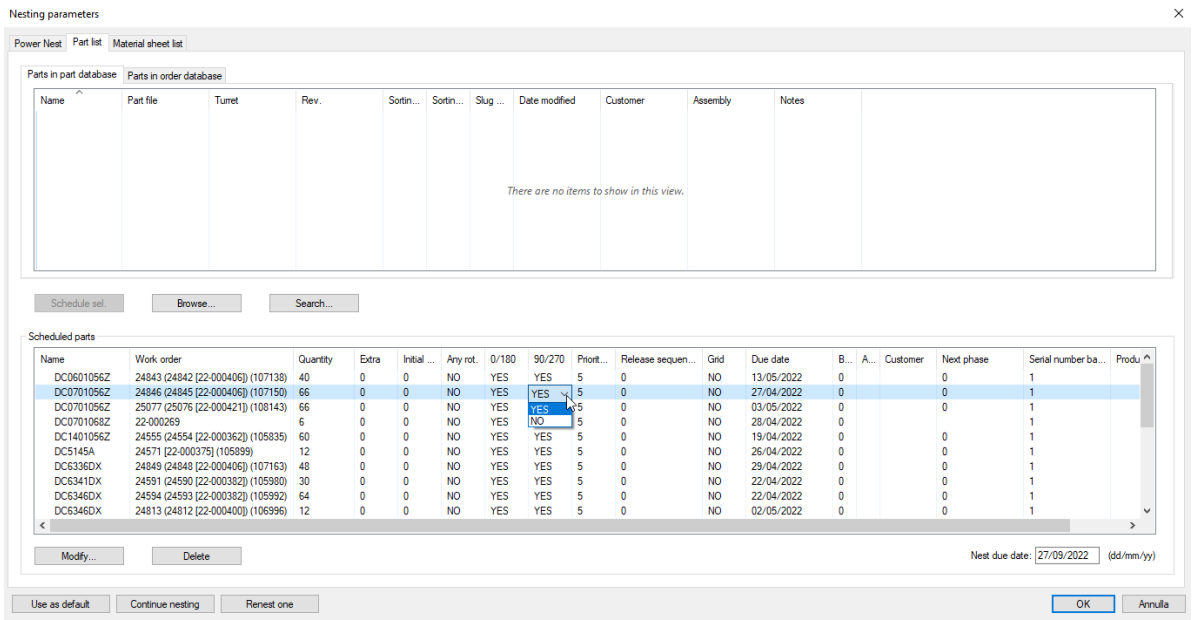
In-cell editing of scheduled part list

When user executes a double-click on a cell of the list of scheduled parts, ***Modify part record*** is automatically opened.

When user selects a line, and then executes a click on a cell he can edit the cell's content for the following fields:

- Quantity
- Extra
- Initial rot
- Any rot
- 0/180
- 90/270
- Priority

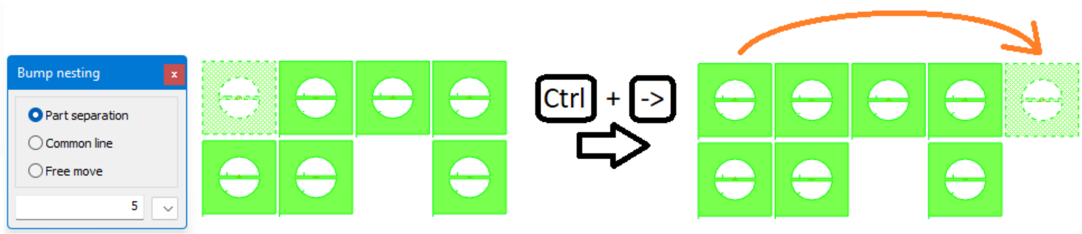




Bump nesting enhancements

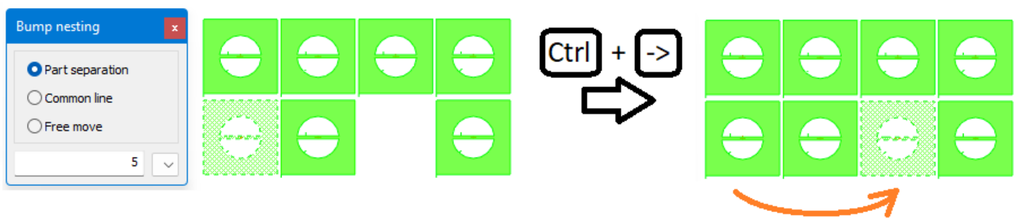
Free-form bump nesting engine introduces a new feature to copy parts interactively to places where an axis aligned bounding box of the part fits considering the separation set. To clarify the mentioned bounding box, it depends on the choice between the alternatives 'Part separation' and 'common line' available in the bump nesting dialog. In other words, the bounding box is based on the tooling envelope of the part or part geometry respectively to the choice. The new copy functionality can be used as illustrated next.

If we select the top left part from the parts depicted by green in the below picture, and then press for example ctrl + 'right arrow' buttons (=: [ctrl] + [->]) on the keyboard while the bump nesting dialog is open, then the engine searches the nearest free place for the part selected and to be copied exactly on the right side of the part as demonstrated in the picture below.



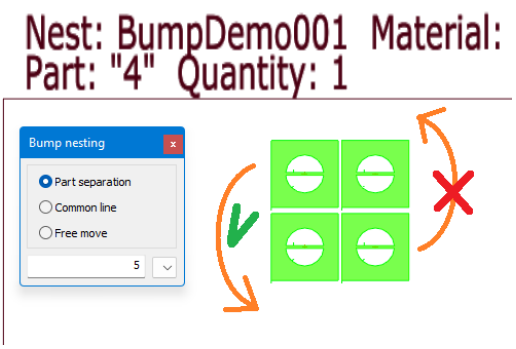
In case the selected part is planned to be copied left, top or bottom side of the part, the corresponding arrow buttons on the keyboard can be used. However, as a note, to utilize the discussed copy operations, the bump nesting dialog must be open. Otherwise, the part copied is simply put next to the part selected meaning that the copied one may overlap with some other adjacent part(s).

The search of the nearest free place for the part selected and to be copied is based on bounding boxes of the part as mentioned in the first paragraph. In practice this means the following: if we select the bottom left part in the below picture, and press Ctrl + 'right arrow' buttons, then the nearest free place can be between parts if the bounding box of the part selected fits into the place as is the case illustrated in the picture below.

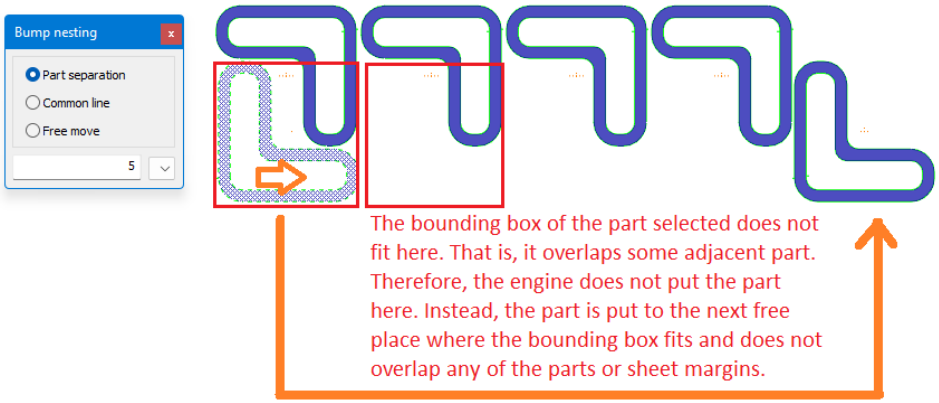


When searching the nearest free place for a part to be copied in the direction pressed, the bump nesting engine takes into account the sheet size and sheet

margins. That is, the engine does not put the part outside feasible places on the sheet as demonstrated in the adjacent picture. In case the part would go outside the sheet or margins are violated, the copy operation is not performed.

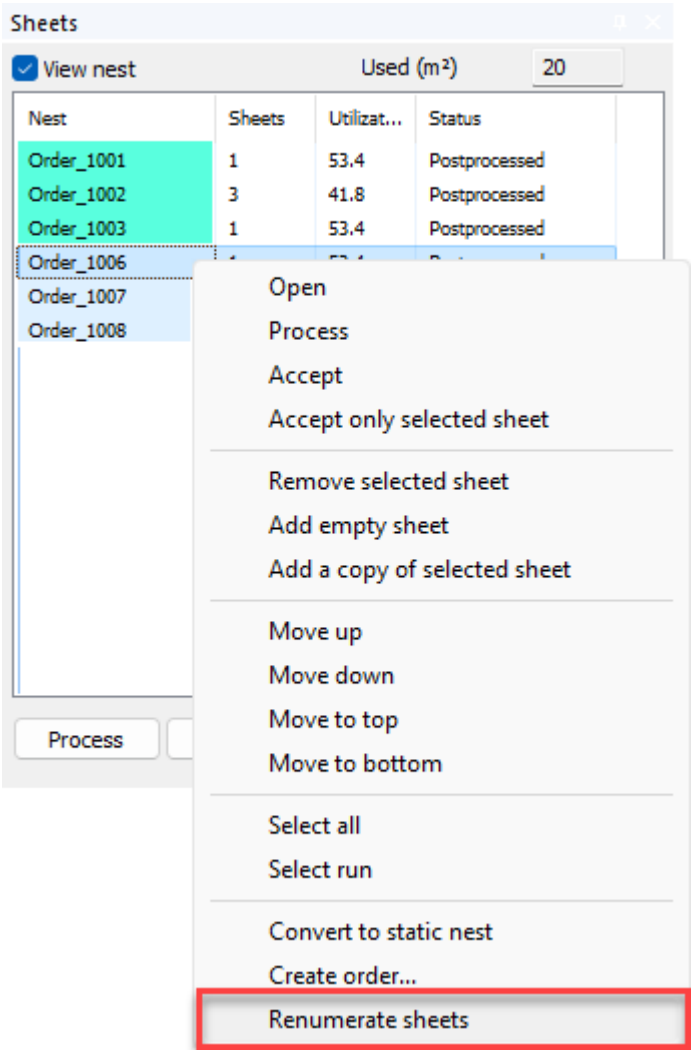


As a last important notice and as said before, the current search of the nearest free place is based on bounding boxes. In other words, the engine is not capable to fully support free-form shapes to be copied to possible tight free places. Due to the bounding box restriction, the engine does not find the nearest free place in the below case even though there is, as a human eye can see, for the L-shaped part selected.



Re-numerate sheets

A new ***Renumerate sheets*** option in the ***Sheets***-view allows removing gaps in the sheet numbering.



Tulus time calculation enhancements

Time calculation supports new things:

- PSBB line with PSR and positioning table
- ShearGenius Evo and ShearBrilliance sorting address change delays
- Sorting wait time and shear cut times separated for simulations
- Machine electric power consumption to reports for Brilliance, Genius and Sharp machines

  - Average power consumption parameter is added to TulusParameters.xml: AverageElectricEnergyConsumption

  - Laser power consumption is calculated using the material specific laser power need and laser source efficiency factor.

  - Actually, the electric power consumption **does not** affect the part cost.

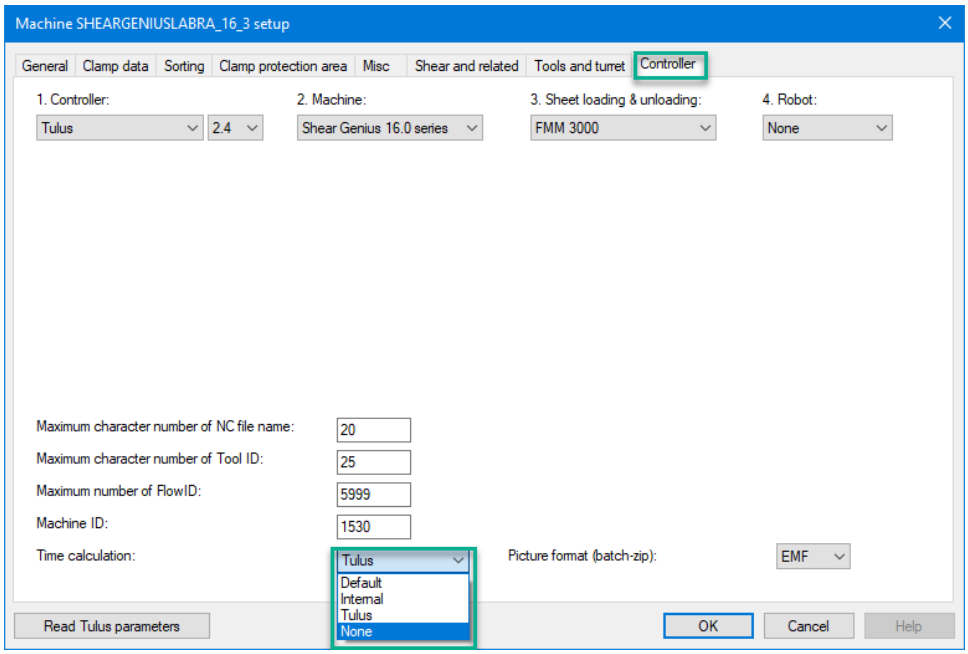
- Possibility to disable completely the time calculation from the machine settings:

  Default: Use the value set in ***Options*** - ***Tulus integration***

  Internal: Use timepar.dat based time calculation

  Tulus: Use Tulus time calculation (recommended for all new machines which have the Tulus cell controller)

  None: Time calculation is not done at all



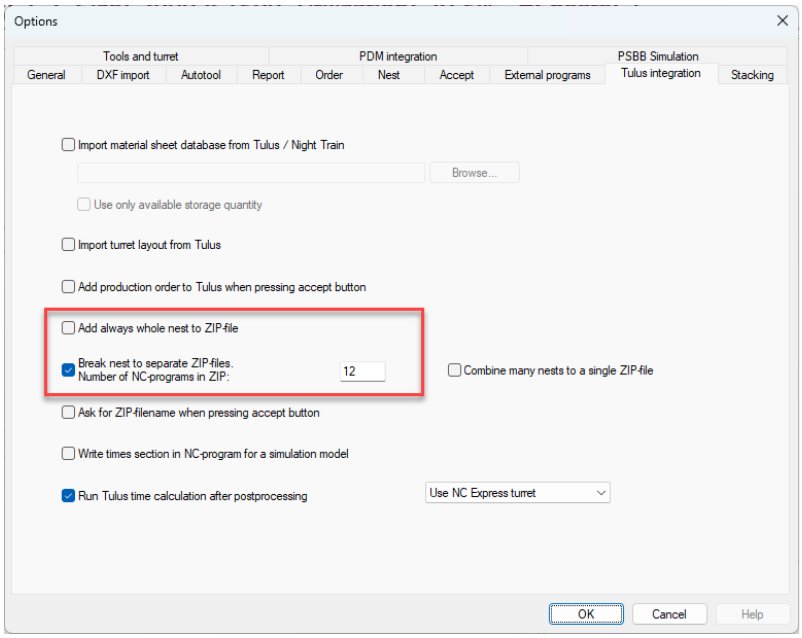
Options to make smaller production order ZIP-files

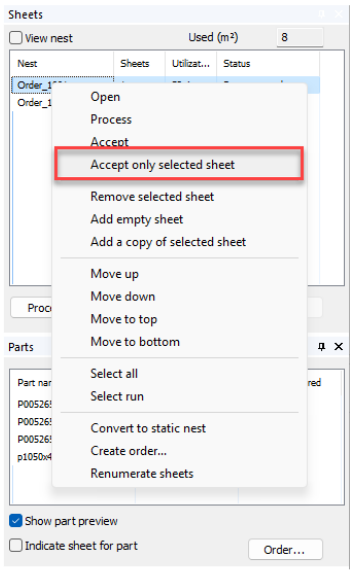
There are the following new ways to limit production order ZIP-file size:

In ***Settings - Options - Tulus integration*** when you set ***Add always whole nest to ZIP-file*** OFF, only selected sheets get written to ZIP-file.

Also, in ***Settings - Options - Tulus Integration - Break nest to separate ZIP-files*** allows you to break a nest to smaller ZIP-files automatically.

Additionally in ***Sheets***-view with a right-mouse click you can find ***Accept only selected sheet*** which makes the production order ZIP-file on selected sheets only.



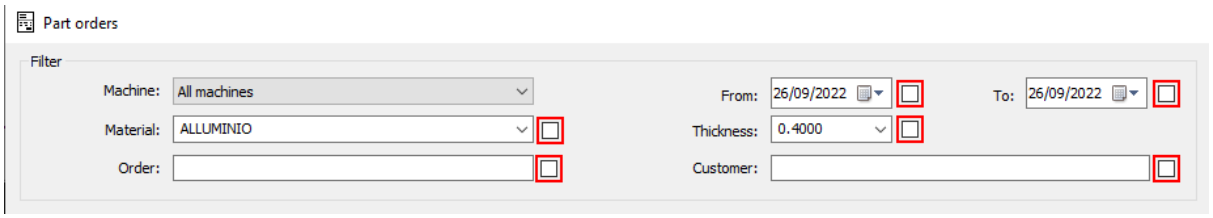


Order database, search by Order, Material or Customer

New search fields are available inside ***Database*** - ***Orders*** dialog on:

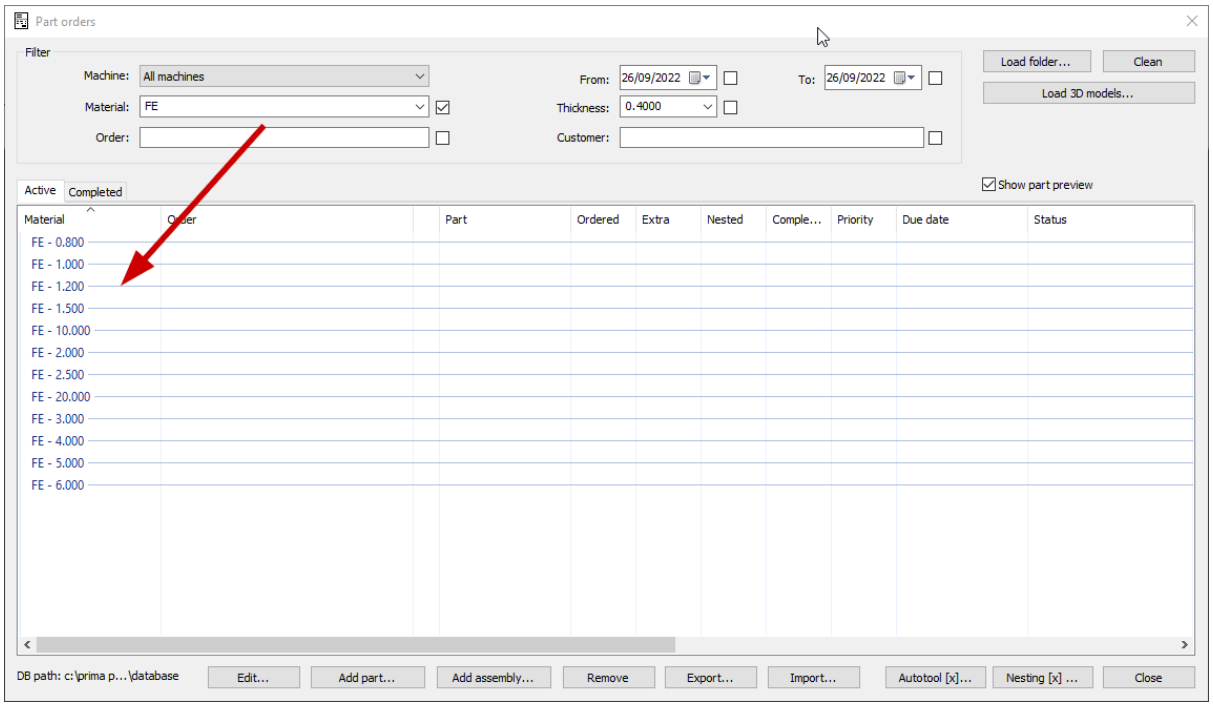
- Material name
- Material thickness
- Order name
- Customer name

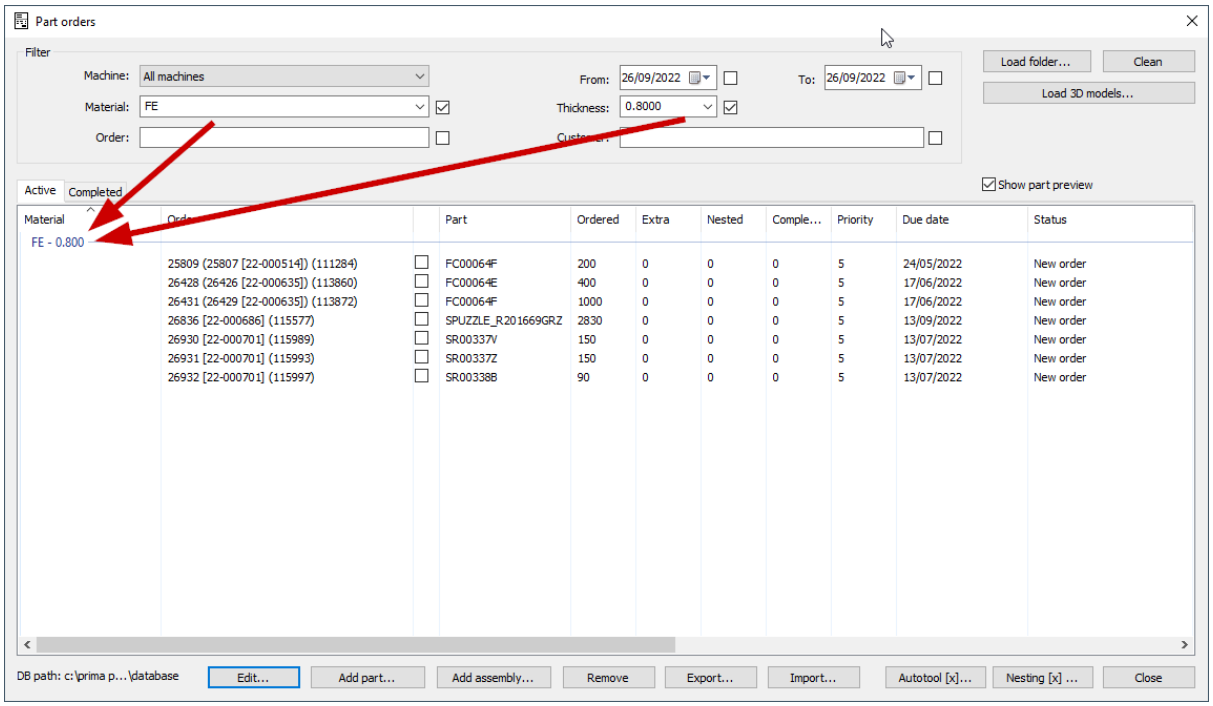
Operability is the same as the filter on due date. Every filter is enabled/disabled through the dedicated checkbox.



About material filters

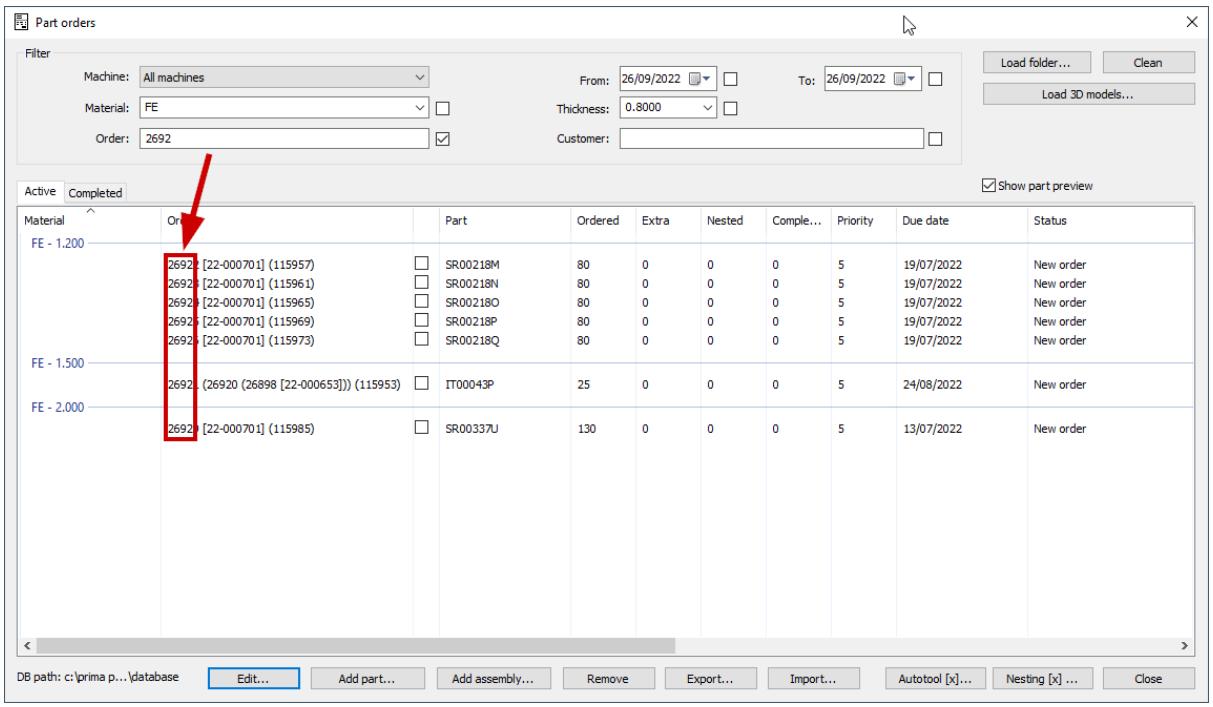
Select the desired material name and/or thickness from the combo box.





About Order and Customer filters

Edit the desired identifier or a sub-string contained inside the identifier of the order and / or customer.

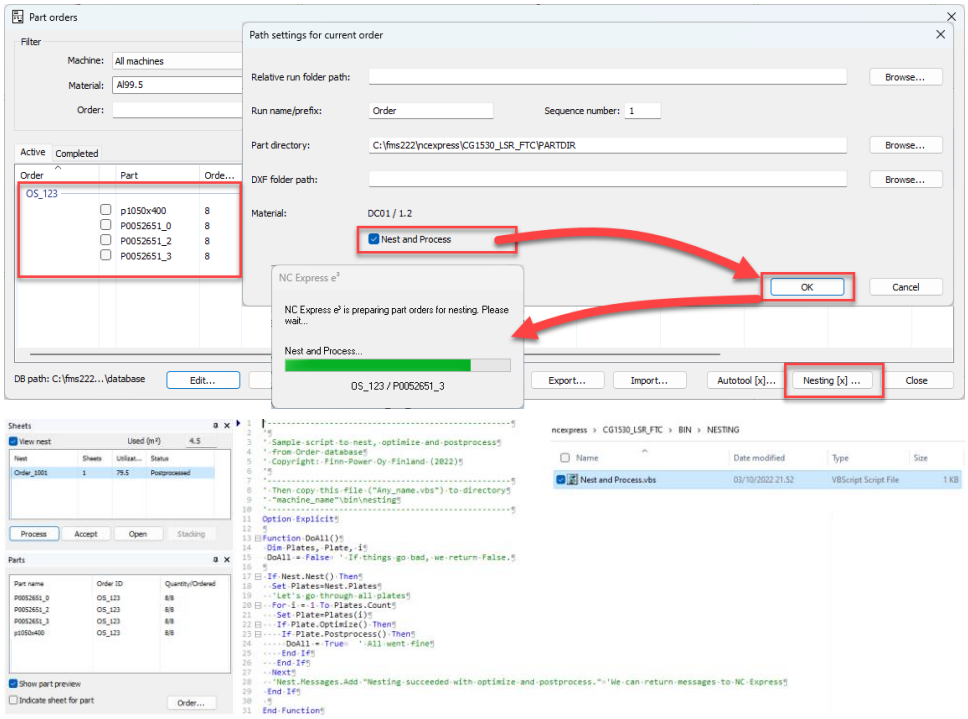


When user edits the content of a filter's string, its checkbox is disabled to avoid the update of the grid of orders until he finishes writing.

Order database, nest scripts

It is possible to run a nesting script from ***Database - Orders*** which nests, optimizes and post processes part orders. This script is customizable to fit your different needs.

You can find a sample script from “ncexpress\bin\Nest and Process.vbs” and copy it to “ncexpress\[machine_name]\BIN\NESTING” folder.

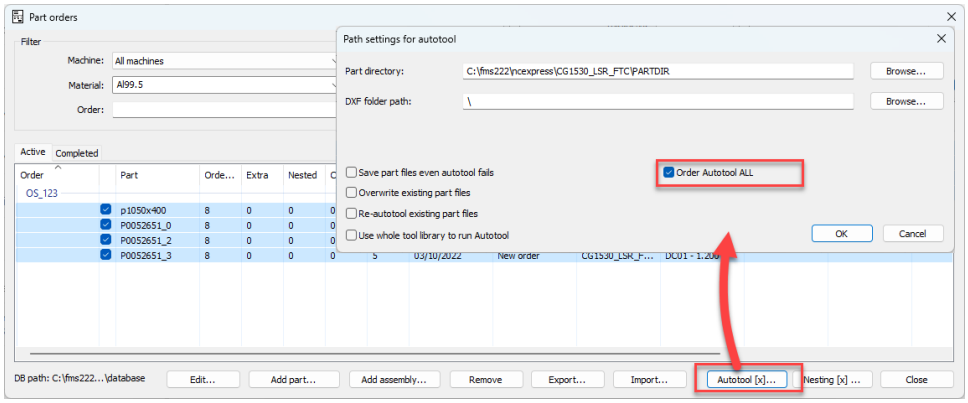


You will need “NC Express e³ Parametric programming” option to run this.

Order database, autotool scripts

It is also possible to customize Autotool from ***Database*** - ***Orders*** by adding a script file in “ncexpress\[machine_name]\BIN\AUTOTOOL” folder. This allows you to customize Autotool for example by:

- Set parameters for Autotool
- Run Autotool for many machines at once
- Run cost estimation
- Whatever scripting can support




```
'-----------------------------------------------------
'
'·Macro·to·autotool·and·cost·estimate·part·file·on·many·machines
'·Copyright:·Prima·Power·(2022)
'
'-----------------------------------------------------
Option·Explicit
SetLocale("en-us")

'Path·to·CSV-file·with·material·names
'---------------------------
Dim·SourceFileCSV,·PathToLOG
SourceFileCSV·=·"C:\Prima·Power\ncexpress\LG_PLUS\BIN\MACROS\Materials.CSV"
PathToLOG·=·"C:\Prima·Power\ncexpress\"

'Set·some·constants
'------------------
Const·ForReading·=·1,·ForWriting·=·2,·ForAppending·=·8
Const·TristateTrue·=·-1,·TristateFalse·=·0,·TristateUseDefault·=·-2
Function·CustomAutotool()

    'Other·machines
    Dim·MachineCount
    MachineCount=3
    Dim·Machines(3),·Exist(3)
    Machines(0)="LG_PLUS"
    Machines(1)="LG"
    Machines(2)="PLATINO_1530_F"
    Machines(3)="PLATINO_1530"

    'Take·parameters·from·the·incoming·Part-object
    '----------------------------
    Dim·Machine,·PartName
    Dim·Material,·Thickness,·Gas,·msgDone
    Machine·=·Part.Machine
    PartName·=·Part.Name
    Material=Part.Material
    Thickness=Part.Thickness
    Gas=Part.LaserTool.Gas
```

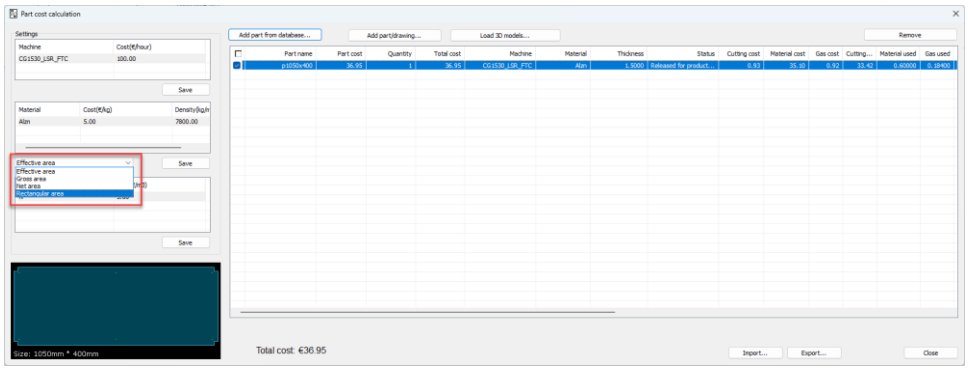
ncexpress › CG1530_LSR_FTC › BIN › AUTOTOOL

Name	Date modified	Type	Size
Order Autotool ALL.vbs	03/10/2022 23.29	VBScript Script File	14 KB

You will need “NC Express e³ Parametric programming” option to run this.

Database Cost enhancements

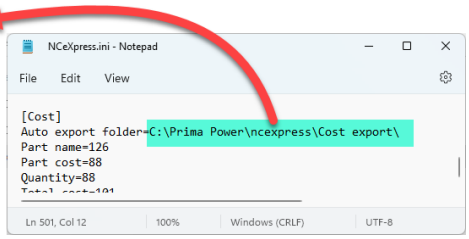
Database - Cost dialog has a new combo box for choosing between different material consumption styles.



There is “NCExpress.INI” file setting below to trigger writing an XML-syntax report file for each calculated part:

```
[Cost]
Auto export folder=C:\Prima Power\ncexpress\Cost export\
```

```
<?xml version="1.0" encoding="UTF-8"?>
- <Part User="" Date="04.10.2022 12:47" Units="mm" Application="NC Express e³" Version="1">
    <Name>p1050x400</Name>
    <Machine>CG1530_LSR_FTC</Machine>
    <FilePath>C:\fms222\ncexpress\CG1530_LSR_FTC\PARTDIR\p1050x400.cp</FilePath>
    <Material>Alzn</Material>
    <Thickness>1.5000</Thickness>
    <Quantity>1</Quantity>
    <MachineTime Unit="sec">33.42</MachineTime>
    <WeightNetto Unit="kg">4.894</WeightNetto>
    <WeightGross Unit="kg">4.902</WeightGross>
    <WeightUsed Unit="kg">7.020</WeightUsed>
    <WeightRectangular Unit="kg">4.914</WeightRectangular>
    <AreaNetto Unit="m²">0.41828</AreaNetto>
    <AreaGross Unit="m²">0.41898</AreaGross>
    <AreaUsed Unit="m²">0.60000</AreaUsed>
    <AreaRectangular Unit="m²">0.42000</AreaRectangular>
    <SizeX>1050.0</SizeX>
    <SizeY>400.0</SizeY>
    <GasConsumption Unit="m³" GasType="N²">0.18400</GasConsumption>
    <CostGas>1.29</CostGas>
    <CostMachine>0.93</CostMachine>
    <CostMaterialNet>24.47</CostMaterialNet>
    <CostMaterialGross>24.51</CostMaterialGross>
    <CostMaterialUsed>35.10</CostMaterialUsed>
    <CostMaterialRectangular>24.57</CostMaterialRectangular>
    <CostNet>26.69</CostNet>
    <CostGross>26.73</CostGross>
    <CostUsed>37.32</CostUsed>
    <CostRectangular>26.79</CostRectangular>
</Part>
```

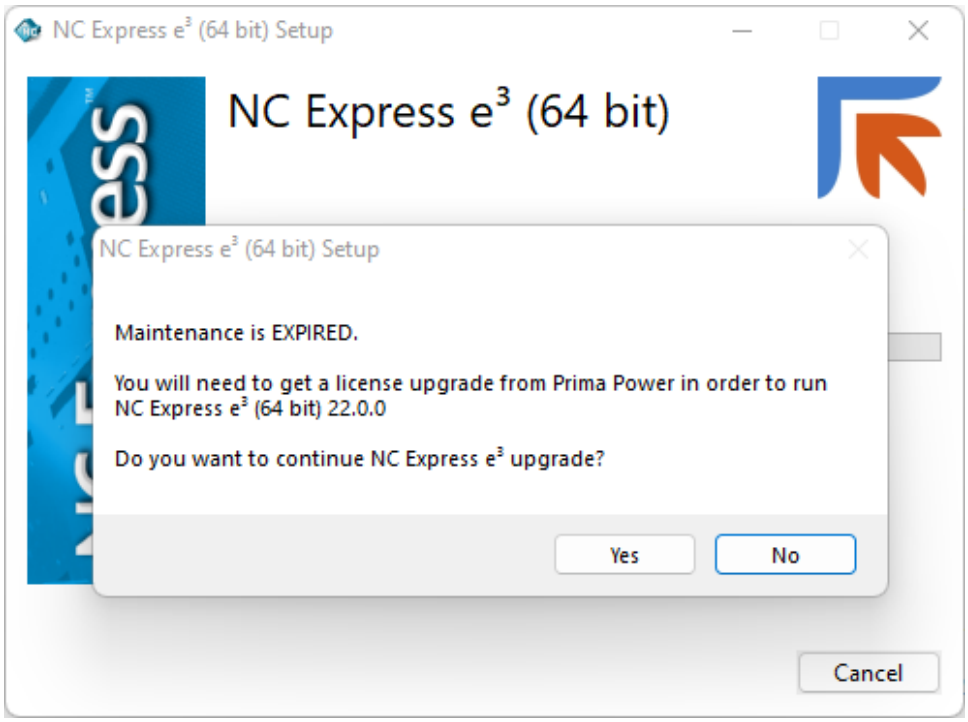


Maintenance date check in the installer

NC Express e³ installer now checks the validity of maintenance license when upgrading an existing installation. It warns the user but allows him to continue.

You need a valid maintenance, when upgrading to the next version if the first two version numbers change. For example, upgrading from **22.1**.22 to **22.2**.5 needs a valid maintenance.

However, you can update inside the same version to the next one even without maintenance. For example, when updating from **22.1**.22 to **22.1**.25 you can do it without maintenance.



Windows support

NC Express e³ 22.2 supports Windows 7 and Server 2012 to 2022 up to the latest Windows 10 and Windows 11 version.

This version is available also as a 64-bit build. New installations are recommended to be made in 64-bit, whereas updates remain in 32-bit.

If you update an existing installation to 64-bit and it uses customized report templates, please be prepared to redo those report templates for new reporting.