

SoftONE-NEST v3.4

User Guide

September 2017

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1. Introduction

1.1. Description of application

SoftONE-NEST is easy-to-use, powerful **CAD/CAM true shape nesting software** for plasma, waterjet, oxyfuel, and laser machines. Application use the best methods for parts nesting and together with its database platform make a professional nesting solution for shipbuilding and sheet metal industries.

Using a strong database system with network support make easy the integration with the existing customers ERP/MRP system.

The main nesting engine provide the best functions for automatic and semi-automatic parts arrangement. The application integrates the SoftONE-CNC smart post processor engine for a fast and complete set of NC instructions supporting the latest cutting technologies

SoftONE-NEST nesting software can be used successfully as stand alone **true shape nesting** software as well as third part nesting solution of the existing customer shipdesign CAD/CAM system.

Microsoft blue style graphical user interface (GUI) makes it easy to learn. It is based on the latest .NET technology.

Technical Specification:

- Operating system: Runs on Windows 7, Windows XP or Vista® operating systems;
- Import from: AutoCAD DXF, Aveva Marine gen files, Nupas, Smart Marine 3D DXF files;
- User customizable ESSI & G-Code post processors;
- Post processors for multiple machines;

1.2 SoftONE-NEST Features

Main Features:

- Automatic parts imports from CAD systems: **DXF, NUPAS, SM3D, AVEVA Marine** ;
- Automatic CAD file correction and error notification;
- **Automatic** or **manual** nesting;
- Powerful nesting algorithms and optimized tool path research;
- **True Shape Nesting**;
- **Array Nesting**;
- **Part In Part Nesting**;
- Smart **bridges nesting: automatic** or manual bridges
- Drag, drop, and bump features;
- Automatic NC tool path generation and optimization;
- Automatic and manual lead-in/out features;
- Automatic part position numbering, productions sketches and reports;
- Integrate the powerful algorithms from [SoftONE-CNC](#) NC post processor application for fastest generation of NC files;
- **ESSI & EIA (G-Code)** standard post processors included;
- User customizable post processors.

Advantages:

- Optimal rectangular material utilization to reduce scrap ;
- Management of parts – parts inventory;
- Management of plates – plates inventory;
- “Real Time” counting of the nested parts;
- “Bridge nesting” reduce the pierces machines processes;
- Maximum flexibility in file conversion and importation;
- Custom shapes can be saved into standard part library for future use;
- Integration with different CAD/CAM systems like Aveva Marine and Nupas;
- Microsoft database system for storing objects and easy reports generation;
- Full functionality of machine technology achieved ;
- Easy Post Processors user addins according with customers CNC controllers configuration;
- Export nesting plates as DXF using closed polylines for each part for an advanced compatibility with machines which can convert directly DXF nesting files;
- Full productions reports: BOM, nesting lists;

1.3 Installation and Licenses

Installation of the SoftONE-NEST software can be performed very simple, launching setup.exe file from installation kit. Follow the information on the screen to complete the software installation.

After installation, if the dongle device is not present, the application will not start working. The licenses protection system consists in a **dongle USB** device or a license key. It comes together with the software installation kit and it is already programmed according with the number of acquired licenses. In order for the program to operate correctly, the dongle device must be inserted into a USB port on the computer at all times. If the dongle key is removed during operation of the program, the software will not function correctly.

1.4 Technical Support

ONESoft offers all customers free technical support for the first year after purchase. Additional support is available through the maintenance and support program. In some cases our staff will offer to investigate the problem with your data file. In this case, we advise that you compress the data file (for example with WinZip) and e-mail it to us. We will investigate the problem and forward a solution to you.

2. Operation Procedure

2.1 Usage notes

Zoom and Pan functions: When work in SoftONE-NEST, two of the most common operations are zooming and panning the work space. Zooming allows one to either examine a narrower view of the work space in more detail or to review a wider overview. For zooming up, 2 mouse click points are necessary. Two or more zoom up commands can be performed as necessary for increase area view. Autoscale enable a whole view of work space. Panning enables one to view a different area of the work space that is not currently visible.

For easy operation, shortcuts key are allocated for zoom and pan functions:

- “Z” for zoom IN
- “W” for PAN
- “S” for Autoscale

Zoom IN  – Menu->View-> Zoom IN function, “Z” key shortcut – zoom to display an area specified by two opposite corners of a rectangle window:

- click for set the lower left point of the zoom rectangle
- while hold down the left mouse click ,click for upper right point of the zoom rectangle
- click on autoscale button for view of all workspace.

Zoom Mouse Wheel: Perform a transparent zoom operations when you scroll the middle mouse wheel :moves wheel forward zooms in; moving wheel backwards zooms out.

Autoscale  - Menu->View -> Autoscale function “S” key shortcut

- Enable a whole view of work space (nesting drawing)

Pan  – Menu->View-> Pan function, “W” key shortcut or mouse wheel click:

- draws a straight line from the centre of the graphics screen to the current

cursor position, as soon as the cursor is moved by any amount. The User can then move the cursor in any direction to a new position and when the left-hand button on the mouse is clicked the system makes this position to be the new centre of the graphics window. Any graphic entities on the screen will appear to move in the opposite direction, and by the same amount, to the movement of the cursor. The scale of the drawing and the associated graphics entities are not changed by this operation.

Accept  or reject  buttons:

For finalizing of any base function (e.g. transform or BUMP operations), the “Operation complete” button should be clicked  (or press return from keyboard)

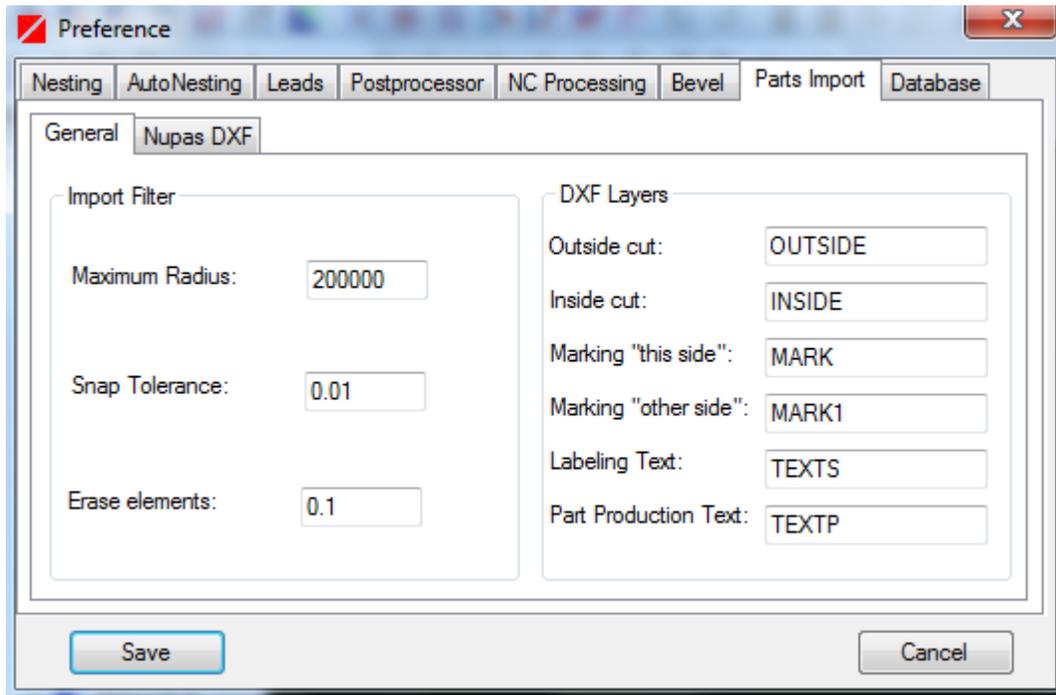
For exit from the current function, the “Cancel” button  should be clicked (or press ESC on the keyboard).

For easy searching for items, all selection lists used by system, can be sorted by clicking on the desired columns head. In this way, the lists “works” similar with the standard file explorer lists in windows operating system, which are familiar to any windows user, making the software operation more easily.

2.2 Nest from DXF

In order to nest parts designed in other CAD system like Autocad, the drawing for each part should be available in DXF (Drawing Exchange Format) file format.

The DXF layers should map the SoftONE-NEST layers settings from Preference menu:



The DXF layers corresponding with the machine processes:

Outside: outer contour of the part

Inside: inside contour of the part – hole(s)

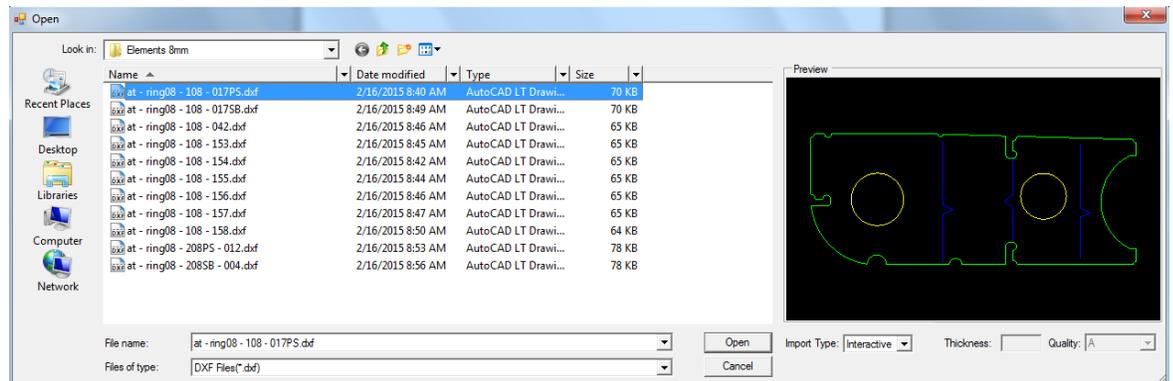
Marking: marking lines

From preference menu, you can adjust the layers name to map your DXF parts layers name.

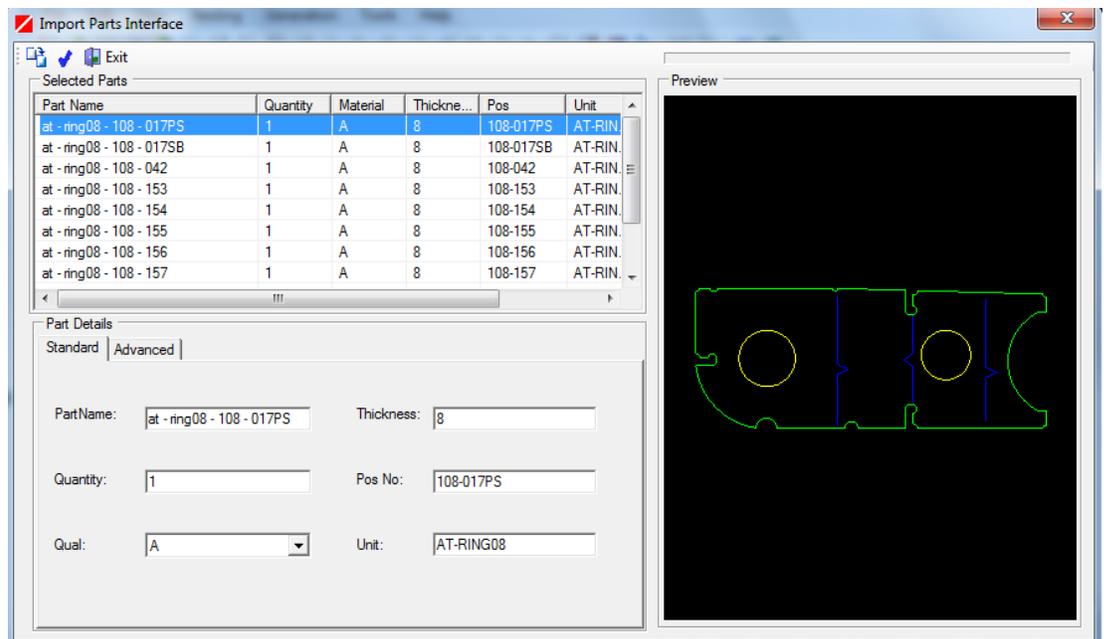
For importing the parts, the following **steps** should be performed:

- 1) Start SoftONE-NEST software
- 2) Import the DXF part files

- Select  button or **File->Import DXF** part function from menu ;
- Select the folder where the DXF files resides ;
- Select the DXF part file - a graphical preview of the part will be shown;



- Select the import type:
 - **Interactive**: manually add/modify the part properties (thickness, material quality etc.)
 - Press “Open” button. A new form will appear;



The following part properties fields are available:

PartName: name of the part (default value is DXF file name)

Quantity: necessary quantities

Qual: material quality

Thickness: material thickness

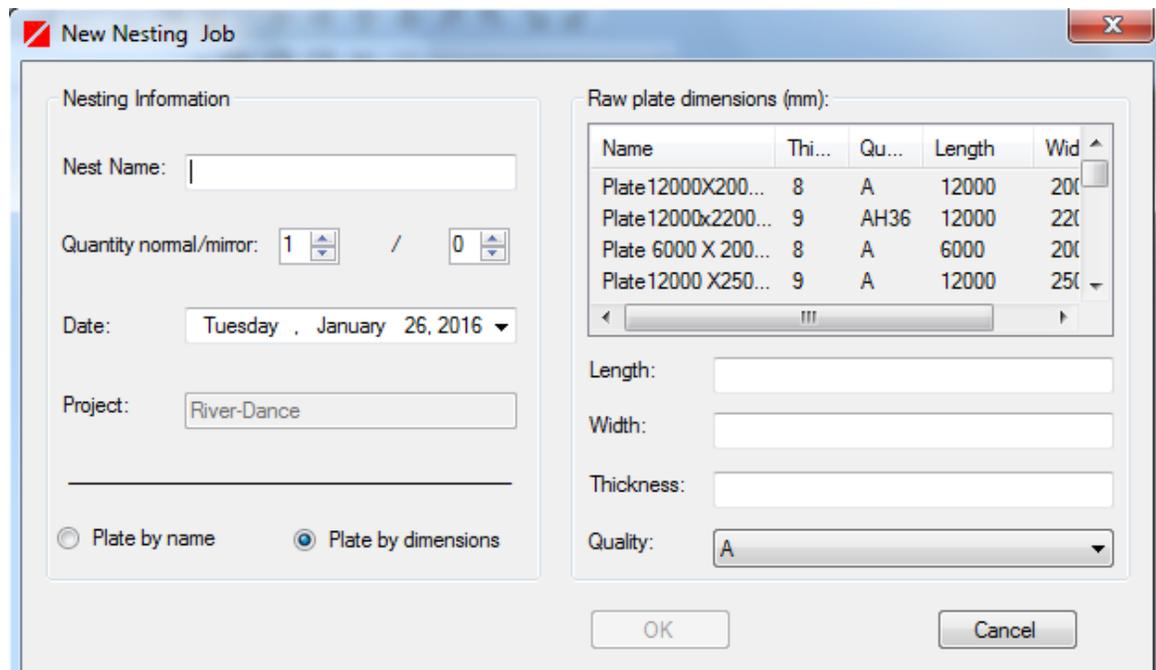
Pos No: position number (part I identification in workshop drawing);

Unit: name of the unit (block) which the part belong to.

- Click “Import”  button.
- **Batch**: For direct import the DXF parts into database: if the part properties are not present inside of the DXF file, the thickness and material quality should be input in the form. If more than one file is selected, the thickness and material quality will be applied for all selected DXF files
- Click “Open” button.

3) Start a new nesting or open an existing nest job

- a. Input nesting job required parameters: nesting name, quantity and the raw plate dimensions:
 - “By name”: select the raw plate (sheet) from the inventory
 - “By dimensions”: input manually: dimensions, thickness and quality of the raw plate.

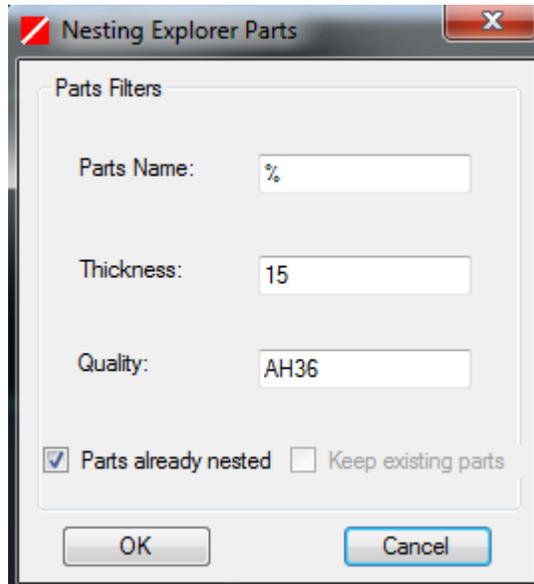


Name	Thi...	Qu...	Length	Wid
Plate12000X200...	8	A	12000	200
Plate12000x2200...	9	AH36	12000	220
Plate 6000 X 200...	8	A	6000	200
Plate12000 X250...	9	A	12000	250

b) click “OK” button for start a new nesting

4) Nest the parts

- Get the part with the Nesting->NestParts-> From Explorer menu function or with  button.



- Drag the part on the plate. The part will be attached to the mouse pointer. Positioning the part on the plate using the mouse. After positioning on the nesting plate, use the “*Transformation functions*” and **BUMP** functions to arrange it on the plate. After finish use “Operation complete” function. After complete, the part will be shown on the “Nest Explorer” tree window.

Parts List			
Preview	Quantity	Area	Name
	2	4.953	at - ring0 - 207 - 015
	1	4.953	at - ring0 - 208PS 012
	1	4.891	at - ring0 - 207 - 015A
	0	1.972	at - ring0 - 108 - 017PS
	5	1.972	at - ring0 - 108 - 017SB
	0	1.972	at - ring0 - 107 - 017PS

PRJH1601	
<ul style="list-style-type: none"> <ul style="list-style-type: none"> M6-SM1-37-01R-PRJ-P Outside Inside Mark M6-SM1-37-01R-PRJ-S M4-SM09-34-01R-PRJ-P M8-47-00R-PRJ-S M8-47-00R-PRJ-P M8-46-00R-PRJ-P M4-SM02-27-01R-PRJ-S 	

- Arrange the part on the nesting
 - a) Select desired part with the Nesting-> Transform part function from menu or click the button
 - b) Select the SoftONE-NEST **true shape nesting** functions:
 - **Transform parts** functions: move, rotate, mirror transformation
 - **SMART BUMP** functions for automatic movement to a distance determined by the system, in a specific direction given by the user. The distance is the largest distance the part can be moved without overlapping any other part or the parent plate. Default clearances between parts and between a part and the parent plate is taken into account when the distance is determined.



5) Automatically or manually add bridges

- **Automatic:** Edit->Bridges-> Automatic menu function or with  button;
- **Manually:** Edit->Bridges-> Insert menu function or with  button;

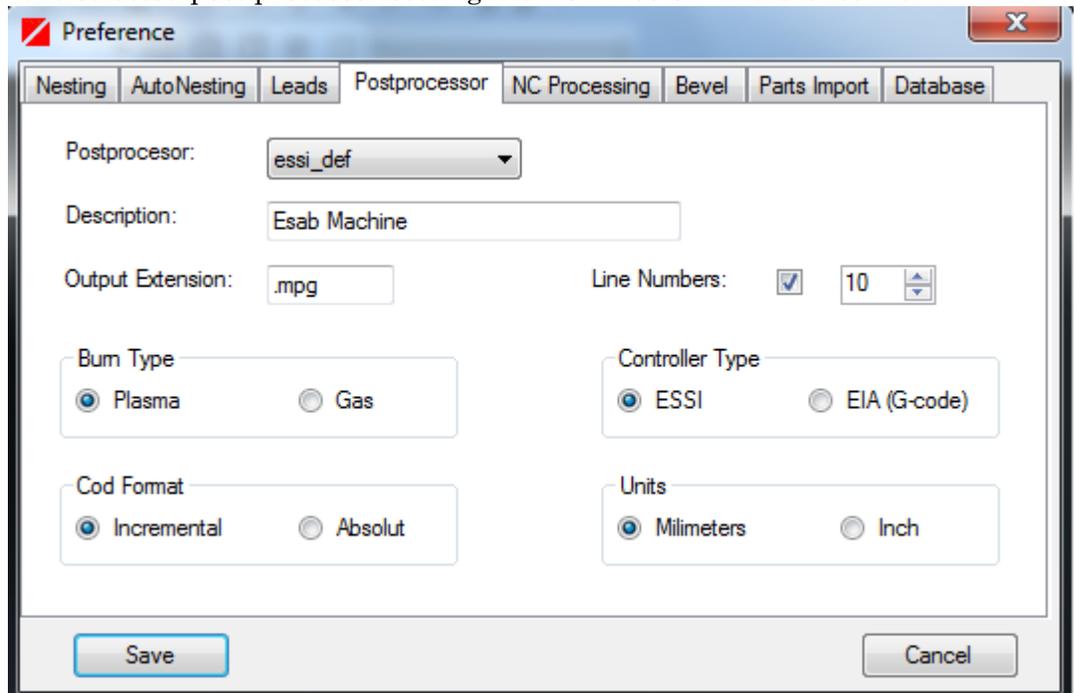
6) Automatically or manually add leads IN/OUT

- **Automatic:** Nesting->Starts -> Automatic menu function or with the  button;
- **Manually:** Nesting->Starts -> Burn menu function.

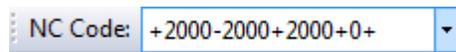
7) Automatically generate the NC file for:

- All machine processes: Generation-> Complete Path function or with  button
- Marking machine processes: Generation-> Marking Path function
- Cutting machine processes: : Generation-> Cutting Path function

The system will optimize the machine paths automatically and generate the NC code according with the selected post processor setting file from Tools-> Preference menu



- a preview of the NC code will be shown in the dedicated NC toolbar



7) Simulate the NC machine paths

- Activate SoftONE-NEST Simulation mode: View-> Simulate function or click on  button
- Change the simulation speed from SoftONE-NEST Simulation toolbar

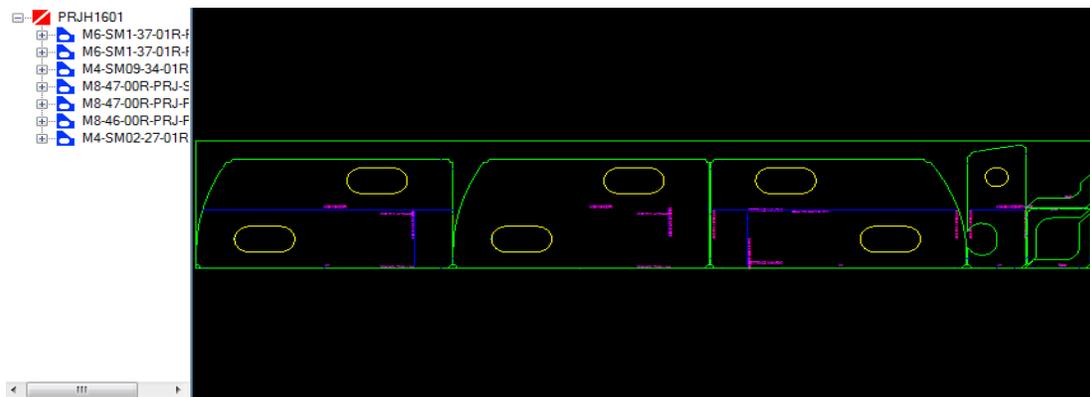
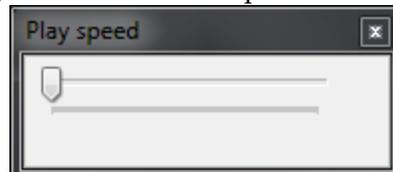


Fig1: Sample SoftONE-NEST nesting job

3. Administration

3.1 Admin overview

The Project is a fundamental concept in SoftONE-NEST, and all nesting work takes place within a project. Post Processor settings are defined separately for all projects through a xml definition files.

A nesting project contains a database file. The project database file owns a number of **tables**: each table type has a different database **schema**; that is, the element/attribute structure is different.

3.2 Nesting database

Database type:

The nesting databases project is a Microsoft Access database type. The system comes with a template default databases located in the “Template” folder in the main installation folder. User specific databases can be easily created and placed on the other location on the disk. Also, it can be shared across the network as necessary.

For information about setting up a new project database, see chapter 3.3: *Setting up a new project*

How Databases are Stored

The databases consist in a 2 MDB database files, stored in the a database directory: the main project database and the MISC.MDB miscellaneous database (for miscellaneous project objects).

The main project database filename can have any name, but, for a easy identification, the following format name is better to be used :

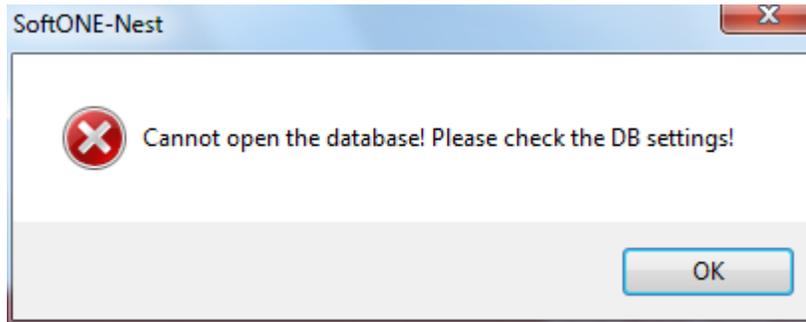
XXXnnn

where xxx is the Project Code, for example, **abc**, and nnnn is a project number, nnn is the database number. Databases can be stored in a different **area**, that is a different directory from the default “DB” directory. This may be necessary, for example, if disk space is a problem. The directory must be created before the database is created. For network environment, the database should be shared. The security permissions of the file should be the “write” acces.

Note: The MISC.MDB should be copied from the template project without changing its name and should exist for each project in the project directory!

3.3 Setting up a new Project

When you first start the SoftONE-NEST application, it search for the default installation nesting database named “Template.mdb” which is located in the DB folder of the application. If the database not found, a error message will be shown.



In order to be able to start nesting jobs, the system should be connected to a SoftONE-NEST database. Connection to database can be done from Tools->Preference menu, “Select” button. Through a standard browse file dialog, the nesting database can be selected as current working database.

For each nesting project, SoftONE-NEST use 2 mdb database for storing nesting objects :

- The main database: store all parts & nesting information;
- Miscellaneous database (MISC db): store other necessary project information: plates & parts inventory, sketches etc.

To set up a new project, the following steps are necessary:

- a) Copy the project template databases located in the Template folder of application in your projects directory: for example: C:\Projects
- b) Rename the main database template.mdb, according with your nesting project: for example **abc123.mdb**
- c) Copy the MISC>MDB database to the new db project directory
- d) Start the SofONE-NEST application and select the main created database from Tools>Preference menu database page. The current selected database name & path are shown in the database tab page.
- e) Change the project information according with your project:
 - Name: project name
 - Code: project code
 - Description: project description
 -

- f) Save the settings;
- g) Restart the application.

Network environment:

For sharing nesting data to other users, the database project folder should be shared in across the network. For store the nesting jobs, the users which will access the SoftONE-NEST database should have the “write” rights security rights.

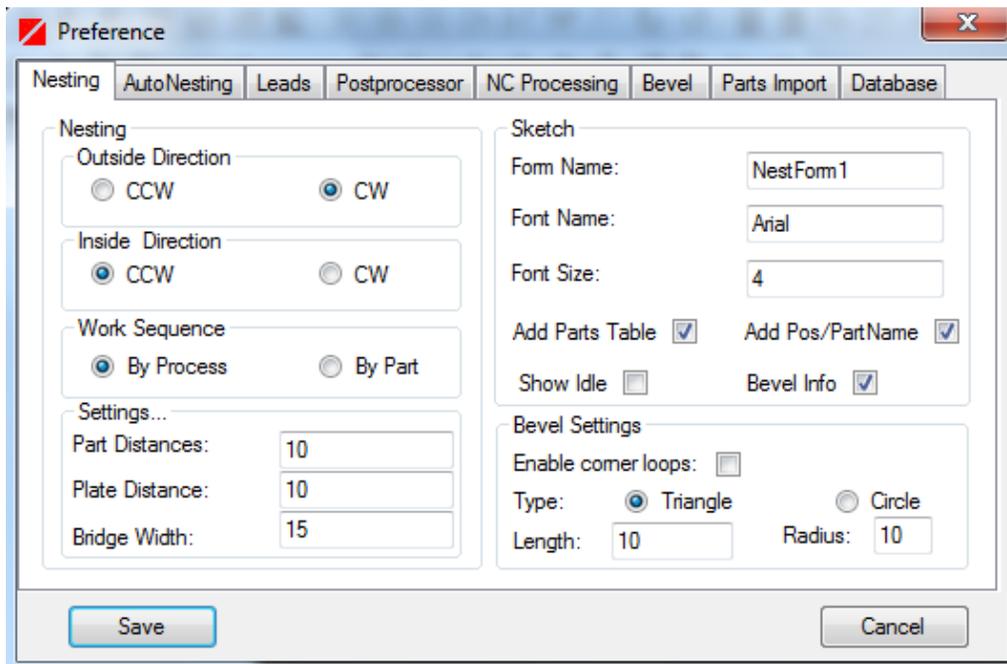
The image shows a 'Preference' dialog box with the 'Database' tab selected. The dialog is divided into two sections: 'Project Info' and 'DataBase Settings'. In the 'Project Info' section, the 'Name' field contains 'Project OS', the 'Code' field contains '134', and the 'Description' field contains 'ONESoft Project'. In the 'DataBase Settings' section, the 'Database Path' field contains 'Data Source=D:\Work\vb\SoftONENest\bin\DB\Test2003.mdb', and the 'Name' field contains 'Test2003.mdb'. There is a 'Select' button next to the 'Name' field. At the bottom of the dialog, there are 'Save' and 'Cancel' buttons.

Field	Value
Name	Project OS
Code	134
Description	ONESoft Project
Database Path	Data Source=D:\Work\vb\SoftONENest\bin\DB\Test2003.mdb
Name	Test2003.mdb

3.4 Projects Settings

Projects settings can be modified from Tools-> Preference menu and consist in the following “Tabpages”:

- Nesting Project Settings
- Application settings
- Post Processor settings



“Nesting” page settings:

Nesting:

Outside direction: enable the direction for outer part contours:

”CW” clock wise ; CCW counter clockwise

Inside direction: enable the direction for inside (holes) part contours:

”CW” clock wise ; CCW counter clockwise

Work Sequence: select the desired cutting order:

”*By process*”: the cutting order will be selected optimized according with processes order: parts inside holes, holes, outside contour;

”*By Part*”: the cutting order will be selected optimized for each part

Part Distance: Distance between parts. This distance is a minimum distance which is default for the transformation functions BUMP. The functions transform plate parts in a way that the distance between the indicated parts is never less than the default distance.

Plate Distance: Distance between parts and raw plate edge. This distance is a minimum distance which is default for the transformation functions BUMP. The functions transform plate parts in a way that the distance between the part and the raw plate edge is never less than the default distance.

Bridge Width: Width of bridge

Sketch:

Form Name: name of the default nesting form which will be used;

Font Name: name of nesting sketch font;

Font Size: nesting sketch font size;

Add Parts Table: automatically generate the parts table in the nesting sketch

Add Pos/PartName: identification string used for parts in the nesting sketch;

Show Idle: show idle paths in the nesting sketch;

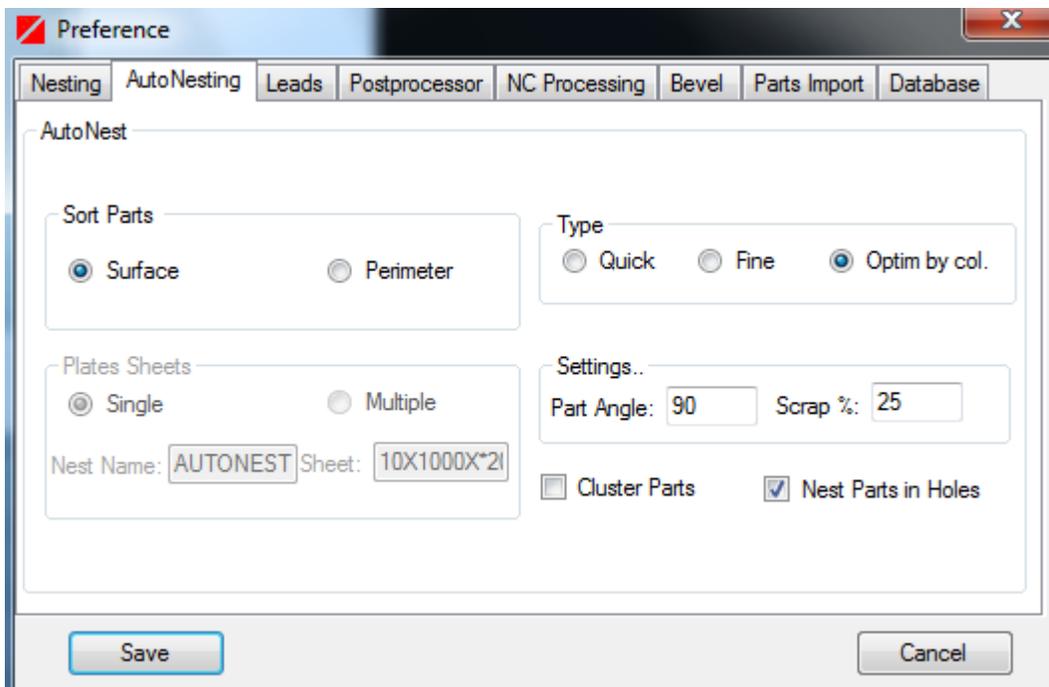
Bevel:

Enable corner loops: Add corner loops for each part;

Type: Corner loop type: triangle (default) or circle;

Length: side length of triangle corner loop;

Radius: circle radius of corner loop.

“AutoNesting” page settings:

Autonest type: type of autonesting used method: quick, fine, Optimize by col. – Optimize mode should be satisfactory in most cases.

Sort Parts:

Surface: nesting will start from bigger surface parts to lowest surface parts.

Perimeter: nesting will start from bigger perimeter parts to lowest perimeter parts.

Plate sheets: Single – single plate sheet will be used

Multiple – multiple plate sheets should be used:

Nest Name: string used for generation of nesting name jobs

Multi Sheer: size of the sheet which will be used.

Part angle: The rotation angle increment of the autonested parts.

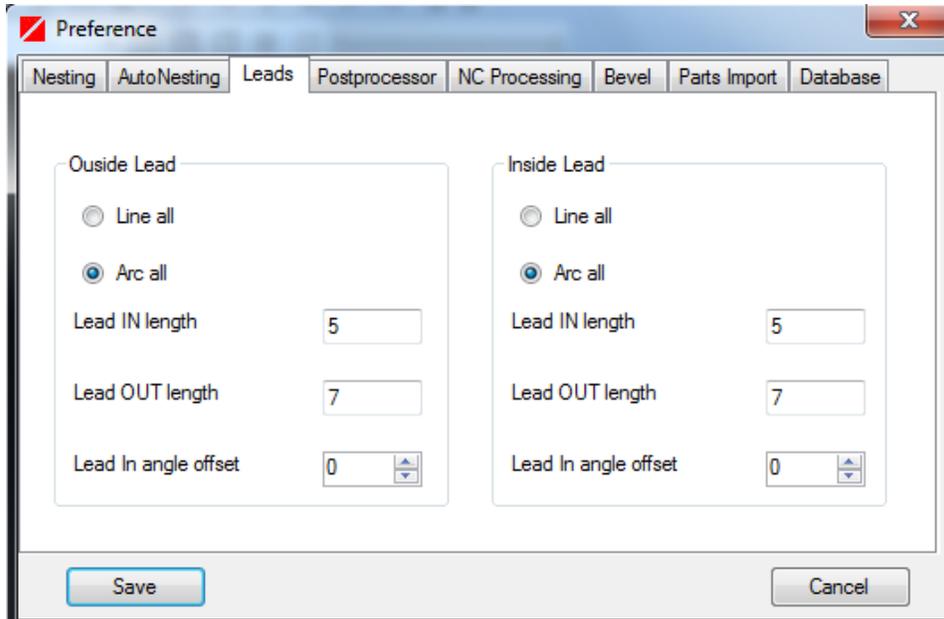
Scrap: Maximum allowed scrap for single part nesting.

Nest part in hole: automatic nesting of parts in holes

“Leads” page

The *outside leads* (for outer contour) and *inside leads* (for holes) can be changed in this page. For “0” value of lead in/out, you can switch on/off the corresponding leads.

Note: You should take into account about the distance between parts when modify these values for avoiding the overlapping!



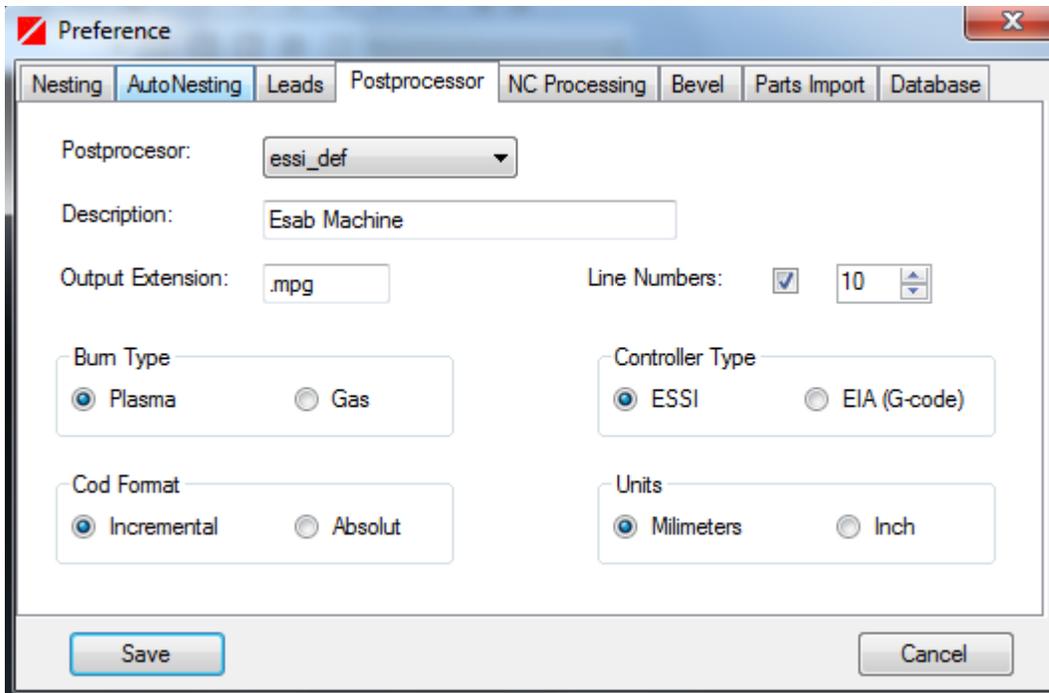
Line all: all leads will be added as lines segments

Arc all: all leads will be added as arcs.

Lead IN length: length of the lead for the first “entry” lead

Lead OUT length: length of the lead for the “out” lead

“Post Processor” page



Postprocessor: select the desire postprocessor for output the NC files

Description: edit the description of the postprocessor

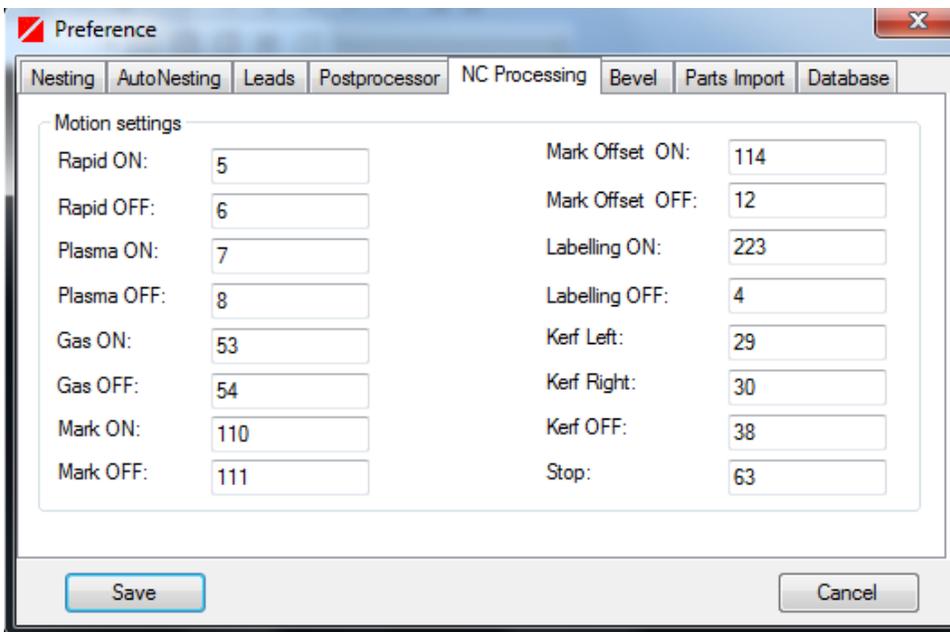
Output extension: modify the extension of the NC file

Burn Type: select the cutting type by selecting : Gas or Plasma

Code format: Select the code format by clicking Incremental or Absolut

Controller type: Select the output NC code standard by clicking ESSI or G-Code

“NC Processing” and “Bevel” pages:



Processing settings are used during post-processing when generating the NC code. You can modify the instruction taking into account about the settings of your machine controller.

See “NC POST PROCESSOR” chapter for more information about customization of the post processor output codes.

“Part Import” page:

“General” page: standard DXF part import interface parameters

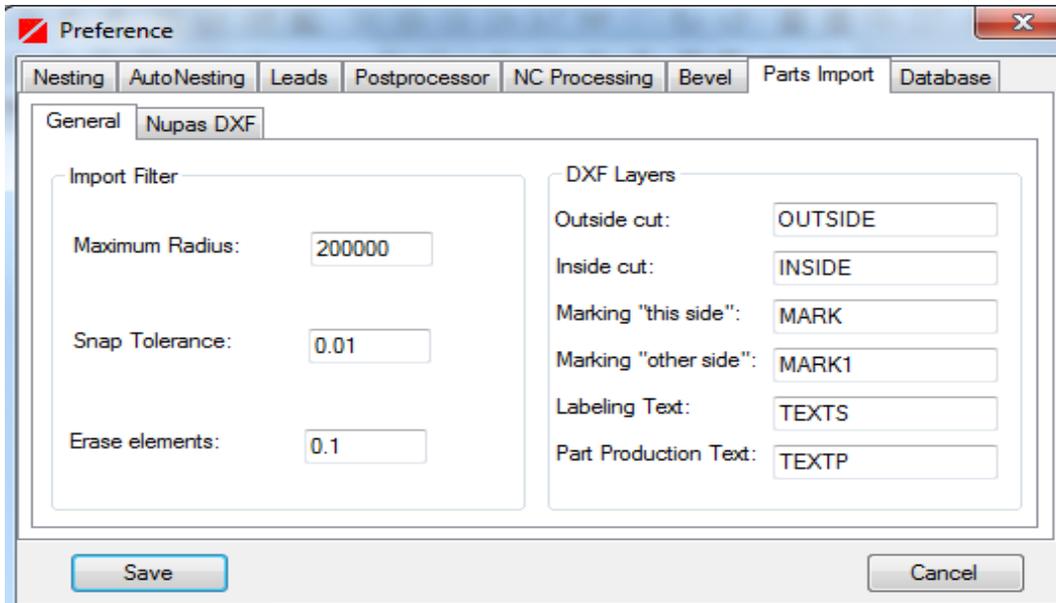
DXF Layers can be changed accordingly to CAD parts geometries layers Default values are: *MARK* for “this side” marking, *MARK1* for “other side” marking (on the opposite side); *OUTSIDE* for outer contour, *INSIDE* for holes, *TEXTS* for labeling text, *TEXTP* for part production texts (e.g.: position, thickness, quality);

The system will detect automatically inside of DXF file the part properties fields. The following tags are currently available for automatically part production imports (part properties):

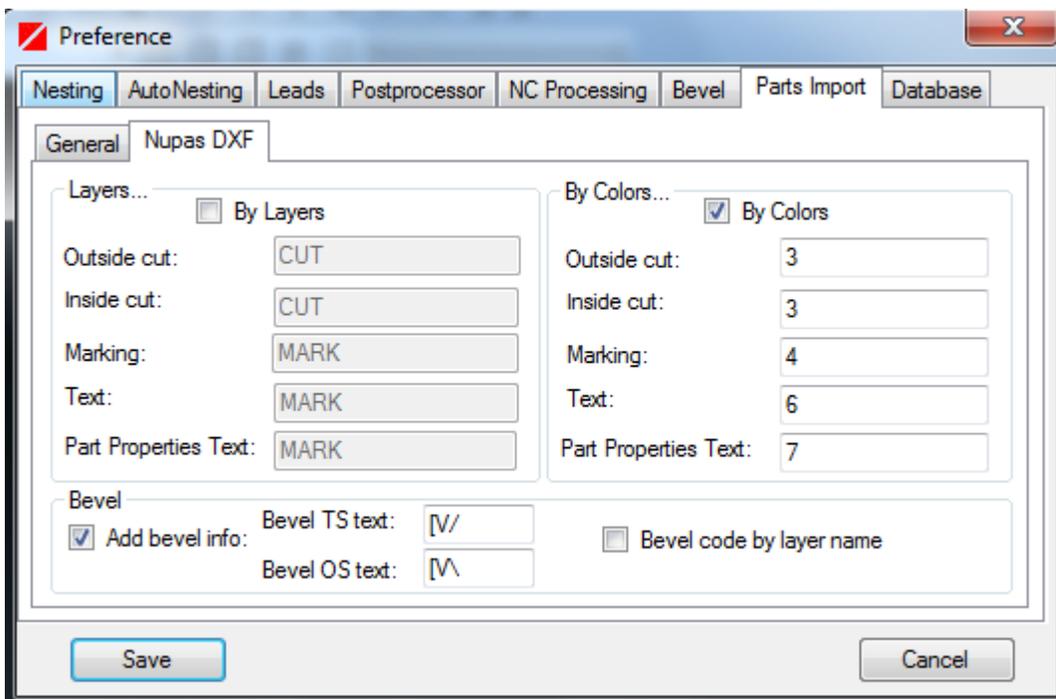
- “**U:**” tag for unit name: should be followed by desired *unit name*;
- “**T:**” tag for part thickness: should be followed by **material thickness**;
- “**M:**” tag for material quality; should be followed by **material quality value**
- “**P:**” tag for part position identification: should be followed by workshop **position number**.
- “**N:**” tag for number of parts;

Maximum radius: set the max radius that are supported by your cutting machine. Check the controller’s documentation for setting this value.

Snap tolerance: The length of the gap between elements of a shape that SoftONE will jump or connect into a single shape. This compensates for lines not actually joined in the original DXF files. Snap tolerance should be GREATER THAN or EQUAL TO the length set in *Erase Elements* <. SoftONE-NEST automatically adjusts two elements to the same meeting point. The program automatically determines which element has to be adjusted to close the gap causing the least change in the path.



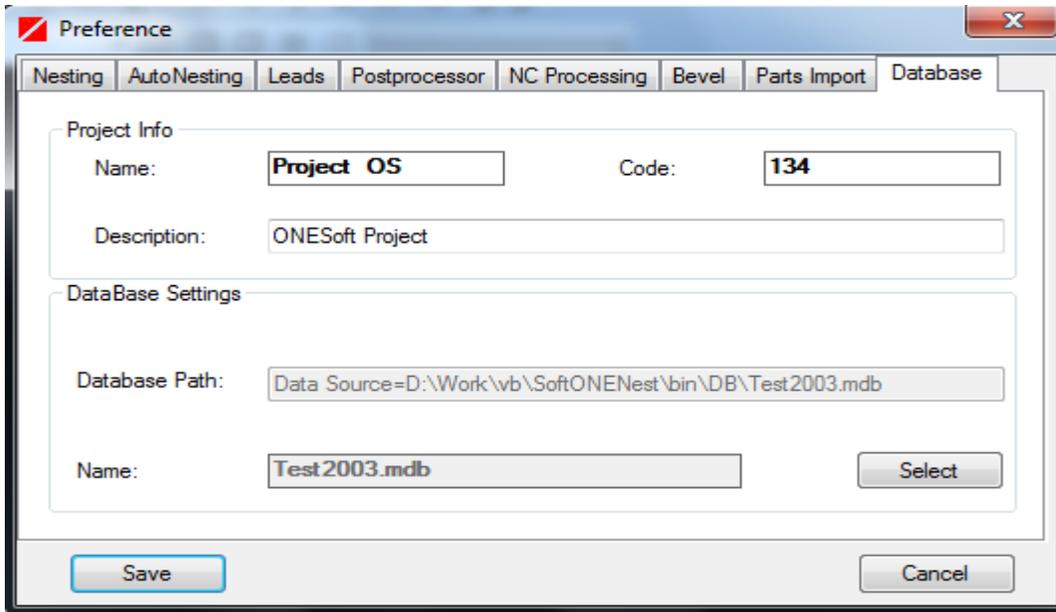
“Nupas DXF” page: customized interface for importing DXF parts from NUPAS CAD/CAM system. Two options are available: “By layer” and “By Color”.



“Database” page

Current used nesting database.

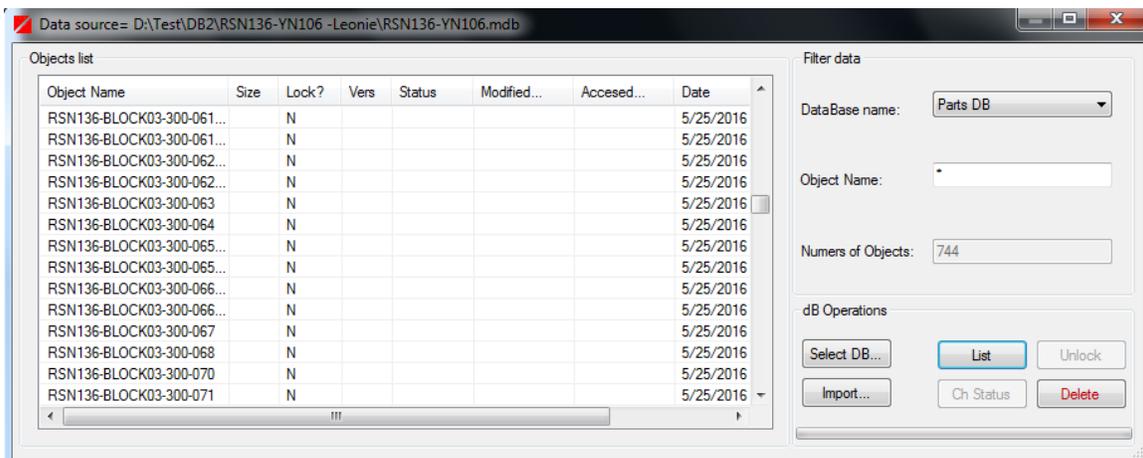
Read Chapter 3.3 , “Setting up a new project” for detailed information about setting up the nesting project database.



3.5 DB Utility

The administration tasks of the current working project database can be done from the Tools->DB Utility menu:

- a) List and delete parts objects;
- b) List and delete nesting objects
- c) Unlock nesting objects.
- d) Import parts from other SoftONE project database;

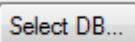


In the database name list can be selected the database for administration: Nesting DB or Parts DB

Nesting DB table operations:

- List: list nesting objects according with the “Object name” filter. Standard information can be found in the associated list view: Object Name, Size, Lock state, Version, Modified, Accessed, Date.
- Unlock: unlock a nesting object: in a network environment, when a user open a nesting, the system lock the nesting object for avoiding opening by other user. Sometimes the nesting remain locked (crash or failure appear) so, a unlock operation should be performed.
- Delete: delete a nesting object from the project database.

Parts Table DB table operation:

- List: list parts objects according with the “Object name” filter;
- Delete: delete a part object from the project database;
- Import parts from other SoftONE database project:
 - Select the database from which you want to import parts with  button;
 - Select the desired parts from the “object list”.
 - Import the selected parts into the current database with  button

4. Parts

Parts are SoftONE-NEST’s nesting units. For nesting, SoftONE-NEST use the “nests parts”. It does not nest geometry.

Parts are closed contours geometries. Parts are created automatically in SoftONE-NEST. Open geometry is automatically detected and there is an opportunity to correct it.

When a part is created, internal and external contours, marking lines and labels are recognized and explicit identified on a part. The area, weights of the parts are automatic calculated. The basic production information like position number, unit, material grade etc, should be added before the part is created.

A part, with all its related information will be stored in the project database and subsequently recalled for modification or re-use in a repeat of the same context or for use in a different context.

4.1 How SoftONE-NEST organize CAD geometries

Entities are the lowest level of geometric information. SoftONE-NEST presently supports the following CAD entities:

- lines
- arcs
- circles
- polylines

If you use CAD blocks to group your drawing data, please explode them just before you write the DXF file. You can then use the undo command to restore the grouped state.

Parts consist of a number of connected entities. Part may be closed, i.e. the end of the last entity connects with the start of the first entity, or a part may be open. Closed parts can be checked for direction of travel, i.e. clockwise or counter clockwise. Open parts cannot be checked for direction. It is the operator's responsibility to check the shapes.

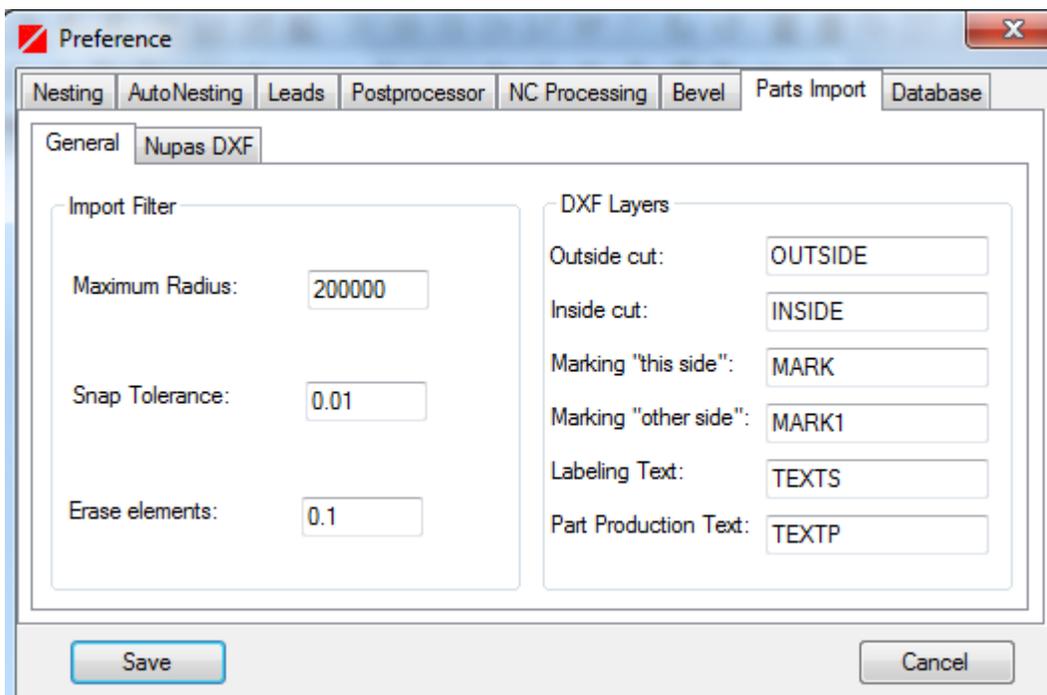
Layers are logical levels in a CAD drawing. They contain entities. SoftONE-nest assigns a meaning to each layer. In order to map the DXF layers to SoftONE-NEST processes, the DXF part geometries should be situated on the layers. The following default layer names are recognized by SoftONE-NEST. You can change the default layer names to suit your needs, from Tools->Preference menu.

- MARK shapes are marked on the plate with a scribing unit.
- INSIDE shapes are cut with the kerf towards the inside of the path. This layer is used for through holes.
- OUTSIDE shapes are cut with the kerf set towards the outside of the closed shapes.

Entities on other layers are omitted.

Note: If outer contour and inner (holes) contour are on the same layer, SoftONE-NEST try to automatically identify the holes and assign the geometries on the SoftONE-NEST "hole" layer.

General part DXF Import settings:



Import filters:

Maximum radius: set the max radius that are supported by your cutting machine. Check the controller's documentation for setting this value.

Snap tolerance: The length of the gap between elements of a shape that SoftONE will jump or connect into a single shape. This compensates for lines not actually joined in the original DXF files. Snap tolerance should be GREATER THAN or EQUAL TO the length set in Erase Elements <. SoftONE-CNC automatically adjusts two elements to the same meeting point. The program automatically determines which element has to be adjusted to close the gap causing the least change in the path.

DXF Layers:

Outside cut: Layer assigned to outer contour geometries;

Inside cut: Layer assigned to inner contour geometries (holes);

Marking this side : Layer assigned to marking lines geometries.

Maring "other side": *Layer* assigned to the opposite part side);

Labeling texts: Layer assigned to text which should be printed on the part;

Part production texts: Layer assigned to part properties (e.g.: position, thickness, quality *);

- ➔ The system will detect automatically inside of DXF file the part properties fields. The following tags are currently available for automatically part production imports (part properties):

- “U:” tag for unit name: should be followed by desired ***unit name***;

- “T:” tag for part thickness: should be followed by **material thickness**;

- “M:” tag for material quality; should be followed by **material quality value**

- “P:” tag for part position identification: should be followed by workshop **position number**.

4.2 Creating nesting parts from DXF

4.2.1 Nest Preparation within a CAD Program

SoftONE-NEST import parts geometries from DXF files. Any CAD program that can export the drawing in DXF format and support layers can be used. The CAD part drawing has to meet certain specifications to be able to be processed. The operations described here are specific for using SoftONE-NEST together with AutoCAD, but are essentially the same for any other CAD program that can export DXF files.

Steps involved:

1. Prepare the CAD drawings for all parts.
3. Explode all blocks that you might have in your drawings.
4. Export the part drawing to a DXF file for each part;
5. Use SoftONE-NEST import function to automatically import the parts;
6. Input the necessary quantities for imported parts;
7. Nest the parts using SoftONE-NEST software.

4.2.2 Import DXF parts in SoftONE-NEST

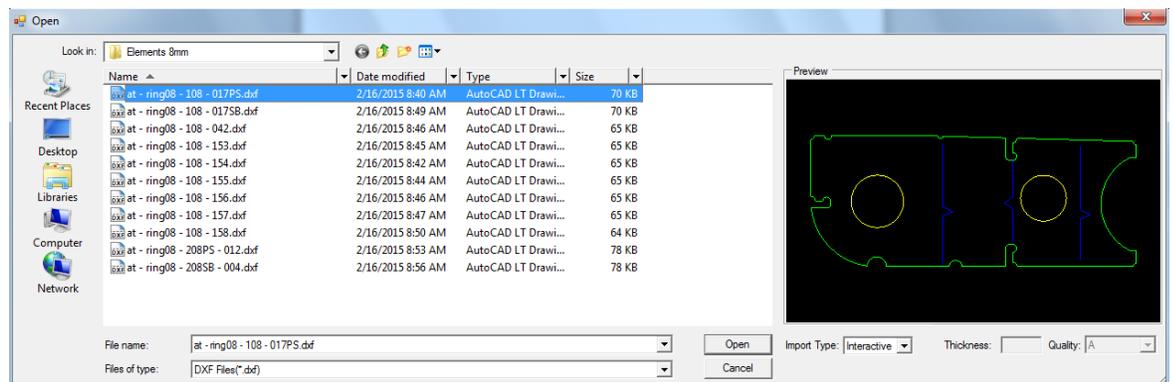
After creating the DXF part, you can easily import it into SoftONE-NEST database. Depending of the requested detailed level part information, 2 types of dxf parts import can be performed:

- a) Interactive (graphical);
- b) Multiple files from folder;

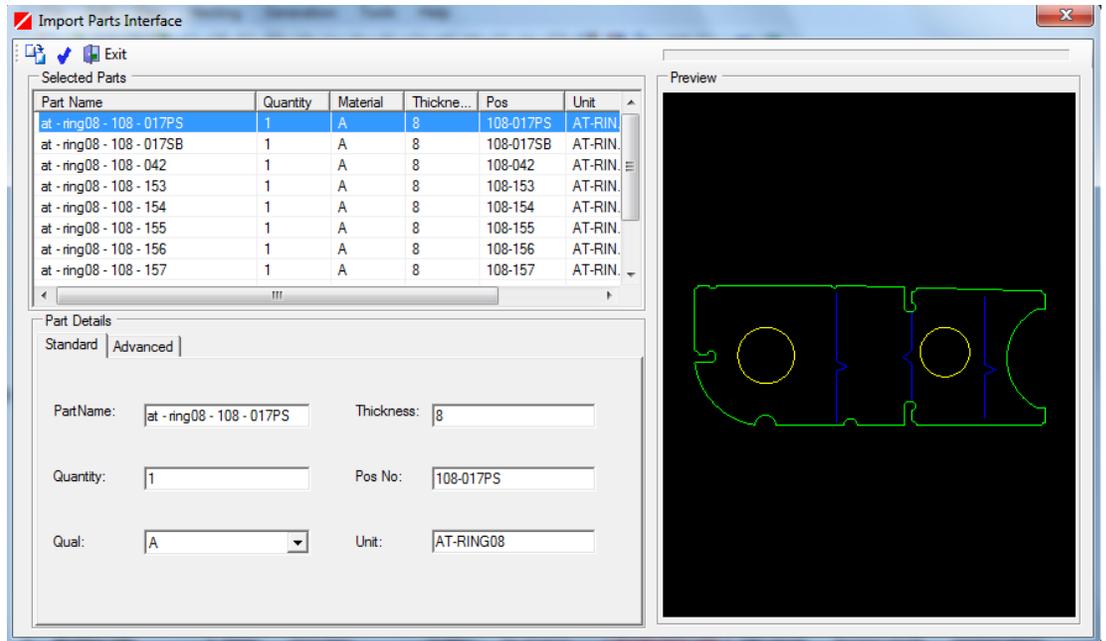
A) Interactive

Steps involved:

- Select  button or **File->Import DXF** part function from menu ;
- Select the folder where the DXF files resides ;
- Select the DXF part file - a graphical preview of the part will be shown;



- Select the import type:
 - **Interactive:** for manually add/modify the part properties: thickness, material quality etc.
 - Press “Open” button. A new form will appear



The following part properties fields are available:

PartName: name of the part (default value is DXF file name)

Quantity: necessary quantities (default 1 pc);

Qual: material quality

Thickness: material thickness

Pos No: position number (part I identification in workshop drawing);

Unit: name of the unit (block) which the part belong to.

- Click “**Import**”  button.
 - **Batch:** For direct import the DXF parts into database: if the part properties tags are not present in the DXF file, the thickness and material quality should be input for the selected DXF files, otherwise an error notification will be shown.
 - Click “Open” button.

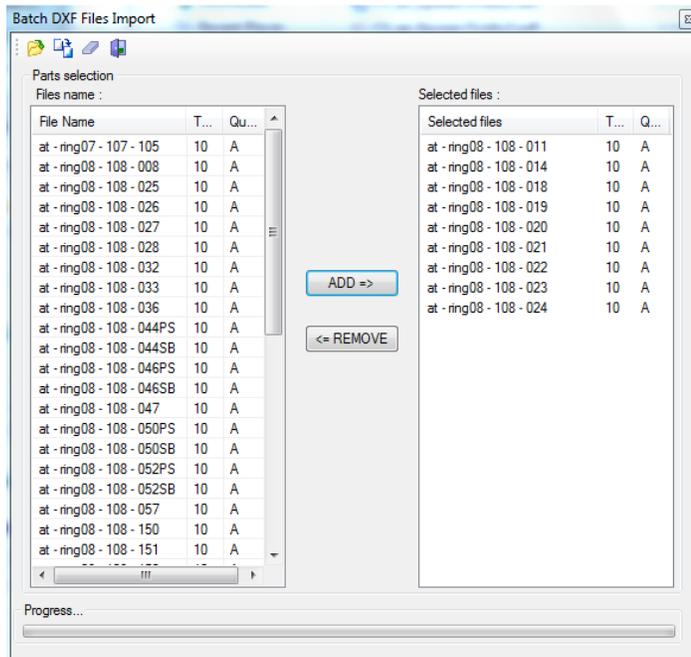
SoftONE-NEST DXF import interface check the part for errors, e.g.: opened contour, double elements etc. If the part contain geometries errors an error message will be displayed on the screen. The operator should correct the part in the CAD program and import the part again.

B) Multiple parts import from folder.

Steps involved:

- 1) Open SoftONE-NEST **Batch import interface** from File->Batch Import DXF Parts;
- 2) Open the DXF parts folder with  button;

3. Click  import button for automatically import the selected part into DB;



A progress bar will show the stage of the import process.

Note: The DXF files should contain the tags for part production information fields. If not, a error message will be generated. The system add 1 (one) pc for each imported part as default in the plate inventory. The necessary quantities can be modified through “Parts inventory” interface.

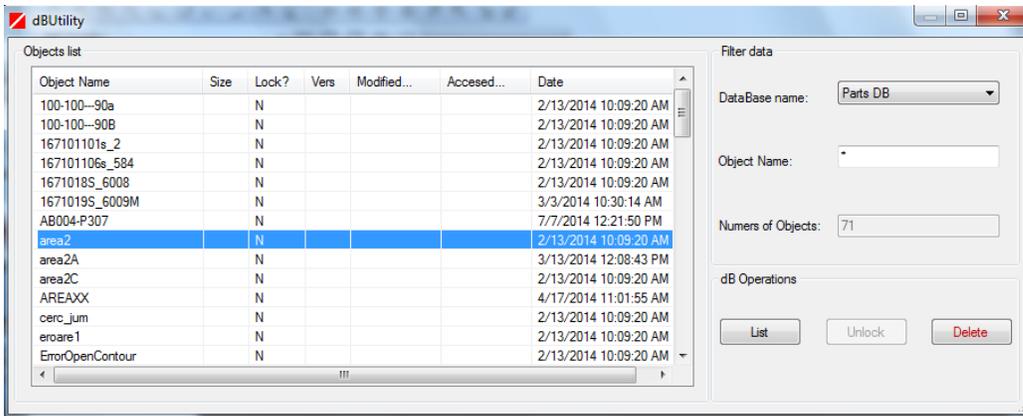
See “*Parts Inventory*” from chapter 5 “Material Management” for more information about how to manage the parts quantities for your project.

4.3 Finding and retrieving parts

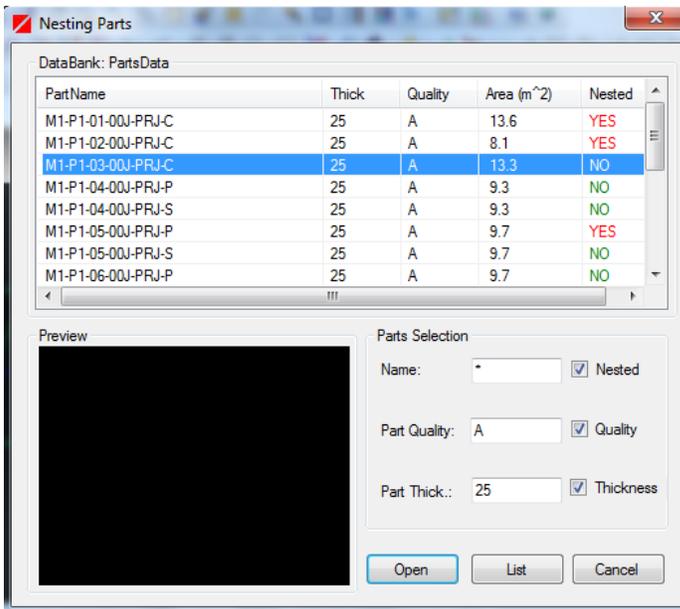
For finding the parts, DBUtility function menu can be used. It can be found in Tools menu.

The parts can be filtered by name.

For delete a part(s), the “Delete” button should be used. If the part is already nested a confirmation message will inform the user about the part nesting status.



For retrieving a part in a nesting job, the “*Nest From Explorer*” or “*Nest part by name*” functions should be used. For more details, see the “**Nesting**” chapter.



Note: A nesting job should be opened for this operation

4.4 Import parts from other CAD/CAM software

SoftONE-NEST can automatically import parts from the following CAD/CAM shipdesign systems:

- 1) Aveva Marine (.gen & .DXF “ppanparts” file);
- 2) Smart Marine (.XML part data file);
- 3) Nupas DXF part files.

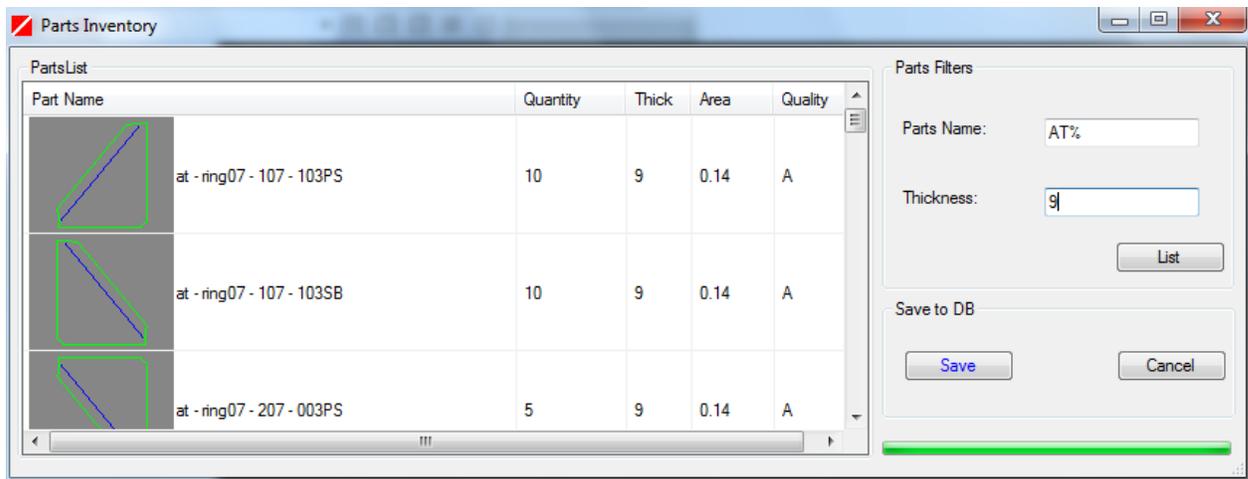
For detailed information about these features, please contact ONESoft technical department, office@onesoft.ro.

5. Material Management

SoftONE-NEST manages the necessary materials and controls the quantities of each the nested part through the material management features: “*Parts inventory*” and “*Plates inventory*”

5.1 “Parts inventory” The Part Inventory Database stores a list of parts that need to be cut more than once. This list could be used for assemblies or for repeated parts . Once this list is created, it can be accessed within SoftONE-NEST when perform nesting parts.

The party inventory form can be launched from *Tools->Materials->Parts Inventory* menu function:



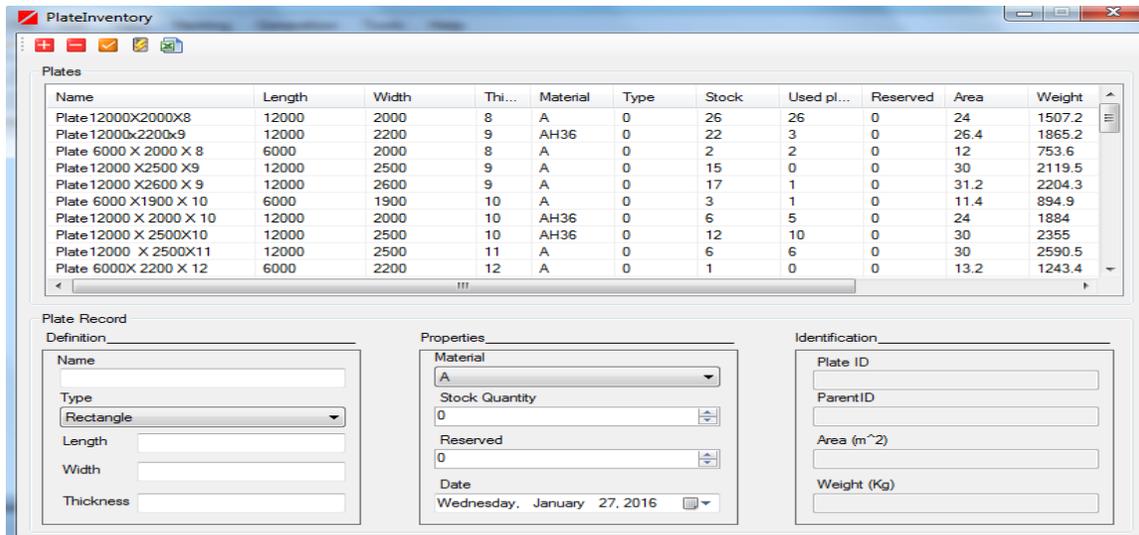
A customized part list can be created according with the project specification. At the import step, by default, the system assign 1 pc for each part (for batch import type). It can be modified by a double mouse click on the selected part in the parts list. After finishing, you should save the parts quantities into Parts inventory database. When all parts have been added to the part list with correct quantities, material and properties, close out of the Parts Inventory screen by clicking on standard form close icon.

Note: When start the nesting jobs, the system will count the nested parts according with the parts list quantities from Parts Inventory DB.

5.2 Plates inventory

The Plate Inventory Database stores a list of all the plates stored at the facility. Once this list is created, it can be accessed within SoftONE-NEST so that a user can easily see what he has available to him to nest on. Plate Inventory is also the location where the unnested portion of a plate is stored as a remnant or skeleton.

The open Plate Inventory interface, click on “Tools menu, Materials->Plates inventory”



Name	Length	Width	Thi...	Material	Type	Stock	Used pl...	Reserved	Area	Weight
Plate12000X2000X8	12000	2000	8	A	0	26	26	0	24	1507.2
Plate12000x2200x9	12000	2200	9	AH36	0	22	3	0	26.4	1865.2
Plate 6000 X 2000 X 8	6000	2000	8	A	0	2	2	0	12	753.6
Plate12000 X2500 X9	12000	2500	9	A	0	15	0	0	30	2119.5
Plate12000 X2600 X 9	12000	2600	9	A	0	17	1	0	31.2	2204.3
Plate 6000 X1900 X 10	6000	1900	10	A	0	3	1	0	11.4	894.9
Plate12000 X 2000 X 10	12000	2000	10	AH36	0	6	5	0	24	1884
Plate12000 X 2500X10	12000	2500	10	AH36	0	12	10	0	30	2355
Plate12000 X 2500X11	12000	2500	11	A	0	6	6	0	30	2590.5
Plate 6000X 2200 X 12	6000	2200	12	A	0	1	0	0	13.2	1243.4

Plate Record

Definition

Name:

Type:

Length:

Width:

Thickness:

Properties

Material:

Stock Quantity:

Reserved:

Date:

Identification

Plate ID:

ParentID:

Area (m²):

Weight (Kg):

The followings functions are available:

-  “Add” Button: Create a new plate. The following fields are required:
 - Name: plate name
 - Type: plate type
 - Dimensions:
 - X Dimension - Length of plate
 - Y Dimension - Width of plate
 - Material - Type of material the plate is made of
 - Stock quantities: number of available plates;
 - Date: creation date

You should press the “accept”  button for saving the plate into database.

This will automatically calculate the area, weight, total weight

-  “Delete” Button: Remove a plate from the inventory database.

 **"Refresh"** Button: Read the all plates data from database and calculates how many plates are used by nesting jobs. The corresponding columns in the plates list will be filled accordingly.

Stock	Used plates
26	26
22	3
2	2
15	0
17	1
3	1
6	5
12	10
6	6
1	0

 **"Excel report"** Button: Export the plates inventory list to Microsoft Excel .csv file.

Note: To change plate information in your Plate Inventory Database: In the list of plates, locate and double-click the plate you want, and then change the information as needed. After finish, press the "Accept" button  for storing the modification in the plate inventory database.

6. Nesting

SoftONE-NEST offer an extensive functions to perform advanced true shape nesting.

SoftONE-NEST support:

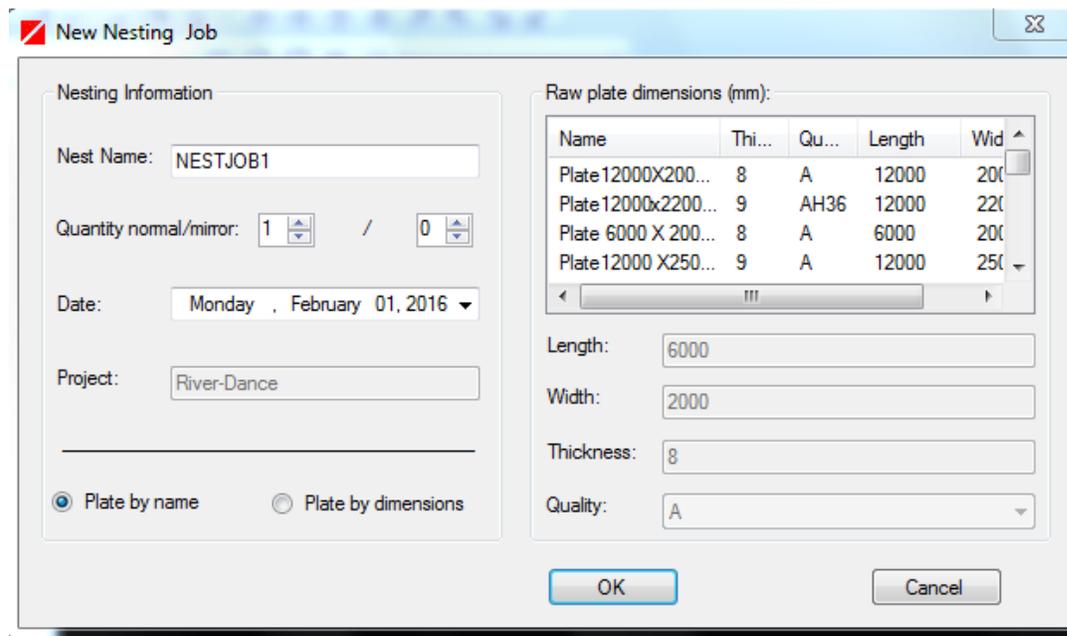
- Full manual true shape nesting;
- Automatic leads adds;
- Automatic nesting sketch generation.

Before starting a nesting process, a nesting job should exist in the work space; a new nesting job can be created, or a previous saved nesting job can be used.

6.1 Nesting job

6.1.1. Start a new nesting job

To start a nesting job, the new nesting job form from “*File->New nesting job*” menu function should be launched. A new nesting job can be initiated also by clicking on *new nesting* button  from standard toolbar.



Name	Thi...	Qu...	Length	Wid
Plate12000X200...	8	A	12000	2000
Plate12000x2200...	9	AH36	12000	2200
Plate 6000 X 200...	8	A	6000	2000
Plate12000 X250...	9	A	12000	2500

Two options are available for defining the plate parameters of the nesting job: “*Plate By Name*” and “*Plate by dimensions*”.

General parameters:

Nest Name: name of the new nesting job

Quantity: quantity of the nesting sheets (default =1)

Date: Date of the nesting job (by default current date)

Project: Current selected project.

Plate By dimensions.

Required fields:

Length: length of the sheet

Width: width of the sheet

Thickness: thickness of the sheet

Quality: material grade

Plate By Name

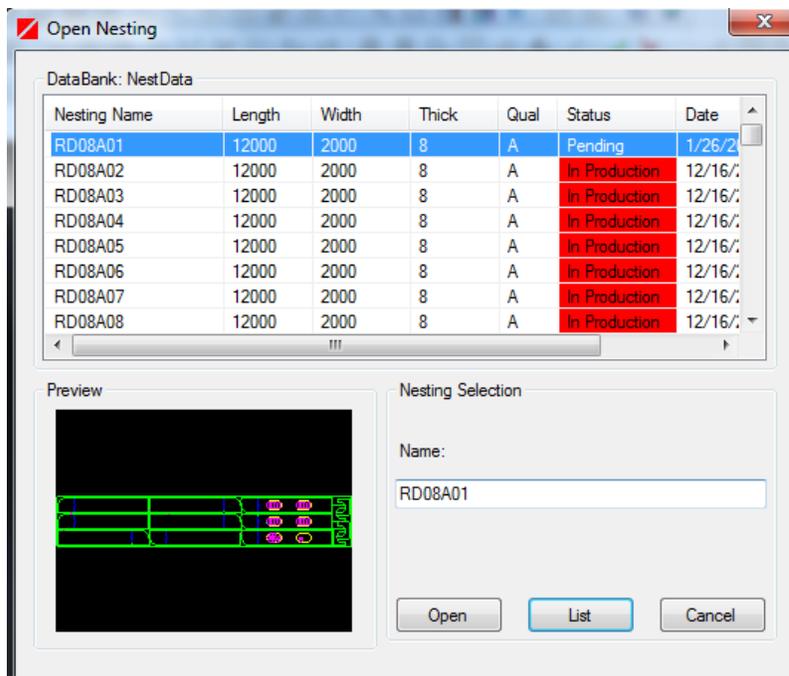
Select the plate name & dimensions from the plate inventory list according with defined plates in inventory. See “*Plates Inventory*” from chapter 5 “**Material Management**” for more information about how to manage the plates & parts inventory for your project.

Note: For the current nesting, the plate sheet dimensions can be changed with “*Exchange Raw Plate*” function from *Edit ->Plate* menu.

An existing nesting job can be opened by *File->Open Nest*” menu function or  standard button.

After selecting a nesting job, a preview image of will be shown in the special “preview” window area. Also, useful information are shown in the nesting list:

- Dimensions: length, width, thickness;
- Material quality;
- Creation Date;
- Nesting status;
- Usage area;



For a quick searching of a nesting job, the nesting list can be sorted by clicking on the desired column.

Save nesting job

For saving the nest job, the “*File->Save nest*” menu function should be used. As result, the nesting job will be saved in the current project database. If the nesting sketch was created, it will be saved in the project database as well.

6.1.2. Nesting job status

Nesting job status is a “flag” which indicate if the status of the nesting job. In this way, is possible to control which nesting are in work, complete or launched in production workshop.

The followings nesting status are available:

- “*Pending*”: nesting is not finished, nesting sketch is not inserted and NC program was not generated;
- “*Complete*”: nesting are finished, but not sent yet in production;
- “*In Production*”: nesting is finished and sent to the cutting production workshop;

After finishing a nesting job, is possible to change its status according with the nesting stages. All status of the nesting jobs are displayed when the “*open nesting*” menu function is involved. Also, the nesting status of all nesting job can be verified using the BOM reports. For more information about report generation, see “*Nesting sketches and reports*” chapter.

NOTE: If a nesting job has “*In production*” status, all modification functions are disabled. It still can be modified only after changing its status to “*Pending*”. *Some warning messages are displayed when changing the status back to “Pending” or when opening the nesting jobs launched in production.*

6.2 Manual nesting

SoftONE-NEST offer advanced function for a manual true shape nesting process. The parts nesting can be performed in 2 ways:

1. “Drag and Drop” from Parts Explorer List
2. “By name” standard procedure.

The most used nesting procedure is “Drag and Drop” which offer fastest nesting way and very good control of the number of parts which should be nest.

Steps involved:

6.2.1. Starting a manual nest

A nesting job should exist in the workspace before starting a manual nesting process.

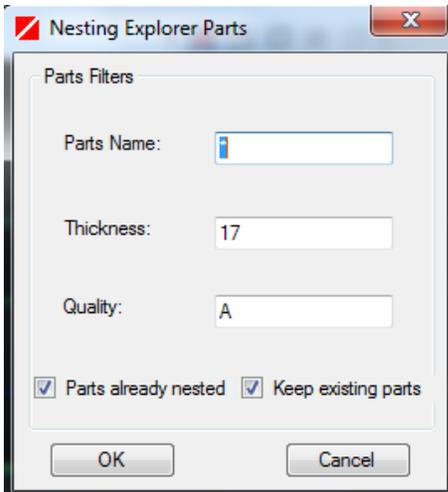
6.2.2 Adding parts

For adding parts to the existing nest, 2 functions can be used:

- **From Part Explorer Nesting->Nest Parts->From Explorer**” menu function or  button;
- **By Name: Nesting->Nest Parts -> By name**” menu function or  button.

1. From Parts List Explorer

This function will load the parts in the part explorer for the nesting tasks. The parts can be added to the nesting job using “drag & drop“ or “double click” features. Before loading, the parts can be filtered by name, thickness and quality fields.



Filtering fields:

Part Name: Part name search string;

Thickness: Thickness of the parts;

Quality: Material grade of the parts;

Parts already nested: if selected, the system will load in the explorer list the already nested parts;

Keep existing parts: if selected, the system will be kept the already loaded parts in the part explorer list.

After press “OK” button, the “Parts Explorer List” will add the parts according with your selection.

Preview	Quantity	Area	Name
	2	4.953	at - ring0 - 207 - 015
	1	4.953	at - ring0 - 208PS 012
	1	4.891	at - ring0 - 207 - 015A
	0	1.972	at - ring0 - 108 - 017PS
	5	1.972	at - ring0 - 108 - 017SB
	0	1.972	at - ring0 - 107 - 017PS

Available information:

Preview: Part preview picture

Pcs: Number of parts pieces which should be nest are retrieved from Parts Inventory database: default is "1" pc;

Area: part area

Name: part name

Quality: Material grade

Note: The "Pcs" value for a part are in accordance with the stored value through Parts Inventory interface (*more info at Material management chapter*). When nest, the system will count the nested parts. After saving the nest, involving the "refresh" function by right mouse click on parts explorer list, the list will count the nested parts and show the remaining number of parts which should be nest!

Thus, a real time control of the counting of nested parts is done, avoiding material loses. The system use 3 colors to show the part status in the "parts explorer list":

- **Green**: all available parts was nested;
- **No color**: there are still parts available;
- **Red**: the number of the nested parts is greater than defined number of parts in inventory database!

You can sort the parts by clicking on the corresponding columns list. By default the list is sorted in descending order by "Area" column. You can change the list view by a list context menu which can be accessed with a mouse "right click". A standard view modes are available: "*Large icons, List, Details, Tile*".

"Drag and Drop" nesting procedure: "**Drag**" the desired part over the nesting area and "**Drop**" it in the desired zone.

Move the mouse pointer in the work space area. An outline of the part is attached to the mouse pointer.

Position the mouse pointer where the part should be placed on the sheet.

Select left mouse button. The part is placed in the location of the work sheet and remain selected for future transform operations; See "**Arrange parts on the nest**" chapter for details.

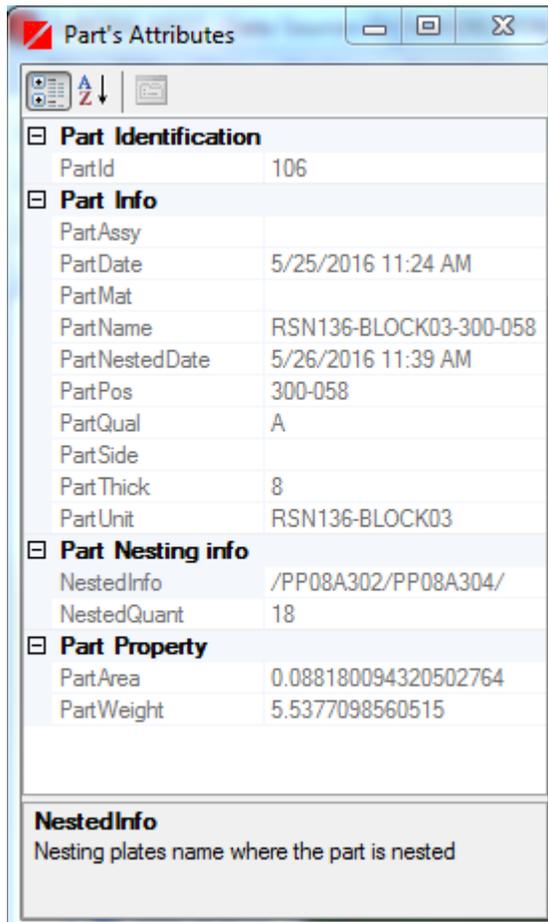
Press operation complete button for leaving the part in the mouse location position. The value from "Pcs" column will be decreased accordingly.

Repeat the above steps for adding more parts to the nesting sheet.

"Double click" parts nesting: perform a mouse double click on desired part from parts explorer list. The system will try to find the "next" available position of your part into the nesting job.

Anytime, the system can give information about the nested parts in the current nesting job. The information are shown by involving the “*Edit->Part->Property*” menu function or by  button.

The following information are displayed: *Part identification, Part information, Nesting information, Part’s property.*



2. By Name

Each part will be selected manually from the selection form. After selecting a part in the list, a preview image of the part will be shown in the special preview area.

The following options are available:

Sorting the parts: parts can be sorted by part name, thickness, quality or area by clicking on the corresponding column of the parts list

Filtering the parts: available filters: name, quality ,thickness or nesting status.

After selection you can place the part on the nesting area.

Move the mouse pointer in the work space area. An outline of the part is attached to the mouse pointer.

Position the mouse pointer where the part should be placed on the sheet.

Select left mouse button. The part is placed in the location of the work sheet and remain selected for future transform operations; See "*Arrange parts on the nest*" chapter for details.

Press operation complete button for leaving the part in the mouse location position. The value from "Pcs" column will be decreased accordingly.

Repeat the above steps for adding more parts to the nesting sheet.

6.2.3. Arrange parts on the nest

After click on "Nesting-> Transform Part " menu function or  button, the system ask for selection of a parts(s). One or parts can be selected by clicking inside of the part or by specify a rectangle window with the mouse. After finishing the parts selection, click on the "Operation complete" button . The arranging function from "*Transformation functions*" and "*BUMP*" toolbars will be activated and become available for transform part operation.

The "**Transformation functions**" are used in a transformation sequence, when a plate part is to be positioned. Thus, they are actuated one after the other, until the part is properly positioned.



- Transformation functions toolbar

With the BUMP functions, a part can be moved a distance determined by the system, in a specific direction given by the user



- BUMP functions toolbar

Accept  or reject  buttons:

After selecting the part(s) or for finalizing the transformation functions (BUMP, ROTATE, MOVE etc), the "*Operation complete*" button  should be clicked (or press return from keyboard).

Note:You can select also the parts by specify by two opposite corners of a rectangle window:

- click for set the lower left point of the select rectangle
- click for upper right point of the select rectangle

All parts inside of drawn rectangle will be selected. A standard selection by clicking inside part's area can be used in combination.

Advantages: when you need to transform more parts, reduce the time for parts selection.

Exiting from the current function can be performed with the "Cancel" button  (or pressing the ESC key on the keyboard). As result, the part will go back to the initial state before the function was issued.

Note: When involve the transform function, first, you should select one or more parts. You can select it one by one (with a mouse click) or defining a mouse rectangle “zone”. All parts inside the “zone” will be selected. After selecting, you should press “ Accept  “button for accessing the transformation functions for the selected part(s).

A) TRANSFORMATION functions:

1. Moving the part with 2 position

With this function, a part can be moved using 2 cursor positions. The vector from the first to the second position will define the translation.

Steps:

1. Click on the transform part(s) button  or *Edit->Part->Transform* menu function
2. Select the part; Part Transform toolbar will be activated:

3. Define the moving vector after click on  button;
4. Click on “Operation complete” button 

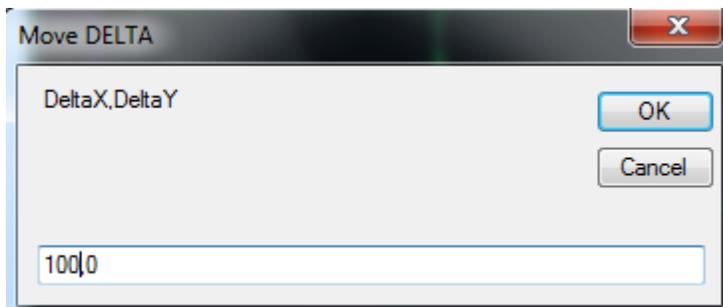
2. Moving with a fixed value by DX or DY axis

With this function, a part can be moved a desired distance horizontally and/or vertically. The operator will be prompted to key in the two distances, first the horizontal (negative if left), then a comma and finally the vertical (negative if down). The translation will then be instantaneous.

Steps:

1. Click on the transform part button  or *Edit->Part->Transform* menu function
2. Select the part; Part Transform toolbar will be activated:

3. Input the specific DeltaX and DeltaY values after click on  button; Press OK.
4. Click on “Operation complete” button 



3. Rotate center

You can freely rotate the part by placing the mouse pointer within its boundaries and select the left mouse button. With the left mouse button selected, you should make a rotate mouse movement. The part will be rotated and a blue line will be shown according with your mouse moving operation. For finalizing the rotation process you should only deactivate the left mouse button. The part will remain activated for other arranging functions.

Steps:

1. Click on the transform part button  or *Edit->Part->Transform* menu function
2. Select the part; Part Transform toolbar will be activated:

3. Start rotate the part after click on  button;
4. Click on “Operation complete” button 

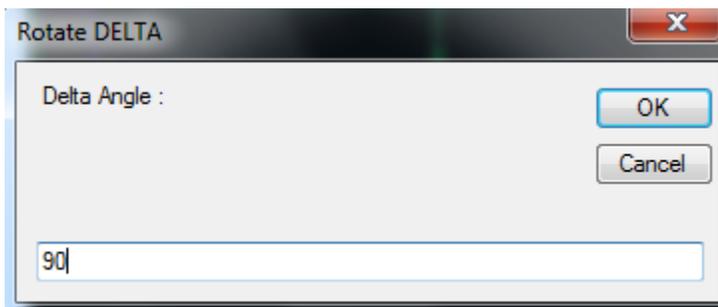
4. Rotate the part with a specified angle

You can easy rotate the part with a specific angle. A input rotate angle form will be shown.

Steps:

1. Click on the transform part button  or *Edit->Part->Transform* function
2. Select the part; Part Transform toolbar will be activated:

3. Input the specific rotation after click on  button; Press OK.
4. Click on “Operation complete” button 



5. Rotate with fixed angle functions: 90,180,45,-90 degrees



When you need to rotate a part, the most used angles are 45,90,-90,180 degrees. For easy rotation of the parts, you can use directly the rotate with fixed angle functions according with your needs.

As result, the selected part will be rotate by a simple left mouse click according with fixed angle: 90,180,45,-90 around the current rotation centre

Steps:

1. Click on the transform part button  or *Edit->Part->Transform* function
2. Select the part; Part Transform toolbar will be activated:

3. Rotate the part with the fixed angles with  buttons;
4. Click on “Operation complete” button 

6. Rotate “parallel”

Rotate a part such 2 lines are parallel.

Steps:

1. Click on the transform part button  or *Edit->Part->Transform* function
2. Select the part; Part Transform toolbar will be activated:

3. Select “rotate parallel” function:  : select the line from other part and then select a line from selected part;
4. Click on “Operation complete” button 

7. Mirror 

Parts in the nesting sheet can be mirrored horizontally or vertically with the mirror functions.

The part will be mirrored on its center vertical line or horizontal line by a left mouse click on the corresponding buttons.

Steps:

1. Click on the transform part button  or *Edit->Part->Transform* function
2. Select the part; Part Transform toolbar will be activated:

3. Mirror part horizontally or vertically with  buttons;
4. Click on “Operation complete” button 

B) BUMP functions:

With this function, a part can be moved a distance determined by the system, in a specific direction given by the user. The distance is the largest distance the part

can be moved without overlapping any other part or the parent plate. Default clearances between parts and between a part and the parent plate (sheet) is taken into account when the distance is determined. The clearances between parts or between parts and parent plate(sheet) can be modified from Tools->Preference menu

The BUMP function toolbar is displayed modally and all other transformations can be performed at any time.



The parts can be transformed in 8 different directions:

- +x along the positive x-axis
- x along the negative x-axis
- +y along the positive y-axis
- y along the negative y-axis
- +x +y along the positive x-axis, along the positive y-axis
- +x -y along the positive x-axis, along the negative y-axis
- x -y along the negative x-axis, along the negative y-axis
- x +y along the negative x-axis, along the positive y-axis

In the four directions which are a combination of transformations along the x and y axes the system alternates between transformations in the x and y directions until it is not possible to move the part any further.

The bump functions can be used in combination with any part transformation.

Delete parts from nesting

Any part on the nesting can be deleted with *Edit -> Parts-> Delete* function or with  button. The function ask you first to select the part(s), and second to confirm the removing of the part from the current nesting job. One or parts can be selected by clicking inside of the part or by specify a rectangle window with the mouse

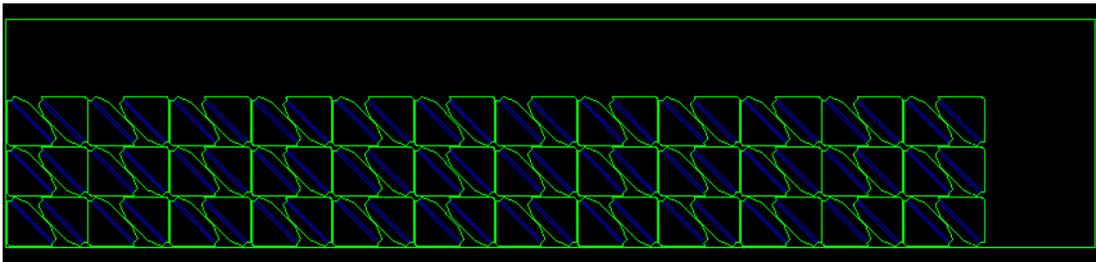
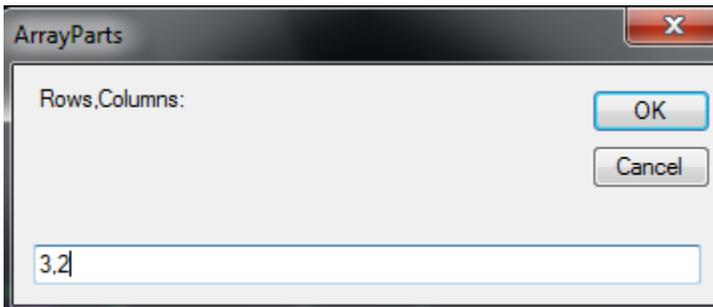
6.2.4. Parts array

Part(s) can be arranged in a array (matrix) using the *Nesting->Array part* menu function.

Steps involved:

- 1) Select part(s);
- 2) Input the number of desired rows/columns;

As result, the selected part(s) will be arranged in a matrix according with number of rows/columns.



6.2.5. Copy part(s)

A selected part(s) can be copied with “**Edit->Part->Copy**” function or with  button. The transformation functions can be used after involving copy function.

6.2.6. Exchange raw plate

The existing plate of the current nesting job can be changed using “**Edit->Plate->Exchange raw plate**” menu function or with  button.

For selecting a new nesting job raw plate, two options are available:

- “*Plate by name*” : select a existing plate from plate inventory;
- “*Plate by dimension*” : input new plate parameters: dimension&quality.

6.3. Automatic nesting

SoftONE-NEST offers 2 types of Automatic Nesting:

- a) On the current sheet
- b) On multiple sheet (from plates inventory)

Both option performs a **true shape** auto-nesting process.

a) Autonest on the current sheet:

Steps involved:

- 1) Start a new nesting job;
- 2) Load the nested parts in the parts explorer list;
- 3) Select the desired parts from PartExplorer;
- 4) Start Autonest with from: Nesting->Auto nest->Current sheet function or with  button;

b) Autonest on the multiple sheets:

c)

1. Load the nested parts in the parts explorer list;
2. Select the desired parts from PartExplorer;
3. Start Autonest with from: Nesting->Auto nest->Multiple sheet function; a new Autoneesting interface will be loaded.
4. Select the desired plates from plates inventory database. The quantities for the selected plates can be changed with a “double-click” mouse on the desired plate.

The system will start arranging automatically the selected parts from parts explorer list according with established parts quantities from Parts Inventory (see *Material management* chapter for more information). The nesting priority is given by the way how the parts was ordered in the list: for example, if the list is sorted descending by area column, the auto-nest function will start nesting with the bigger area parts to smaller parts; if the list is sorted ascending by parts quantities, the system will start auto-nesting with the fewest parts to most numbers of parts.

The user can filter the loaded parts in the list and nest automatically the sequenced parts. After finishing, the user can load the other parts and auto-nest it and so on. Depending of the user experience, good auto-nesting results can be achieved.

A mixed manual and auto-nesting is possible as well. You can start a nesting job manually and continue nesting process automatic.

Note:The auto-nesting parameters can be changed from Tools->Preference menu >AutoNesting

5. NC code generation

a. 7.1 Introduction

Machine specific NC code is not actually generated until the post step. Refer to *Chapter 7 NC Post Processor* for details. This chapter deals with the preparatory determination of cutting sequence and the details of the cutting path, using an idealized, virtual NC machine. It is assumed that, at this point in the SoftONE-NEST nesting process, a nesting job has been created and parts have been laid out as required, on one or more sheets of material.

The NC step normally takes place after the nest has been finalized.

b. 7.2 Lead IN/OUT

Leads are short straight lines at the start and end of a shape. They are used to avoid piercing directly on the edge of a part. SoftONE-NEST places leads automatically at the appropriate location of a shape. The cutting cycle is started at the beginning of the lead-in and terminated at the end of the lead-out; thus ensuring that a 'dirty' cut does not ruin the edges of the shapes.

You can create NC-code with no leads or lead-ins and lead-outs. SoftONE-NEST is capable to generate the lead In/Out automatically or manually.

A) Adding the leads automatically

The leads can be added automatically for all parts with Nesting->Starts-> Automatic function or by click ob  button. The system will add automatically all leads according to all processes layers: cutting, marking, labeling.

The default size of the leads will be used. It can be changed from *Tools->Preference->Leads* menu function

B) Adding the leads manually

The cutting leads can be added also manually with Nesting->Starts->Burn function.

Steps:

1. Select a cutting edge of the part.
2. Click on "Operation complete" button.

As result, the system will place the lead In and Out at the nearest clicked point of the selected edge. If the parts has already the leads added, a warning message will be generated. The existing leads will be removed automatically.

C) Edit leads

Available edit leads operation are:

- change size
- rotate
- move
- delete

Change lead steps:

1. Click on the transform lead  button or *Edit->Leads->Change* ;
2. Select the lead; Transform toolbar will be activated: 
3. Change the angle or size with  buttons or  arrows buttons;
4. Click on “Operation complete” button  .

Move lead steps:

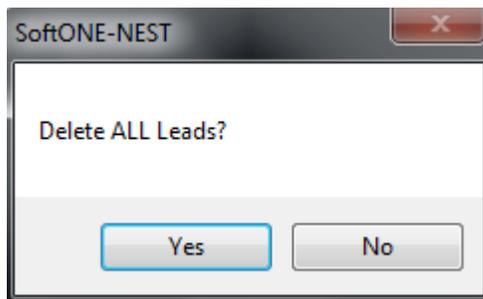
1. Click on the transform lead  button;
2. Select the lead; Transform toolbar will be activated: 
3. Move the lead with  button: you should select other edge of the part;
4. Click on “Operation complete” button  .

Delete single lead steps:

1. Click on the transform lead  button;
2. Select the lead; Transform toolbar will be activated: 
3. Delete the lead with  button;
4. Click on “Operation complete” button  .

Delete ALL leads

You can delete all leads with Edit ->Leads ->Delete ALL function or with  button. A confirmation message window will be displayed.



As result, all leads from the current nesting job will be deleted.

c. 7.3 Bridges

Bridging is a pierce reduction technique that enables the continuous cutting of external contours with just one pierce. It creates a small tab between adjacent parts. This enables the cutting machine to quickly cut each part without having to lift the head—reducing pierce times and stress on the piercing

Adding bridges

The bridges can be added automatic or manually with the *Edit ->Bridges-> Automatic* menu function ( button) or *Edit ->Bridges-> Insert* menu functions ( button).

7.3.1. Manually adding bridges

Normally, for adding a bridge, are necessary to 2 points, one for each part which should be connected by the bridge.

Adding the bridges in SoftONE-NEST is done “semi-automatic” which mean that it is necessary to indicate only the desired bridge position and the system will find automatically the nearest second point necessary for construct the bridge.

Steps:

1. Click on add bridge  button or Edit->Bridge->Insert function;
2. Indicate the bridge position on a part edge;
3. Click on “Operation complete” button  .

You can follow up with the 2&3 steps for adding the next bridges as necessary.

7.3.2. Automatically adding bridges

For a fastest bridges adding, SoftONE-NEST can add bridges **automatic**, which mean that no user action are necessary for adding all bridges within a nest job.

Steps: After finishing the nesting parts, the *Edit ->Bridges-> Automatic* menu function or  buttn should be clicked for adding all bridges automatically for the current nesting job. After finishing, you can manually modify the bridge arrangement as well.

Delete bridges

You can delete a single bridge or all leads.

Delete a single bridge:

Steps:

1. Click on the  or Edit->Bridge-> Delete-> Single function;
2. Indicate the bridge;

3. Click on “Operation complete” button .

You can follow up with the 2&3 steps for deleting the other bridges as necessary

Delete ALL bridges:

You can delete all bridges with Edit ->Bridges ->Delete ALL menu function or with  button. A confirmation message window will be displayed.

As result, all bridges from the current nesting job will be deleted.

d. 7.4 Generation of NC files

After finalizing the nesting, with or without adding of bridges and leads, the NC files for the nestings jobs can be performed.

SoftONE-NEST generate the NC code automatically according with the machine processes in the following order:

1. Marking lines
2. Holes
3. Outside contours
4. Labels
- 5.

The following types of NC generation functions are available:

- **Complete path** : NC code will contain instructions for all type of processes found in current nesting
- **Marking path** only: NC code will contain instructions only for marking processes found in current nesting
- **Cutting path** only : NC code will contain instructions only for cutting processes found in current nesting
- **Kerf compensation**: A tool offset value will be calculated in the final NC code according with the nesting plate parameters.

The SoftONE-NEST post processor will optimize the machine paths automatically. This will reduce the time spent by machine to complete the nesting increasing the production efficiency.

Steps involved:

1. Select the desired machine post processor from Tools->Preference->Post Processor menu;
2. Run the post processor with *Generation -> Complete path* menu function, or with *Marking path /Cutting paths/Kerf compensation* menu functions as desired;
3. Save the NC code with File -> Save NC code function or click on save NC button .

For adding and customizing your own controller setting file for post processing task, you should refer to chapter 7, *NC Post Processor*.

8. NC Post Processor

8.1 Introduction

SoftONE-NEST operates on a wide range of machines with substantially different capabilities. For the same nest can be generated different NC code according to machine model and controller. SoftONE-NEST uses a controller code file for every type of controller to handle the variations. You can modify or make your own controller files with any text editor or XML editor or through Preference menu, to support any controller.

Definition:

The post processor in SoftONE-NEST nesting process is the translation of the cutting path from SoftONE-NEST's internal, to the actual codes employed by the target machine. SoftONE-NEST support two type of NC output code: ESSI and EIA (G-Code)

Locations:

There are two primary groups of files related to the post processor:

- The definition files include the xml setting files. The post processor setting files are locate din the “def” folder of application. These files define the machine and determine what NC code is output.
- The output NC code file that is produced by the post processor operation. The NC files can be saved in different location according with the user preference

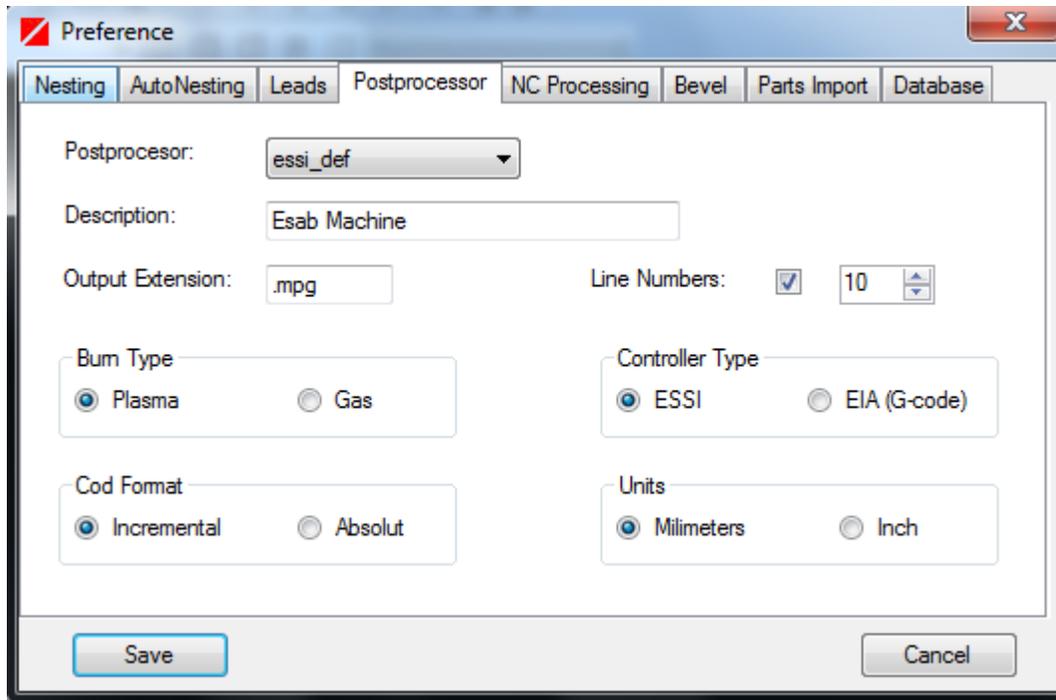
8.2 Running the post processor

For same nesting job can be generated different NC files, according with the selected post processor.

A new post processor can be customized according with your controllers machine settings. For post processor settings details, please refer to chapter *7.3 Settings & Customization*.

Steps involved:

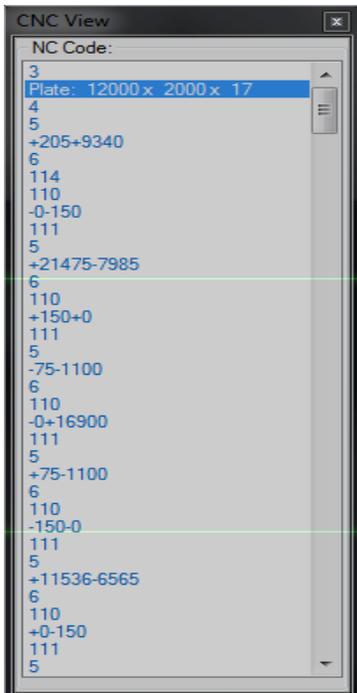
1. Select the post processor file from Tools->Preference->Post Processor tab; you can change the settings as necessary;
2. Generate the NC code from Generation menu functions;
3. Save the NC code with File->Save NC code function or with  button.



8.3 View NC code & simulation

View NC code:

After successfully complete the post processing, you can view the NC code machine instructions from View->CNC Code function or with  button. A new list window with NC code instructions will appear.



A short preview of the NC code will be shown in the simulation toolbar as well:



Simulation:

NC simulation steps through the generated NC code to observe the NC sequence. The NC path must be generated before starting the NC simulator. Use the following procedure to simulate the NC path:

1. Activate the simulation mode *with View-> Simulate* menu function or with clicking on  button; Simulation toolbar function will be activated:



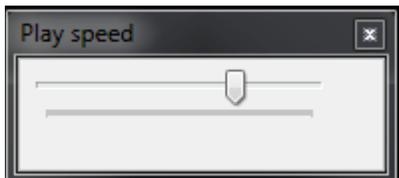
The following options are available:

- a. Play
 - b. Step
 - c. Stop
 - d. Exit
2. Start simulation of the NC code with “Play” or “Step” button. The processed entity will start highlighted with red color according to machine processes; The corresponding NC code instruction will be highlighted in the NC code list;

NC Code: -100-100

3. Stop the simulation with the “Stop” button as you need: you can analyze the NC code and entities.
4. Exit from simulation mode with “Exit” button.

You can speed UP anytime the simulation from the “Play speed” bar:

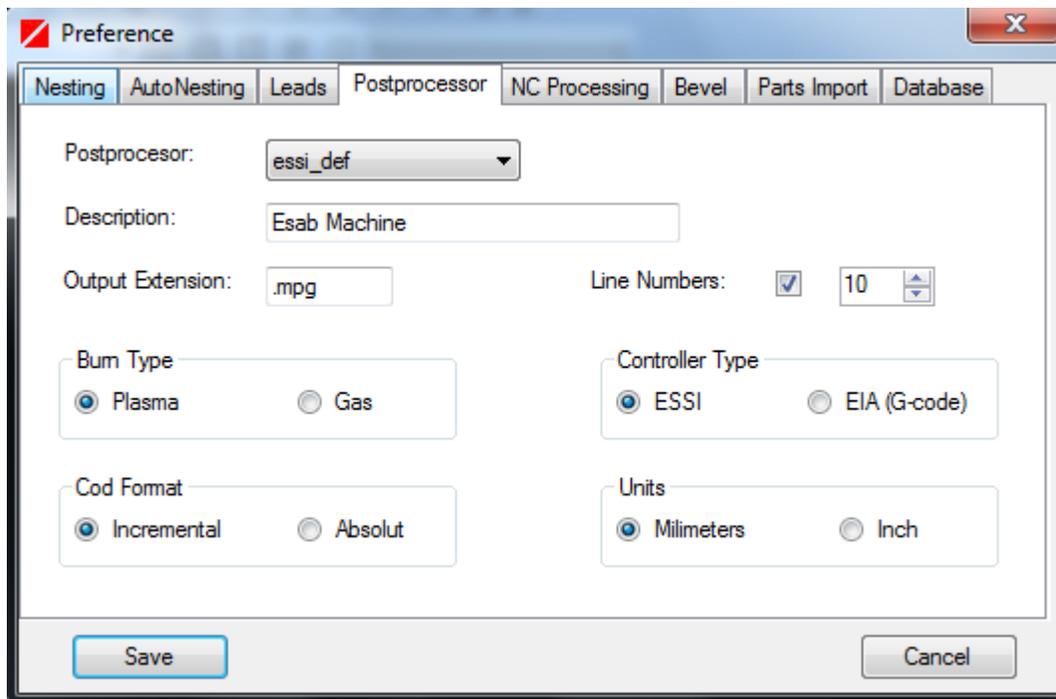


8.4 Settings & Customization

SoftONE-NEST uses a controller code file for every type of controller to handle the variations. You can modify or make your own controller files with any text editor or XML editor or through Preference menu to support any controller.

For creating a new machine XML file, you can copy an existing file with a different name in the “def” folder. You can modify it through **Preference** menu or edit manually the XML file.

Post Processor:



Postprocessor: select the desire postprocessor for output the NC files

Description: edit the description of the postprocessor

Output extension: modify the extension of the NC file

Burn Type: select the cutting type by selecting : Gas or Plasma

Code format Select the code format by clicking Incremental or Absolut

Controller type: Select the output NC code standard by clicking ESSI or G-Code

NC Processing:

Rapid ON - the code to tell the controller to use fast travel for all further movements. Used for ESSI

Rapid OFF- The code to tell the controller to stop a fast travel

Plasma ON The code to tell the controller to use the plasma tool and turn it on.

Plasma OFF The code to tell the controller to use the plasma tool and turn it on.

Gas On The code to tell the controller to use the gas tool and turn it on.

*Gas OFF*The code to tell the controller to use the gas tool and turn it off

MARK_ON -- The code to tell the controller to turn the marking head on. This can be punching, spray paint, inking, or zinc powder marking.

MARK_OFF -- The code to tell the controller to turn the marking head off.

MARKOFFSET_ON -- The code to tell the controller to offset the tool head for the marking head.

MARKOFFSET_OFF -- The code to tell the controller to turn the marking head offset off.

LABELING_ON -- The code to tell the controller to turn on the labeling head.

LABELINGOFF -- The code to tell the controller to turn off the labeling head

KERF_LEFT -- The code used to offset the torch to the left of the cutting path.

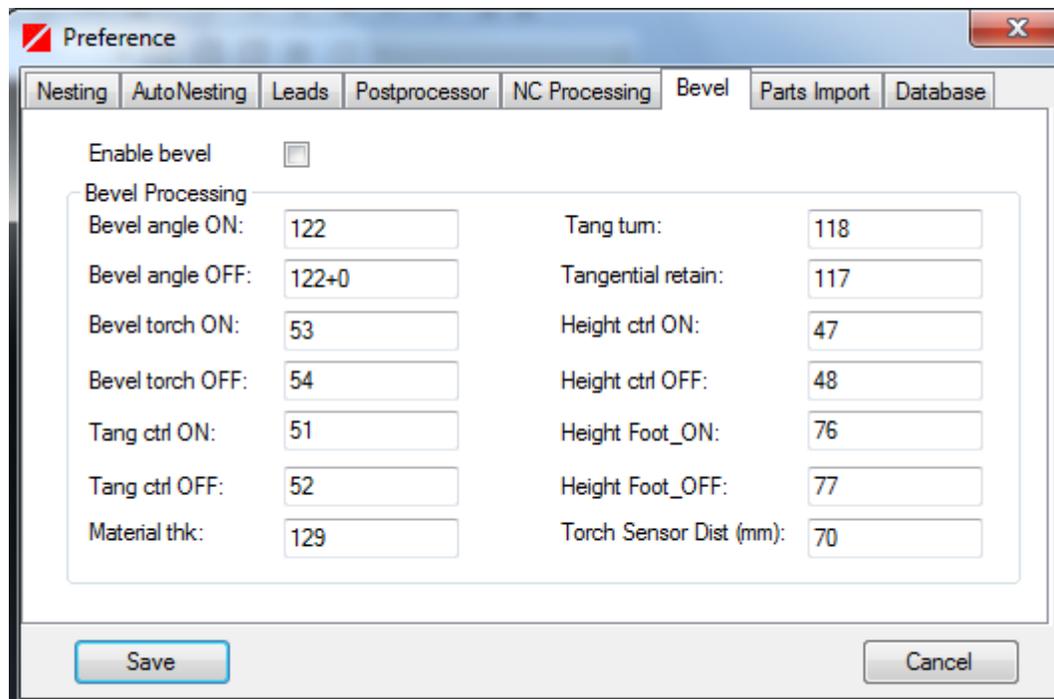
KERF_RIGHT -- The code used to offset the torch to the right of the cutting path.

KERF_OFF -- The code used to cancel the torch offset.

Stop: The code used to stop the machine operations.

Processing settings are used during post-processing when generating the NC code. You can modify the instruction taking into account about the settings of your machine controller.

Bevel:



Bevel settings are used during post-processing when generating NC code with bevel codes. You can modify the instruction taking into account about the settings of your machine controller.

For more information about bevel cutting instructions and settings, please send an e-mail to office@onesoft.ro

9. Nesting sketches & Reports

Production nesting sketch can be generated for all nesting job and contain a sketch of the nesting job together with all production information needed for production workshop.

Reports can be generated for a single nesting job or for a group of nesting jobs. Parts and plates detailed report (Bill of Materials – BOM) is also available.

All sketches and reports can be printed as necessary with the “*File->Print functions*”. A “*Print preview*” function is available for these operations as well.

9.1 Nesting Sketches

9.1.1 Insert nesting sketch

In SoftONE-NEST, the nesting sketch is generated automatically and contains the following production information:

- Nesting name
- Project information
- Plate sheet dimensions
- Material grade
- Production info: number of nested parts, burning length, marking length, idle length, brutto scrap, weights of the nested parts.
- Table with parts position numbers are automatically generated.

For inserting a nesting sketch, the nesting job should be ready.

Steps involved:

1. Generate the NC file from “*Generation->Complete path*” (Marking or Cutting path) functions
2. Insert nesting sketch from *Tools->Nesting sketch->Insert Form* or from  button
3. Select the template form from the Sketch lists and click “Insert” button

SoftONE-NEST will change automatically to “Nesting sketch” mode workspace. You can easily switch from “Nesting sketch mode” to “Plate nesting mode” with

 or from *Tools->Nesting sketch->Toggle sketch/plate* function.

4. Save the nesting job for storing the sketch in the database.



9.1.2 Edit the nesting sketch

After generate the nesting sketch, you can add your own information according with the production workshop needs.

For editing the information a sketch, you should go into Nesting sketch mode by

clicking on  button,

A new nesting text toolbar will be available:



Available functions:

Insert text 

Steps:

1. Click on the insert text button  or *Edit->Text->Insert function*
2. Input the text; Press OK.
3. Place the text in the sketch area according with your needs.

Move text

Steps:

1. Click on the move text button  or *Edit->Text->Move function*
2. Select text; the text will be attached to the mouse pointer and you can freely move the text.
3. Place the text in the new position according with your needs.

Copy text

Steps:

1. Click on the move text button  or *Edit->Text->Copy function*
2. Select text; the copy of the selected text will be attached to the mouse pointer and you can freely move the new text.
3. Place the new text in the new position according with your needs.

Modify text

Steps:

1. Click on the modify text button  or *Edit->Text->Modify function*
2. Input the text; Press OK.
3. Place the modified text in the sketch area according with your needs.

Delete text

Steps:

1. Click on the move text button  or *Edit->Text->Delete function*
2. Click on the text which want to be deleted;

Change height

Steps:

1. Click on the modify text button  or *Edit->Text->Change-Height function*
2. Input the new height; Press OK.

Change angle

Steps:

1. Click on the modify text button  or *Edit->Text->Change Angle function*
2. Input the new height; Press OK.

9.1.3 Delete a nesting sketch

The nesting sketch can be deleted with “Tools->Nesting sketch->Delete” The operation can be performed only in Nesting plate mode workspace

9.1.4 Creating a Template Sketch

SoftONE-NEST template project comes with some standard nesting sketches template. You can define your own sketch template as follows:

- Open the default SoftONE-NEST dxf nesting sketch with a standard CAD program. The sketch is located in the “Sketches” folder of application.
- You can add your own text or change the company logo according with your company needs. The new text should be placed in the default “TEXT1” layer in order to be visible in SoftONE-NEST

Please note that the **red color** texts act as “keywords”, which mean that the SoftONE-NEST search for those keywords text when generate the nesting sketch. SoftONE use the keywords for automatically adds the production information in the production sketch table.

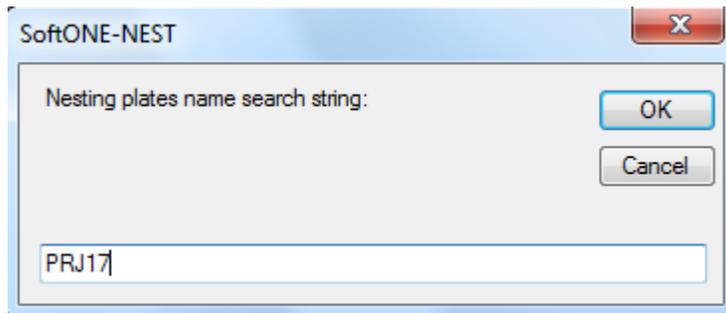
- Save the new modified nesting sketch as DXF giving a new name.
- Start the SoftONE-NEST application;
- Import the nesting sketch in the SoftONE-NEST database with “Tools->Nesting Form->Import to project DB” function

The new nesting form will be available.

9.2 Report, BOM & Nesting Lists

SoftONE-NEST comes with the following standard reports:

1. Nesting plates – generate nesting job list according with the user nest job name filter:



1 of 1 100% Find | Next

Nesting Plates Reports

Name	Length	Width	Thickness	Area	Weight	Qual	Density	Nr Parts	Used%
PRJH1601	12000	2000	16.5	30000000	3885750016	A	0	7	55.4
PRJH1602	10000	2000	16.5	20000000	2590500096	A	0	17	77.1
PRJH1603	10000	2500	16.5	25000000	3238125056	A	0	3	52.9
PRJH1604	10000	2000	16.5	20000000	2590500096	A	0	4	74.6
PRJH1605	10000	2000	16.5	20000000	2590500096	A	0	5	74.7
PRJH1606	10000	2000	16.5	20000000	2590500096	A	0	5	68.6
PRJH1607	12000	2500	16.5	30000000	3885750016	A	0	5	37.2
PRJH1608	12000	2500	16.5	30000000	3885750016	A	0	4	23.1
TEST1	6000	3000	10	15000000	1177500032	A	0	2	27.8
PRJ2001	10000	2000	20	20000000	3140000000	A	0	5	81.7

Report information:

Nesting name, plate dimensions, area, weight, quality, density, number of nested parts, scrap percent.

2. Nesting parts (BOM) –generate BOM list for the nested parts according with the user part name filter:

ReportPartsNested

1 of 3 100% Find | Next

Parts Reports

Proj1

Part Name	Pos No	Block	Area	Thk	WL	Unit	Side	Quality	Weight	Material	Nesting
M1-12-00R-PRJ-C	M1-12-00R	2B25-01C	6.4322	19	M1		C	A	95.8	Steel	
M1-13-00R-PRJ-P	M1-13-00R	2B25-01C	1.4701	17	M1		P	A	19.62	Steel	/PRJ1702
M1-13-00R-PRJ-S	M1-13-00R	2B25-01C	1.4701	17	M1		S	A	19.62	Steel	/PRJ1702
M1-P1-01-00J-PRJ-C	M1-P1-01-00J	2B25-01C	13.6028	25	P1		C	A	266.82	Steel	/PRJ2501
M1-P1-02-00J-PRJ-C	M1-P1-02-00J	2B25-01C	8.1161	25	P1		C	A	159.12	Steel	/PRJ2501
M1-P1-03-00J-PRJ-C	M1-P1-03-00J	2B25-01C	13.3307	25	P1		C	A	258	Steel	
M1-P1-04-00J-PRJ-P	M1-P1-04-00J	2B25-01C	9.3119	25	P1		P	A	182.76	Steel	
M1-P1-04-00J-PRJ-S	M1-P1-04-00J	2B25-01C	9.3118	25	P1		S	A	182.88	Steel	
M1-P1-05-00J-PRJ-P	M1-P1-05-00J	2B25-01C	9.6857	25	P1		P	A	189.74	Steel	/PRJ2501
M1-P1-05-00J-PRJ-S	M1-P1-05-00J	2B25-01C	9.6856	25	P1		S	A	189.83	Steel	

Report information: Part name, position number, block, unit, part area, part weight, thickness, working location, side, material grade, nesting information. All reports data can be exported to Microsoft Excel or Adobe Acrobat pdf format for easy data sharing across the company departments.

Note: Other customized reports can be deployed upon request according with the customer needs.

- SoftONE-NEST Report generator can be used for generation of a customized Bill of Material .csv files. The user should select the desired csv file columns and the column order, as well as the file name and location. Finally, generate button  should be pressed. Available columns are: Part name, part position number, number of pc(s), Nesting name, part unit, part area, part thickness, part side, part quality, part block and weight.

Reports Generator

Output Parameters:
 Output Path: C:\ File name: BOM1

Report Filters:
 Parts name: % Thickness: 0

Parameters...

Available Fields :	Selected fields :
PartName	
Pos	
Pcs	
Nesting	
Unit	
Area	
Thickness	
Side	
Quality	
Block	
Weight	

ADD =>

<= REMOVE

Progress...

Two reports are generated automatically: **Parts reports** and **Plates report** which include the nesting job status.

1	PartName	Pos	Pcs	Nesting	Unit	Area	Thickness	Side	Quality	Weight
2	RSN134-UNIT12-12-018	P-12-018	18	/RD08A03/RD08A15/	RSN134-UNIT12	0.20968	8		A	13.16789
3	RSN134-UNIT12-12-009	P-12-009	1	/RD09A16/	RSN134-UNIT12	30.7794	9		A	2174.565
4	RSN134-UNIT12-12-010	P-12-010	1	/RD09A17/	RSN134-UNIT12	30.7794	9		A	2174.565
5	RSN134-UNIT12-12-011	P-12-011	1	/RD09A18/	RSN134-UNIT12	30.7794	9		A	2174.565
6	RSN134-UNIT12-12-012	P-12-012	1	/RD09A01/	RSN134-UNIT12	29.5864	9		A	2090.279
7	RSN134-UNIT12-12-013PS	P-12-013P	1	/RD09AH3604/	RSN134-UNIT12	4.566221	9		AH36	322.6035
8	RSN134-UNIT12-12-013SR	P-12-013S	1	/RD09AH3604/	RSN134-UNIT12	4.566199	9		AH36	322.602

1	Name	Thickness	Width	Length	Quality	Scrap	Burning Length	Status
2	RD08A03	8	2000	12000	A	20.1	120487.9609	In Production
3	RD08A15	8	2000	12000	A	20.1	120487.5781	In Production
4	RD08A16	8	2000	12000	A	20.2	120424.2656	In Production
5	RD08A17	8	2000	12000	A	20.2	120781.7031	In Production
6	RD08A18	8	2000	12000	A	20.2	120454.8828	In Production
7	RD08A19	8	2000	12000	A	20.1	120683.4766	In Production
8	RD09A16	9	2600	12000	A	0.8	29030	In Production
9	RD09A17	9	2600	12000	A	0.8	29030	In Production

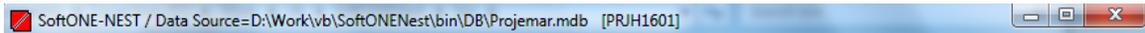
10. Appendix

Introduction

This section explains the individual menu commands.
The user interface consists of several bars and windows:

- Title bar
- Menu bar
- Toolbar
- Parts Explorer tree view
- Display window
- Information window

Title bar



The narrow bar at the top of the screen displays the database name and location and the current nesting job.

Information Window:

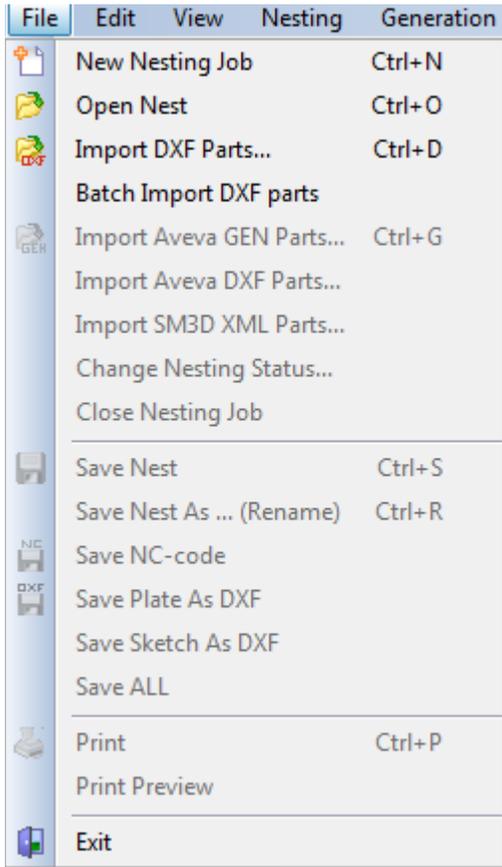
Display the production information:



The following information are available:

- Nesting dimensions
- Nesting Quality
- No of Parts
- Idle length
- Burning length
- Marking length
- Labeling length
- Coordinates of the current mouse point on the screen.

10.1 FILE Menu



New Nesting job

Initiate a new nesting job. For this operation, the user should input the plate sheet name, dimensions and material quality.

Open Nesting job

Open a nesting job from the current project nesting database. The current project database can be changed from “Tools->Preference” menu as necessary.

Import DXf Parts...

Import a part drawing DXF file into SoftONE-NEST nesting parts database. Nesting jobs deals with nesting parts entities, so you should first create the parts before start a nesting job.

Import Aveva gen Parts

Import Aveva GEN parts data file format (.gen) into SoftONE-NEST nesting parts database

Import Aveva DXF Parts

Import Aveva DXF plane parts data file format (ppanparts dxf file) into SoftONE-NEST nesting parts database

Import SM3D xml parts

Import Smart Marine 3D XML: parts data file format into SoftONE-NEST nesting parts database

Change Nesting Status

Change the current nesting job status: *pending, complete, in production*

Close Nesting

Close current nesting job

Save Nest

Save current nesting job in the database project

Save Nest As...

Save as different name the current nesting job. This operation rename the current nesting job as a different name.

Save NC code

Save machine NC code to disk.

Save Plate as DXF

Export current nesting job to DXF file format. The resulted DXF file will contain dedicated layers and colors according with machine processes.

Save Sketch as DXF

Export current nesting sketch as DXF file format.

Save ALL

Save All saves as an NC code file and nesting job with "one click" (with the appropriate file extensions).

Print

Print the current nesting job/nesting sketch, according with the current workspace mode.

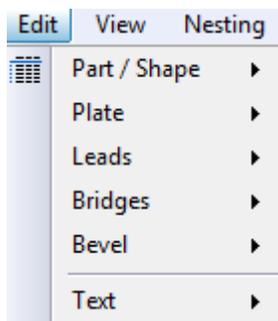
Print Preview

Preview the the current nesting job/nesting sketch before printing. You can print it directly from the print preview window.

Exit

Exit from SoftONE-NEST application.

10.2 EDIT menu



Part/Shape - Functions:

Transform Perform a part geometrical transformation in the current nesting job:

Delete Remove a part from current nesting.

Properties show the part production information

Plate – Functions:

Exchange Raw Plate: Change the plate material dimensions, quality and thickness for the current nesting job

Leads - Functions:

Change: interactive change the lead angle and/or the lead length. :

Delete all leads: delete all starts from the current nesting;

Bridges

Insert: Add a bridge between 2 nested parts

Delete: Delete a single or all bridges in the current nesting job.

Automatic: Add bridges between parts in the nesting job.

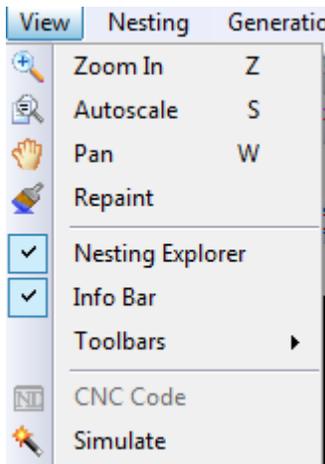
Bevel:

Perform bevel operation on the selected part.

Text: Nesting Sketch Functions:

Insert: Insert a text;
Move: Move a text to a new position;
Copy: Copy a text row;
Modify: Change the text contents;
Delete : delete a text;
Change: change a height or angle of text.

10.3 VIEW Menu



Zoom IN

Zoom magnifies a selected area. Select the area by dragging a zoom window enclosing the area to magnify (the hot key for this function is Z).

Pan

Pan moves the drawing about the screen (hot key W).

Zoom All

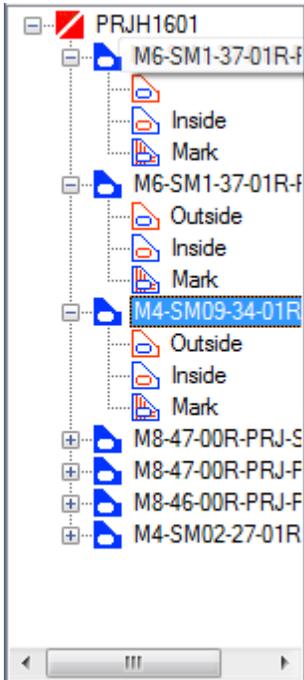
Zoom All displays the entire drawing on the screen (hot key A).

Repaint

Refresh the current drawing.

Nest Explorer:

Show or hide the part explorer tree view which contains detected nested parts.



Info bar

Show or hide the info bar situated at lower bottom side

Toolbars

Show or hide the application Toolbars : Standard Toolbar, NC Information Toolbar, Transform Parts Toolbar, Text Toolbar

CNC Code

Bring a new window on the screen with NC code for easy visualization of NC Code

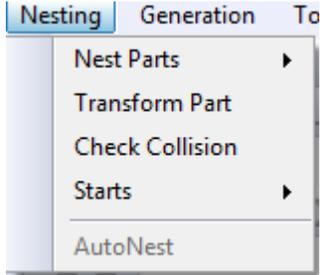
Simulate

Simulate the machine paths on the screen:



Play, Stop, Step toolbar buttons are available for easy analyzing of NC code.

10.4 NESTING Menu



Nest Parts Functions:

- **By Name:** Get the parts from database for nesting. Part filters can be used for a fastest part selection.
- **From Part Explorer:** Parts can be selected from nesting a part explorer list. Get the

Transform Part:

Select parts for applying geometrical transformation or BUMP translation.

Check Collisions

Check the interference between parts in the current nesting job

Start - Functions:

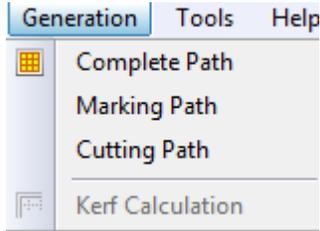
Automatic: Add leads In/Out to all nested parts in the current nesting .automatically.

Burn: Add a single burning start to a nested part in the current nesting.

Autonest:

Start auto nesting function which perform automatic nesting of the parts selected in the parts explorer list.

10.5 GENERATION Menu



Complete path

Generates the NC code with optimization of the machine paths. This operation runs the SoftONE-NEST post processor for automatic generation of the NC code for the current nesting.

For more information see “NC code generation” chapter.

Marking Path

Similar with “Complete path” but generate only the marking paths.

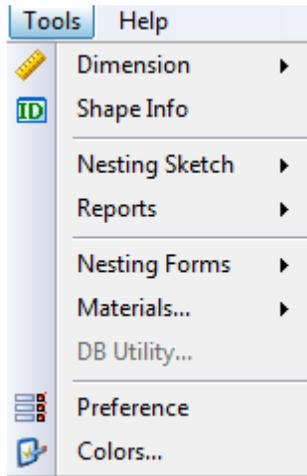
Cutting path

Similar with “Complete path” but generate only the burning(cutting) paths.

Kerf Calculation

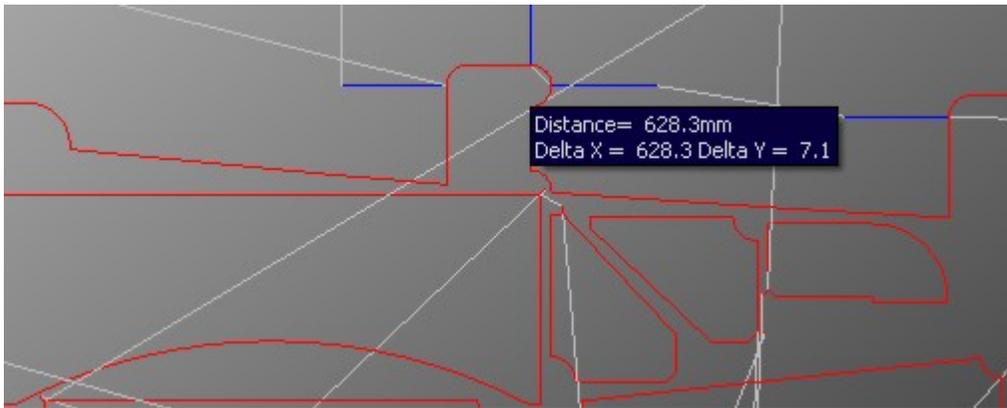
Generate the tool offset path. This function creates a parallel contour for all geometries on the cutting layer at specified kerf value. The parallel tool offset contour will be calculated for the input kerf value divided by 2.

10.6 TOOLS Menu



Dimension : Distance

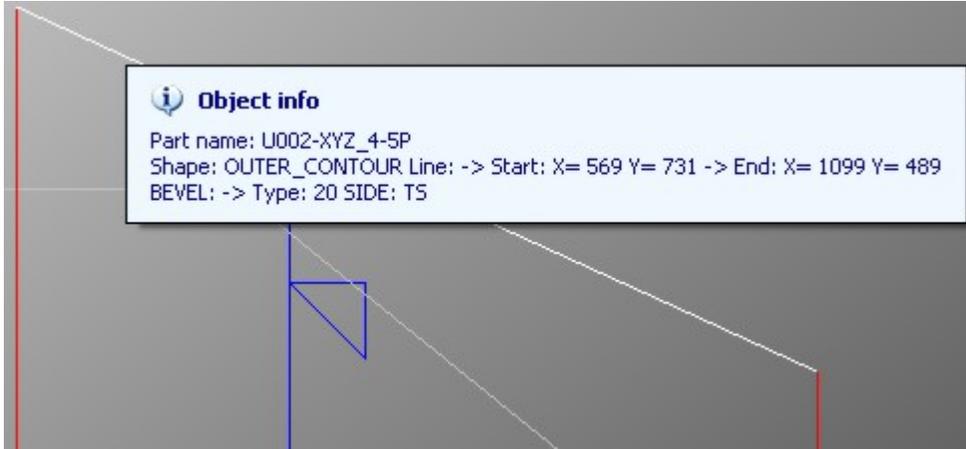
Perform a distance calculation between 2 points.



Information displayed: distance between points in mm, delta X, delta Y.

Shape Info

Show information about selected object in a “InfoTool” window. First, user must select a geometry.



Information displayed: Part name, shape type, Start/End Points, Bevel type/side

Nesting Sketch

Insert: Generate a sketch for current nesting. Toggle button between plate and sketch can be used for easy display of the nesting plate or drawing sketch.

Delete: Delete the current nesting sketch

Toggle Sketch/Plate : Show the nested plate or sketch on the main application window

Reports :

Launch the reports generator:

Nesting plate report: generate the nesting plate list;

Nested parts report: generate Bill of Materials report (BOM);

BOM – Generate Bill of Materials in csv file format.

See the Nesting Sketch & Reports chapter for details.

Nesting Form:

Import a customized user DXF nesting sketch into SoftONE-NEST database.

Material

Quality Density: Add or edit the materials qualities and densities;

Parts Inventory: Store a part list with necessary parts quantities;

Plates Inventory: Stores a list of all the plates stored at the facility.

DB Utility

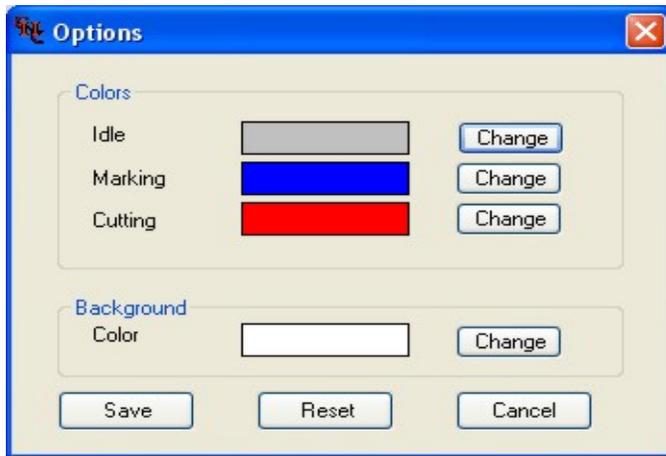
Launch the DB Utility Admin tool

Preference:

Show the application preference window for change the application and controller settings.

Option

Show the option settings window.



Idle : change the color used for display on the main screen for idle geometries layer.

Marking : change the color used for display on the main screen for mark geometries layer.

Cutting : change the color used for display on the main screen for cutting geometries layer.

Background : change the color used for background main screen color

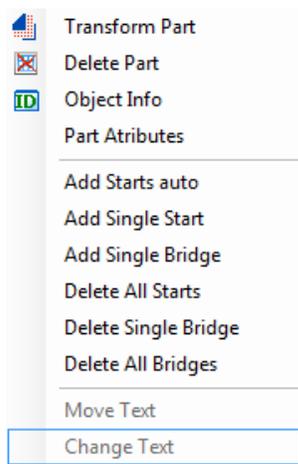
HELP Menu

Launch the application help file.

10.7 CONTEXT Menu

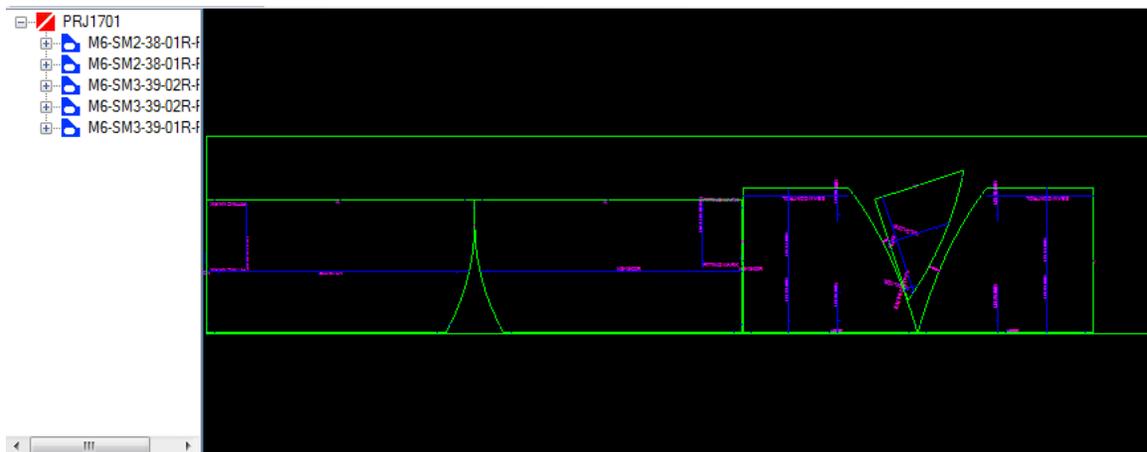
“Context menu” functions can be accessed using a mouse right click in the main application window. No new functions are implemented here. Each context menu function represents a shortcut to specific menu item. The icon used for each item is shown also in the menu and corresponding toolbar items.

Please note that depending of the current work space (nest or sketch) some functions are not available.



Main Display Window – Work Space:

The large center window displays the geometry of the path. The left tree view control show the nested parts. Colors are used to distinguish between the different functions of the geometric entities.



10.8 TOOLBARS

The tool bars are located, by default, at the top of the screen underneath the Pull-down Menu. Their positions can be rearranged around the edge of the graphics area by dragging them to the desired position.



Each button represents a shortcut to a menu item. The icon used for each toolbar is shown also in the menu at the corresponding function.

*Please note that the parts **geometric transformation** and **BUMP** toolbar functions are available only in the corresponding toolbars.*

A tool tip (a text message that describes the function of the button) appears if you rest the cursor over a button for a short time
