

T·FLEX Nesting17

USER MANUAL

OPTIMIZATION OF SHEET MATERIAL NESTING



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General Provisions

Introduction

Optimal nesting of materials is the most important task of the procurement production. T-FLEX Nesting program is an application for the T-FLEX CAD program and is designed to automate a nesting of sheet materials for various types of nesting. The program accurately and quickly calculates the parts nesting layout in such a way that the remnants of the material are minimal. Nesting layouts can be exported as a T-FLEX CAD drawing and used to prepare programs for CNC machines. For example, they can be used when working with the program T-FLEX CAM 2D, which creates control programs for processing parts in two-dimensional geometry.

Materials

	Description	Parts Nested	Sheets Used	Utilization
1		92/115	1 / 1	0,5720

Sheets

	Description	Sheet No	Material	Number	Utilization
1	Sheet	C2D-St5		1	0,5720

Parts

	Description	Part No	Quantity
1	Part 1		38
2	Part 2		4
3	Part 3		50

Elapsed Time: 00:00:00

Example of true-shape nesting layout

The following types of material nesting exist in the T-FLEX Nesting:

- **linear nesting** - nesting of sheets in whips;
- **guillotine nesting** allows to obtain optimal nesting layouts of sheet material using through cuts. The required parts can be a rectangle shape;
- **true-shape nesting** allows to obtain optimal nesting layouts of sheet material. The required parts can be of any arbitrary shape.

The main criterion for optimization of the received nesting layouts is material utilization ratio, which shows the production efficiency.

Nesting can be used for various types of sheet materials:

- glass;
- metal;
- wood;
- plastics, etc.

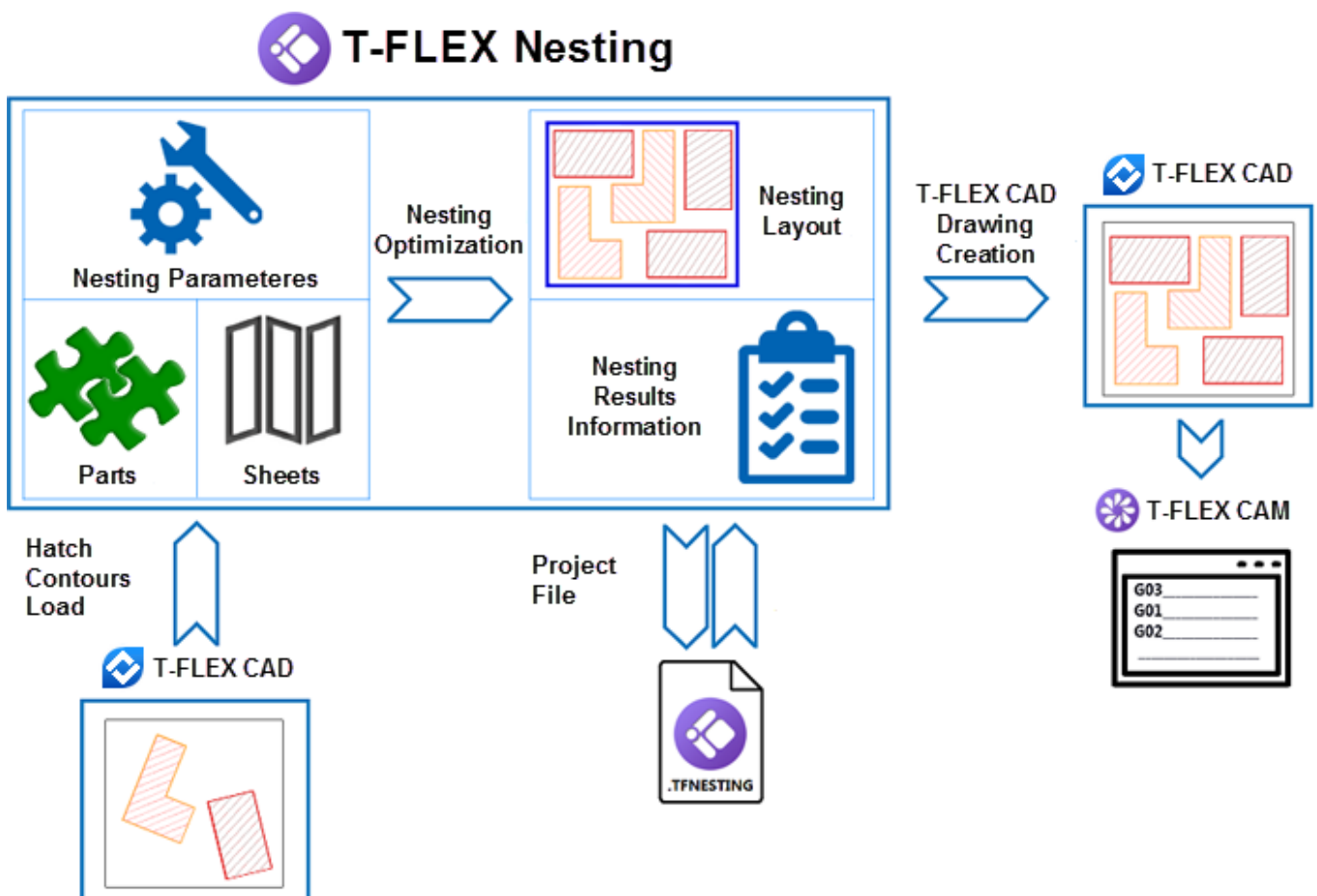
The main users of the system are the following specialists:

Normer - uses the product for normalization of the nesting operations. The main parameter is material utilization ratio.

Technologist - uses the product to obtain optimal nesting layouts and create a documentation.

Nesting Project Structure

The work in the program is carried out within the framework of the nesting project. The nesting project combines the initial data, the nesting parameters and the results of the calculation of the optimal nesting. The nesting project is created separately for each type of nesting. Set of parameters and geometry differs for each of the project types.



T-FLEX Nesting Functionality

Hatch contours, downloaded from one or more T-FLEX CAD drawings, can be used in the program as data for parts and sheets. Moreover, parts and sheets overall dimensions may be set manually in the program interface. Number of parts and sheets in the project is not limited.

Sheets with defects may be set for the guillotine nesting in the program. A defect is a rectangular area of a certain size and position on the sheet. The program performs calculation taking into account the existing defects. It is possible to set a certain number of parts "to stock" for guillotine nesting to provide a stock of the most demanded parts.

You can setup general settings related to the calculation algorithm (part to sheet distance, part to part distance, usable remnants sizes, allow parts inside other parts, solver optimization level, etc.) in the project parameters.

As a result of the calculation the program generates:

- Layouts of optimal nesting with the ability to display cuts and material remnants, the value of the material utilization ratio for each sheet. The resulting nesting layouts can be exported to the T-FLEX CAD for further analysis and creation of documentation;
- Summary information about nesting: the number of specified and nested parts and used sheets, the values of material utilization ratio and effective material utilization ratio taking into account the usable remnants.

There is associative relation between the contours of parts and sheets in the nesting project and their initial geometry in the T-FLEX CAD drawing. Due to this relations, the corresponding contours of parts and sheets in the nesting project can be updated when changing the hatching contours in the drawing. The update is done manually, which makes it possible to take into account changes in the original geometry, when it is necessary.

The program allows you to save the nesting project in a separate file to allow subsequent use of the nesting project data.

Comparison of T-FLEX Nesting functionality for different types of nesting:

Functionality	Linear Nesting	Guillotine Nesting	True-shape Nesting
Initial data and nesting results			
Nesting of long parts ("in whips")	✓		
Nesting of rectangle sheets		✓	✓
Nesting of arbitrary shape sheets			✓
Manual addition of parts and sheets from T-FLEX CAD interface	✓	✓	✓
Loading parts and sheets from T-FLEX CAD (manually or from a file)		✓	✓
Using of rectangle and arbitrary shape parts		✓	✓
Manual reallocation of parts on the nesting layout		✓	✓
Specify part to part distance for managing usable remnants			✓
Reports creation	✓	✓	✓
Export of the nesting layout to T-FLEX CAD for documentation creation	✓	✓	✓

Functionality	Linear Nesting	Guillotine Nesting	True-shape Nesting
Nesting parameters			
Parts rotation		✓	✓
Parts inside other parts			✓
Accounting usable remnants	✓	✓	✓
Assigning parts to stock	✓	✓	
Accounting sheets defects		✓	
Strategies for parts layout on sheets			✓

Terms and Abbreviations

Parts. In T-FLEX Nesting system parts are elements that should be placed on the sheets. For some parts further processing after nesting may not be required. In this case such parts are semi-finished products.

Nesting layout is the result of nesting parts on the sheets in the T-FLEX Nesting.

Nesting pattern is a technological document created on the basis of the nesting layout exported into T-FLEX CAD.

Remains are everything that remains after the separation of parts from the sheet. There are two types of remnants: **waste** (filings, small elements) and **usable remnants** that can be used in other nesting projects.

Usable remnant - the term is used for production remnants, which can later be used for the production of smaller parts. Dimensions of sheets to be considered as **usable remnants** are assigned by the user.

Nesting "to stock" - is used for nesting an additional number of parts to provide a stock of the most demanded items.

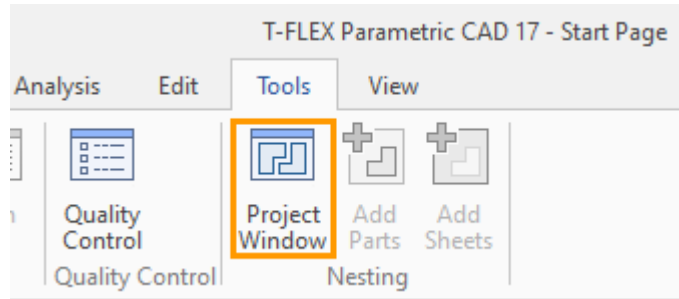
Utilization - material utilization ratio.

PC - product composition T-FLEX CAD.

T-FLEX Nesting Fundamentals

Launching the Program

Running T-FLEX Nesting is carried out from the T-FLEX CAD program window. The program commands are located on the **Tools** tab in the **Nesting**.

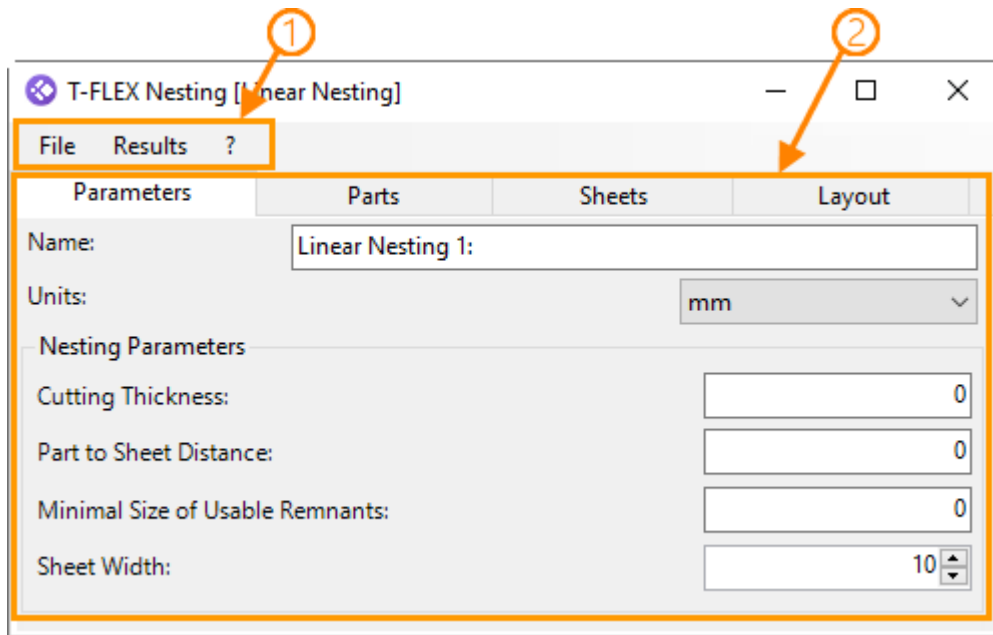


Launching the T-FLEX Nesting program

For the legacy interface, start by using the **Tools > Nesting > Project Window** command.

Program Window

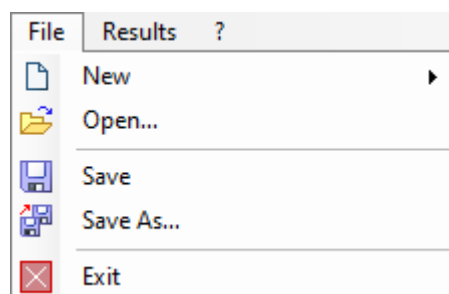
The program window consists of a toolbar and a workspace.



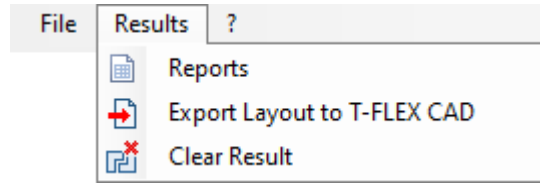
1 - Main Menu; 2 - Workspace

The **Main** menu contains commands for project and results management.

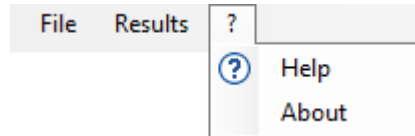
The **File** menu allows you to create, open, and save projects.



The **Results** menu allows you to use the calculation results, in particular, to export nesting layouts to the T-FLEX CAD.



The menu ? allows you to get help and information about the program.



The Workspace contains a set of tabs:

- The **Parameters** tab is intended for setting nesting parameters.
- The **Parts** tab is used to manage the list of parts for nesting and their parameters.
- The **Sheets** tab is used to manage the list of sheets and their parameters.
- The **Layout** tab contains the calculation results: preview of the optimal arrangement of parts on the sheet and information on the results of nesting.

Saving of the Nesting Project

Project settings, lists and parameters of parts and sheets, as well as calculation results are saved for a specific project and written to a file with the extension **.tfnesting*.

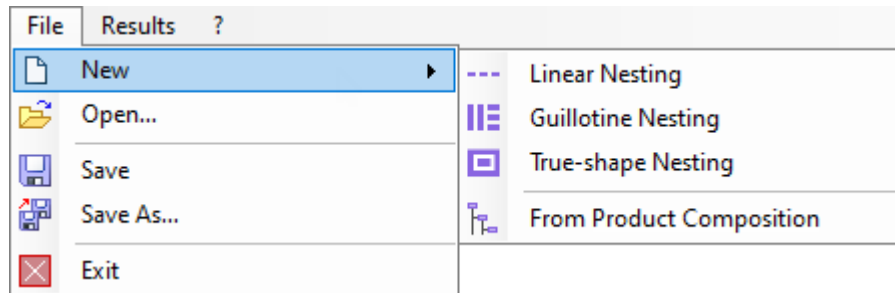
Select **File** from the main menu. When saving for the first time, select **Save As**, specify the directory and enter the filename, confirm the save. When you use the **Save** command, changes will be saved to the current saved file.

To open the saved file select **File > Open**.

If you open another project, the current project will be closed. All unsaved changes will be lost.

Nesting Parameters

The program allows you to create nesting layouts for different nesting types. To create a new project, choose **File > New** from the document menu and specify the nesting type. The selected type determines nesting parameters that are set on the **Parameters** tab.

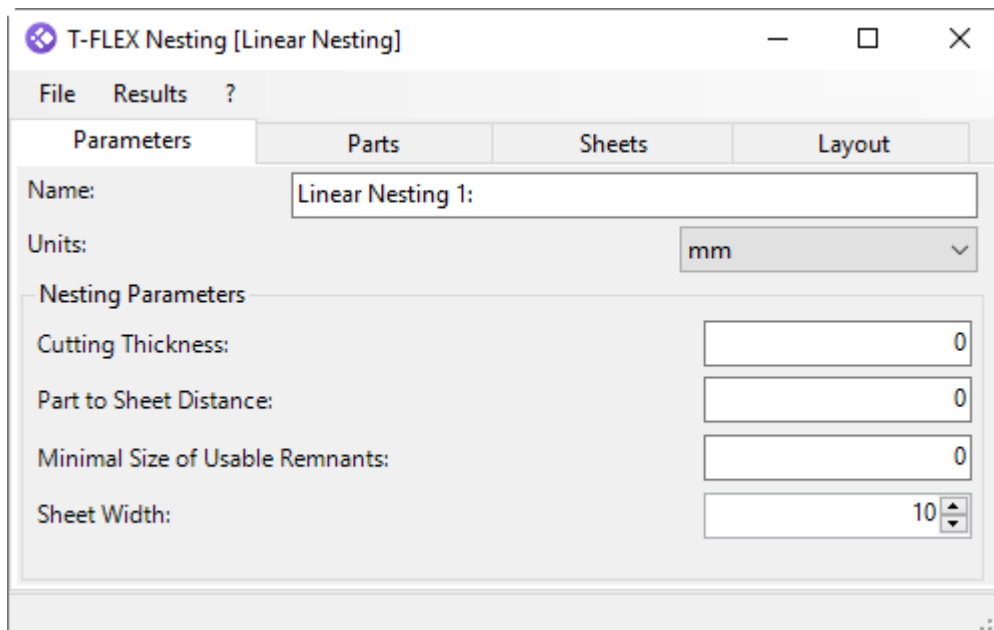


Common parameters for all types of nesting include:

- **Name** - field for entering the name of the current project (user comment).
- **Units** - parameter for setting the units of measurement used in the project. It allows you to use models that are created in different units. The units are taken into account when we import and export data from and to T-FLEX CAD. I.e. if the project is in meters in T-FLEX Nesting, then when you transfer data to T-FLEX CAD units will be converted to millimeters.

For **Linear Nesting** is characterized by the following parameters:

- **Cutting Thickness** - the gap between the parts as a result of the nesting.
- **Part to Sheet Distance** - the value of the minimum allowable distance between the edge of the sheet and the contour of the part.
- **Minimal Size of Usable Remnants** - the smallest size of sheet remnants, which will be considered to be usable remnants.
- **Sheet Width** - the width for all sheets in the project for the proportional display in the preview window.

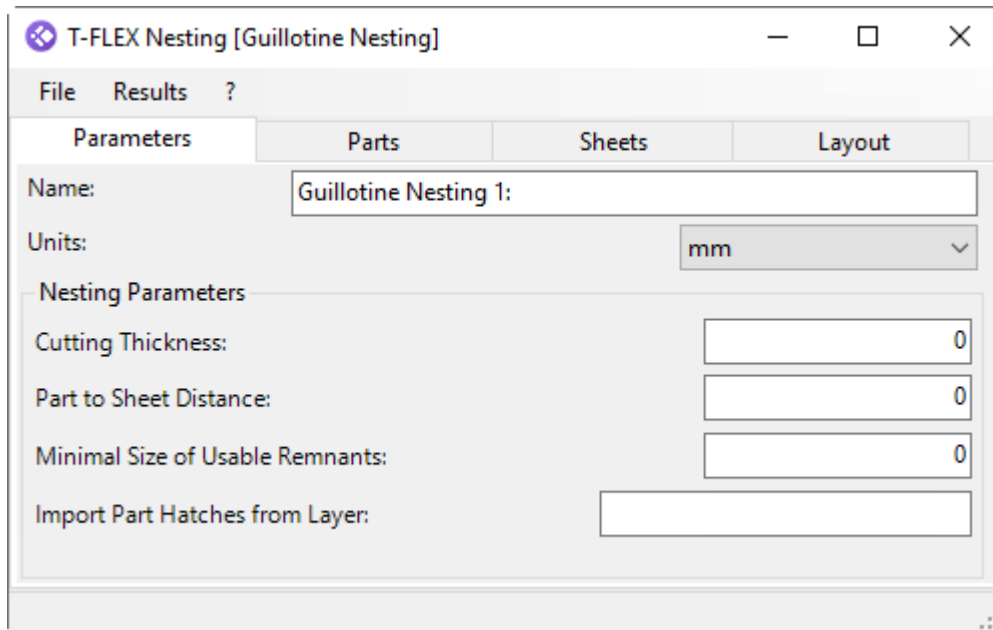


For **Guillotine Nesting** is characterized by the following parameters:

- **Import Part Hatches from Layer** - parameter for specifying the name of the layer, all hatches from which will be imported to T-FLEX Nesting as parts. A layer with this name must be

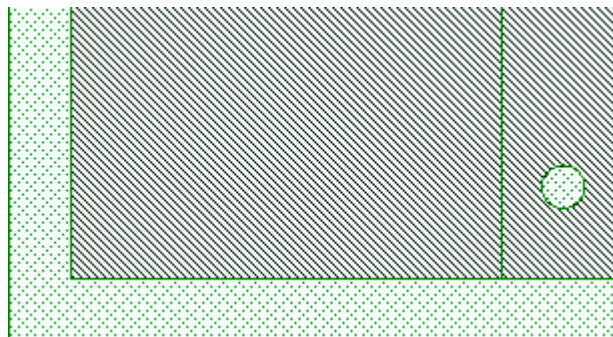
created in the T-FLEX CAD document, and all hatches for the nesting project should be placed on it.

The parameters [Cutting Thickness](#), [Part to Sheet Distance](#), [Minimal Size of Usable Remnants](#) are similar to the corresponding parameters of **Linear Nesting**.

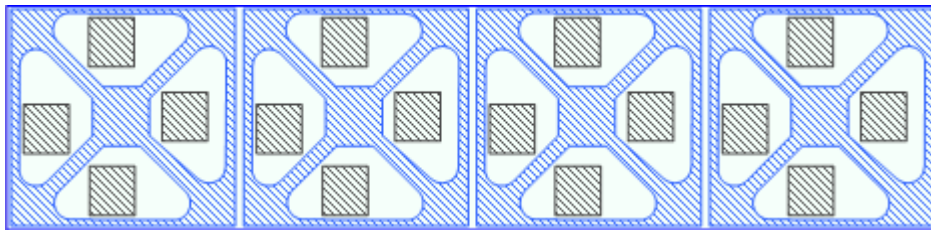


For **True-shape Nesting** is characterized by the following parameters:

- **Part to Part Distance** - the distance between the parts to be cut.
- **Part to Sheet Distance** - minimum distance of parts from the edges of the sheet. If the sheet has a cavity, then this space is also indented.

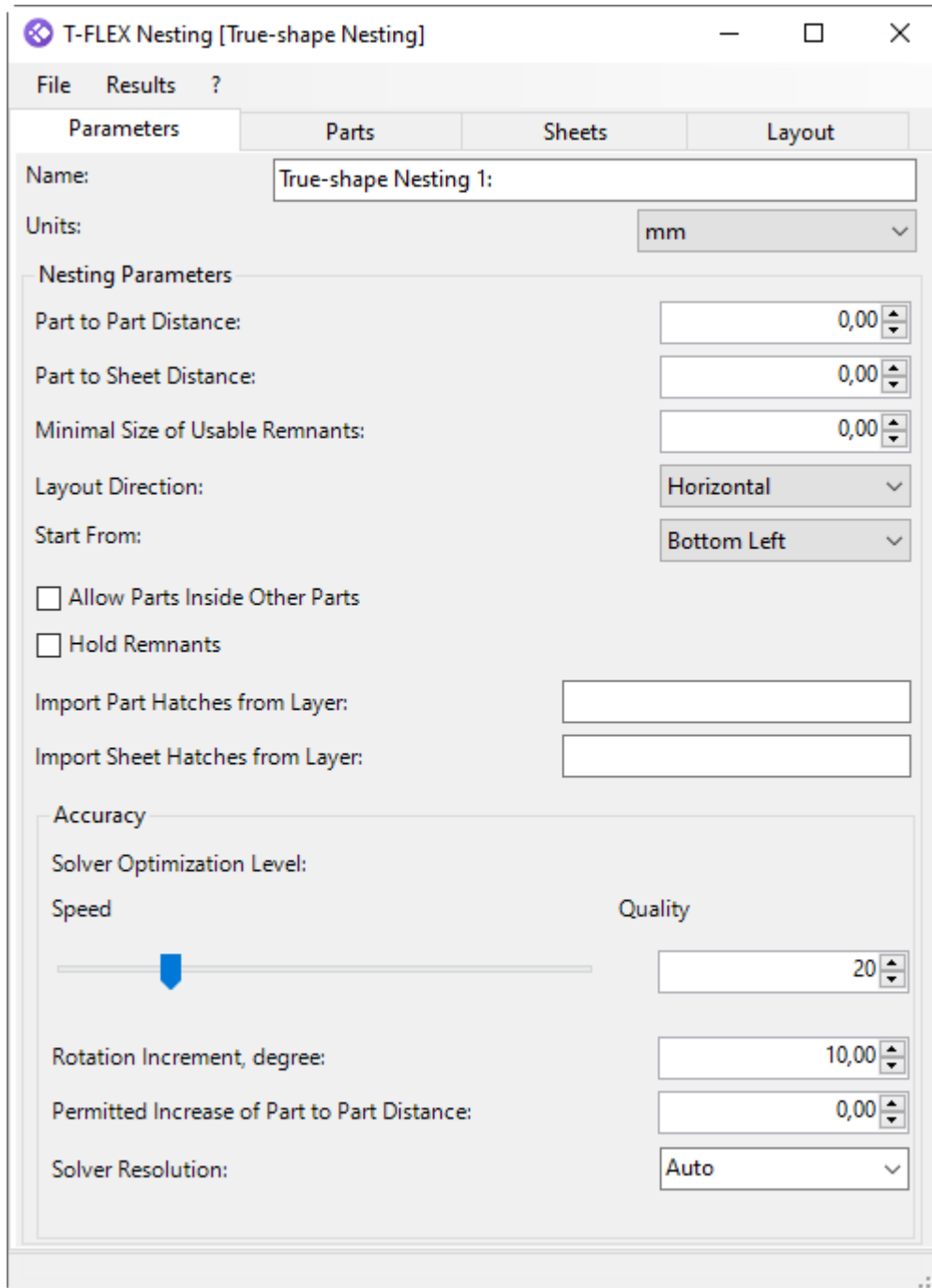


- **Minimal size of usable remnants** - the minimum size at which the remnant will be considered usable. All the remnants are displayed on the nesting layout, and their sizes are displayed when you hover the cursor. When changing the parameter value, the layout and information in the reports are updated without recalculation.
- **Layout Direction** - parameter to select the direction for parts layout (**Horizontal** or **Vertical**).
- **Start From** - the angle from which the layout will start.
- **Allow Parts Inside Other Parts**. If the parameter is active, it is allowed to place small parts inside large parts when nesting. Used to increase the value of material utilization ratio.



Nesting layout with placement of small parts inside other parts

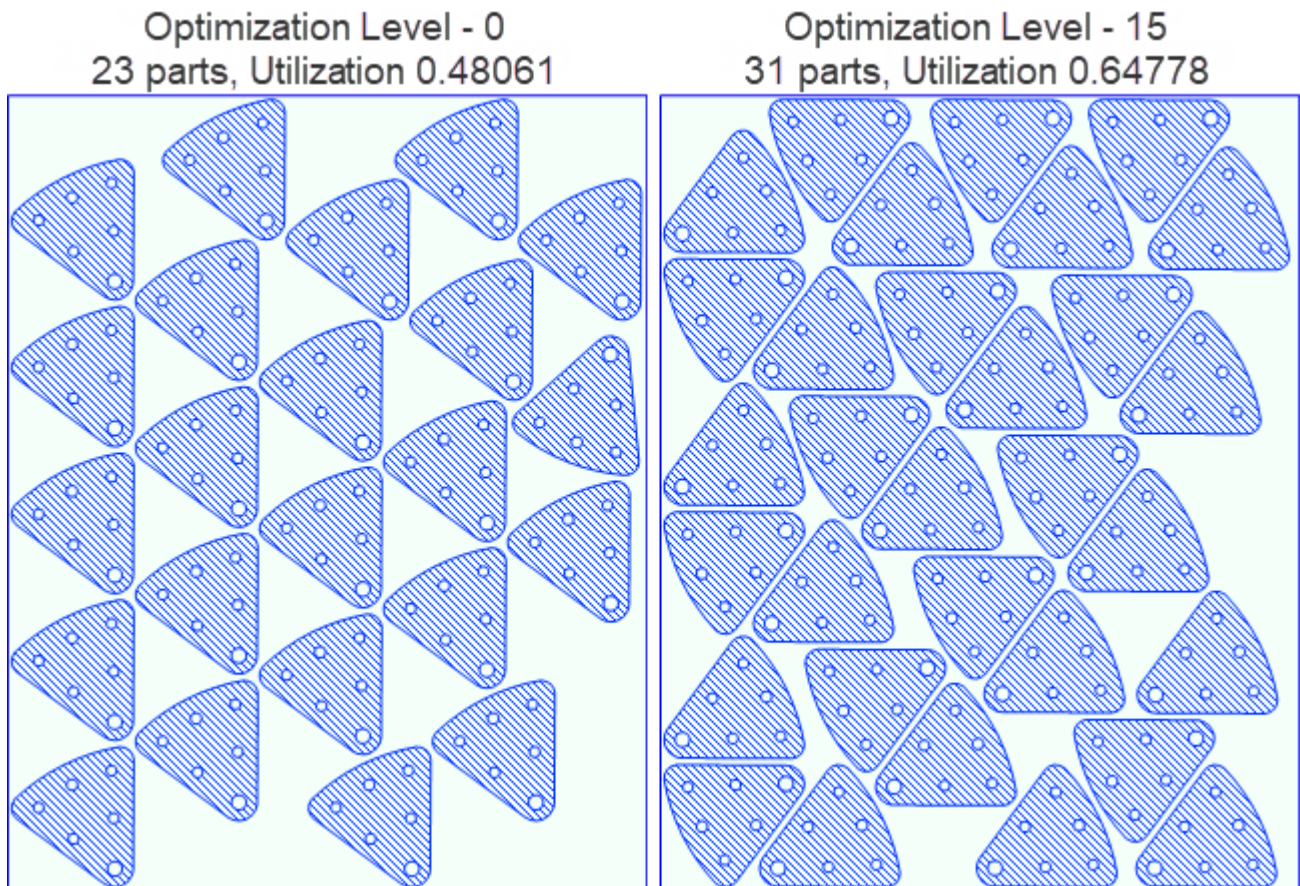
- **Hold Remnants.** Accounting for remnants in the project is optional. With this option enabled, the reports will record remnants, the size of which is set by the **Minimal Size of Usable Remnants** parameter. When the option is disabled, remnants is not recorded.



- **Import Part/Sheet Hatches from Layer** - the name of the layer, all hatches from which will be imported to T-FLEX Nesting as parts/sheets. Layers with these names must be created in T-FLEX CAD document and the corresponding hatches must be placed on them.

The **Accuracy** group contains a set of parameters for controlling the Nesting layout:

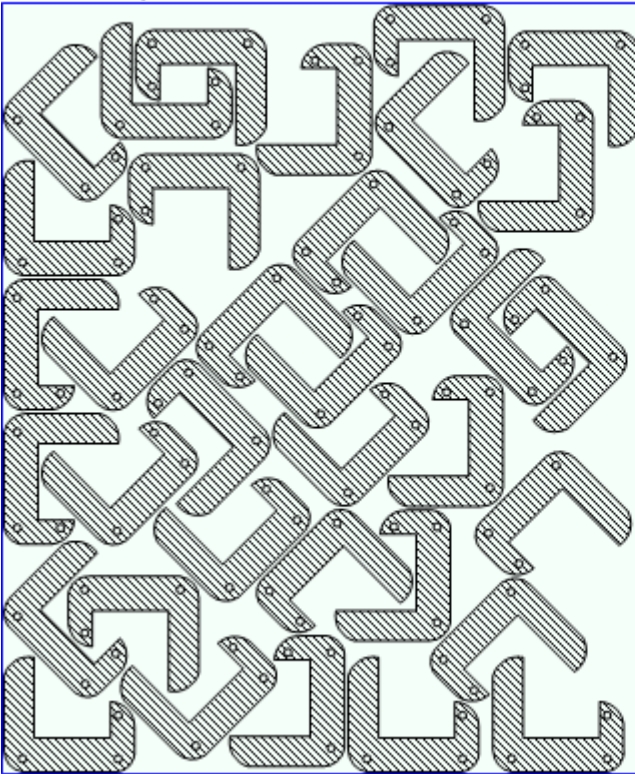
- **Solver optimization level.** The value can be set from 0 to 100. The higher the value of the parameter, the more variants for the estimated placement of the part the program will calculate for achieving the optimal nesting, but the slower the calculation will be performed. In most cases, a value from the range [5..20] is sufficient.



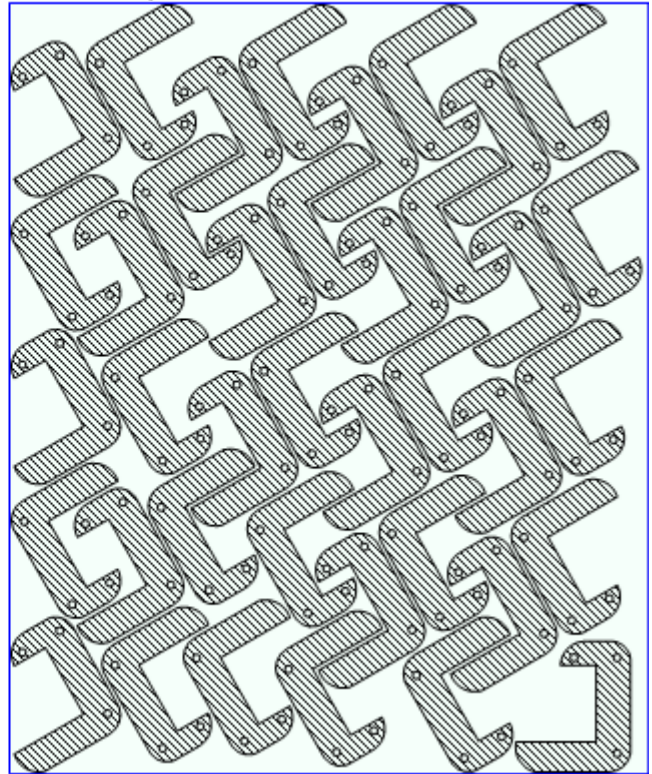
Nesting results at different optimization levels

- **Rotation increment** - step of the rotation angle of parts. The ability to rotate certain parts is set on the **Parts** tab.

Rotation Increment = 45 degree
35 parts, Utilization 0.49757



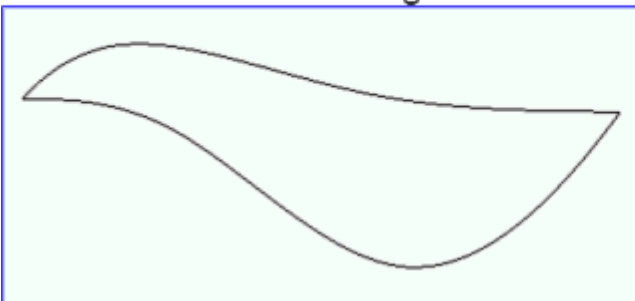
Rotation Increment = 5 degree
39 parts, Utilization 0.53903



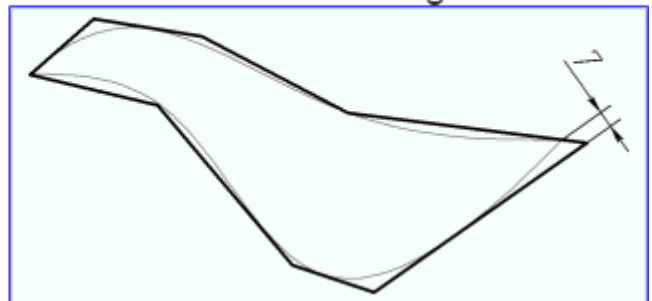
Nesting results at different steps of the rotation increment

- Permitted Increase of Part to Part Distance** - parameter that controls the degree of approximation of the original geometry within the nesting project. For example, at a value of 0 mm, the contour of the part will be used without approximation, regardless of the [simplification type](#) set by user. In this case, the number of contour elements will be maximum and will be equal to 150. When the value of the parameter is increased to 7 mm, the contour of the part can be represented in the form of eight approximating segments. In fact, the contour of the part, where the value of the parameter 7 mm is the maximum deviation of the simplified geometry from the original contour, will participate in the calculation.

Permitted Increase of Part to Part Distance - 0 mm,
Number of Contour Segments - 150



Permitted Increase of Part to Part Distance - 7 mm,
Number of Contour Segments - 8



Nesting results with different values of the permitted increase of part to part distance

The geometry is always approximated on the outer side of the contour without intersecting the original one. The part becomes more simple, and the calculation is faster. The **Permitted Increase of Part to Part Distance** parameter affects both the speed of calculation of the calculation and the accuracy of the solution.

Adding Parts

The program allows you to add parts of rectangle and arbitrary shape. The following ways of adding parts the nesting project are possible:

- manually (parts are added one by one in the program interface);
- based on hatches (reading the hatch contours from the T-FLEX CAD drawings);
- from other projects created in T-FLEX Nesting;
- from external tables (multiple addition via the clipboard).

Supported shapes of parts and ways to set them:

Shapes of parts	Ways of specifying parts	Nesting type:		
		linear*	guillotine	true-shape
Rectangle	manually	✓	✓	✓
	from external tables	✓	✓	✓
	based on hatches		✓	✓
Arbitrary shape	based on hatches		✓	✓
	from product composition	✓	✓	✓

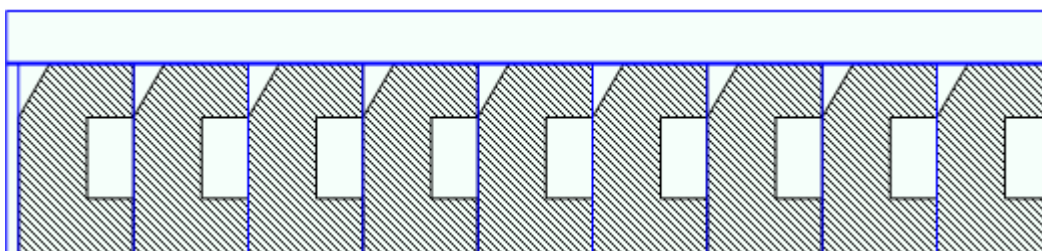
* the width of the sheet is determined by the width of the part for linear nesting.

Part parameters are entered and edited on the **Parts** tab of the T-FLEX Nesting program window.

Parameters		Parts		Sheets		Layout			
+		-				+			
	Description	Part No	Material	Length	Width	Quantity	To Stock	<input checked="" type="checkbox"/> Rotation	<input type="checkbox"/> Exclude
1	Clamp	ABC.9.002.004	A2	60	60	20	0	<input checked="" type="checkbox"/>	<input type="checkbox"/>



The use of arbitrary shape parts is allowed in the guillotine nesting. In this case, the overall dimensions of the parts are taken into account.

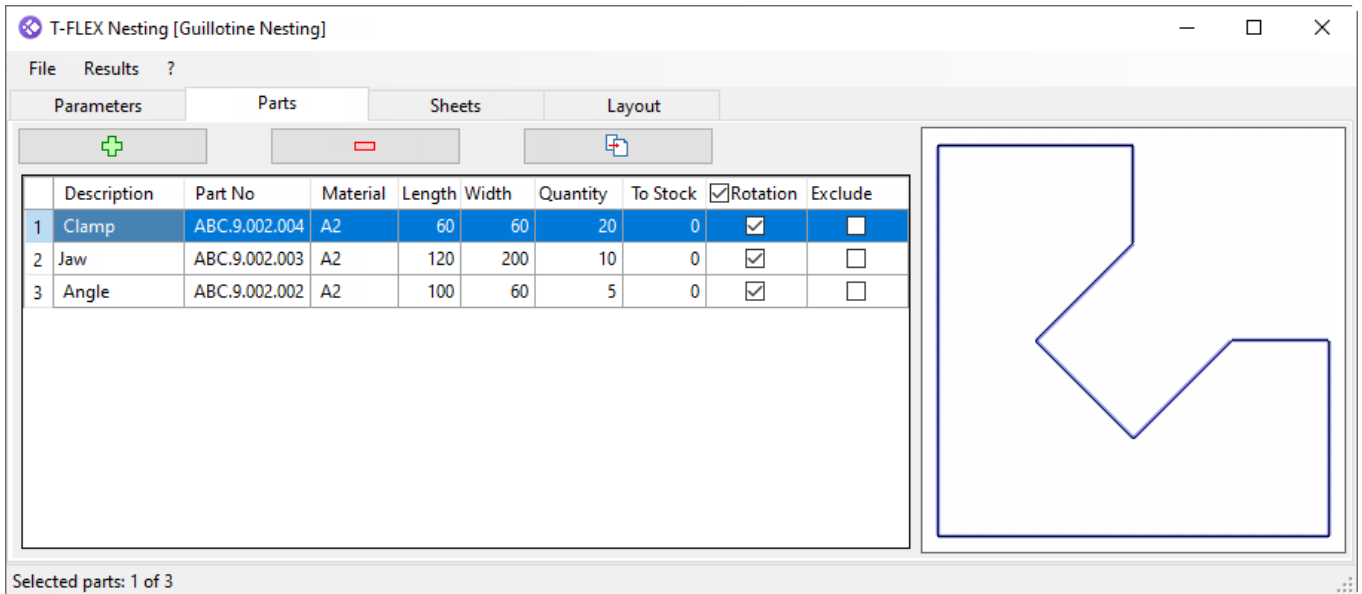
For correct calculation it is recommended to use parts, the size of which is at least 1% of the dimensions of the sheet.



Guillotine nesting for arbitrary shape parts

Adding Parts Manually

To add a new part manually, there is the  [Add Part] button. Removing parts from the list is carried out using the  [Delete Selected Parts] button. Each part has a graphical representation in the right part of the window.



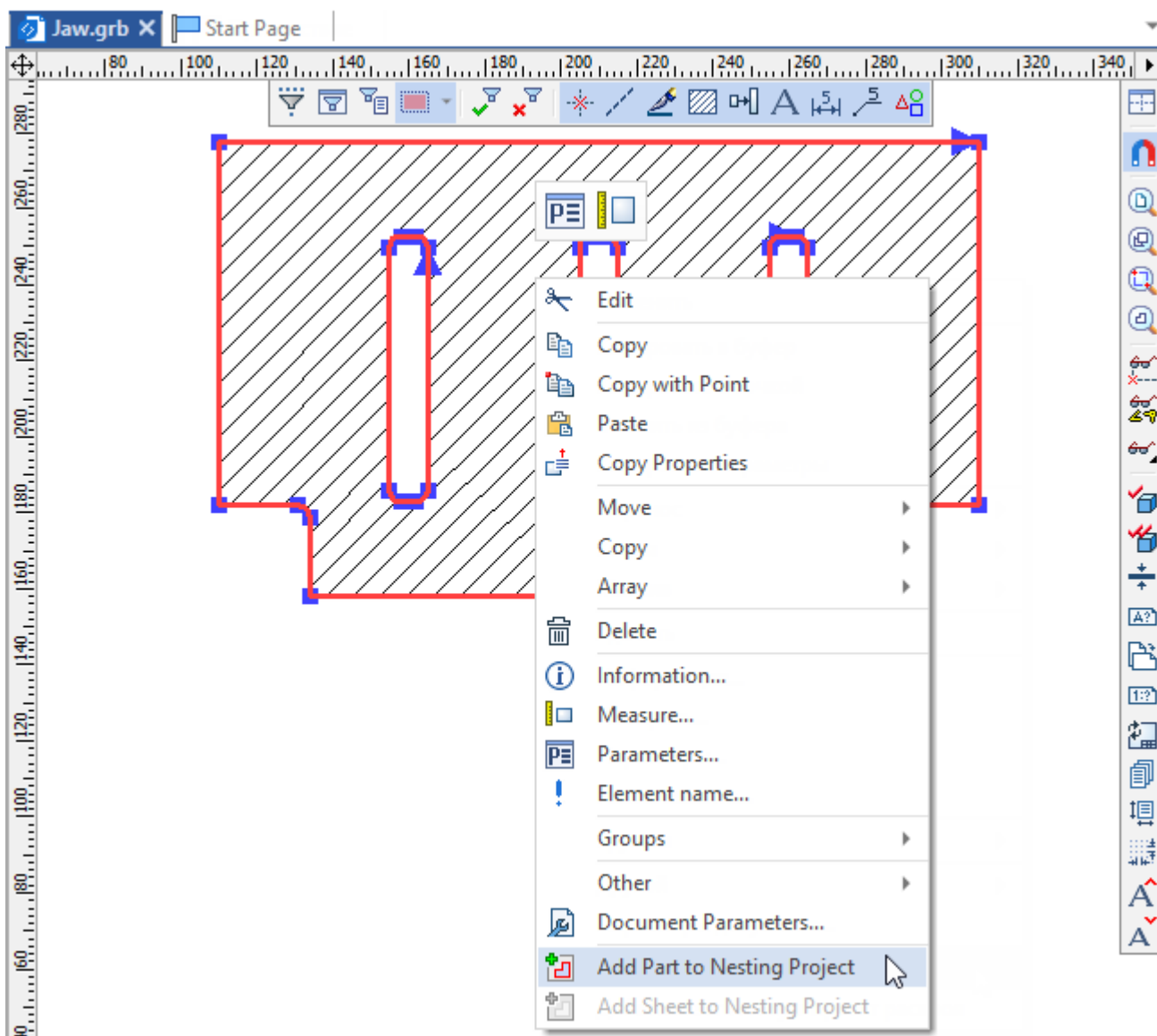
Adding Parts from T-FLEX CAD Drawings

There are two ways to read contours of hatches from a T-FLEX CAD drawing.

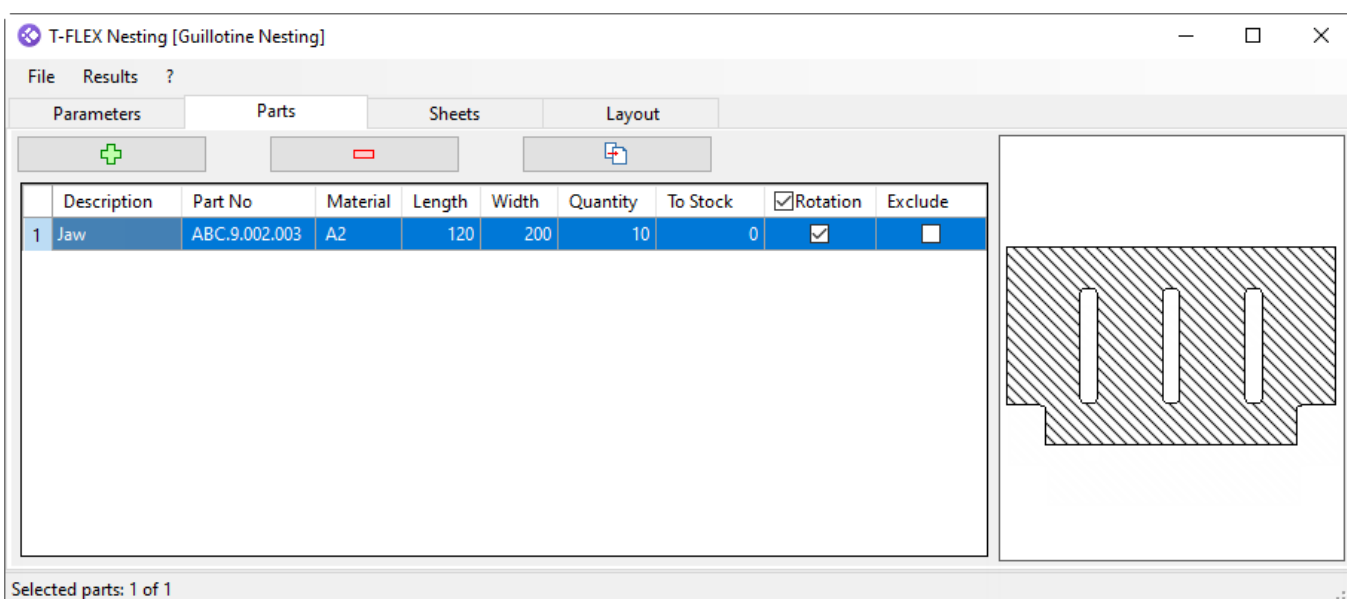
The described methods are not available for linear nesting.

Selective addition of parts from the active T-FLEX CAD document

Open the T-FLEX CAD document with the hatches, if you need to add particular contours of parts from the drawing. Select the necessary parts (hatches) and in the context menu (or in the **Tools** tab of the T-FLEX CAD program) select **Add Part to Nesting Project**. As a result, the entries for the added parts will appear in the list on the **Parts** tab of the T-FLEX Nesting program.

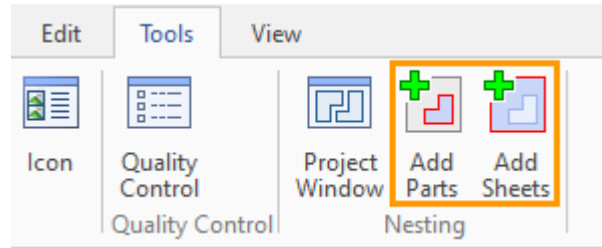



Adding parts from the T-FLEX CAD drawing




Part in the T-FLEX Nesting window

In addition, you can add several selected parts or sheets at once using the appropriate commands in the Ribbon panel.



After the command activation, you need select all the hatches to add to the project and click .


Adding all the parts from the T-FLEX nesting interface

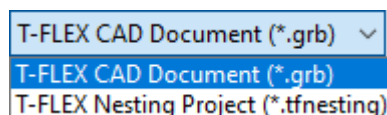
Select the  [Import parts] option on the **Parts** tab to add all parts from the drawing. Then select the T-FLEX CAD document, containing the parts for cutting, in the **Open** dialog window. As a result, all the contours of the drawing hatches will be added to the T-FLEX Nesting.

A T-FLEX CAD document can contain a large number of hatches, not all of which are contours for parts. In this case, it is convenient to place the hatches for nesting on a special layer, for example, "Nesting". If you click the [Import Parts] button, only the hatches belonging to this layer will be added to the nesting project. The name of the layer is specified in the project in the **Import Hatches from Layer** parameter.

If the hatch in the drawing is changed, it can be updated with the appropriate command from the context menu.

Adding Parts from Created Projects

To add all parts from an existing nesting project, use the  [Import Parts] button on the **Parts** tab. You need to specify the document type "T-FLEX Nesting project" in the appeared window.



The parts existing in the current project will not be deleted. Parts imported from another project will be added to the end of the list.

Adding Parts from External Tables

You can add parts to the **Parts** tab from external tables.

First, you need to select the data in the table and copy it.

Description	Part No	Length	Width	Quantity
Part 1	ABC.000.01	500	400	1
Part 2	ABC.000.02	40	50	2
Part 3	ABC.000.03	50	100	10
Part 4	ABC.000.04	200	200	25
Part 5	ABC.000.05	1000	500	1

Then go to the T-FLEX Nesting window on the **Parts** tab. Then call the context menu by clicking the right mouse button in the Nesting window field. Select the **Paste** command in the context menu. All the copied parts will be added to the table.

Parameters		Parts		Sheets		Layout			
	Description	Part No	Material	Length	Width	Quan...	<input checked="" type="checkbox"/> R...	<input type="checkbox"/> M...	Excl...
1	Part 1	ABC.000.01		500	400	1	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	Part 2	ABC.000.02		40	50	2	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	Part 3	ABC.000.03		50	100	10	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4	Part 4	ABC.000.04		200	200	25	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5	Part 5	ABC.000.05		1000	500	1	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Example of adding multiple parts from the external table

In the external table, you can select not only values, but also column names. In this case, after inserting a nesting into the project, the values are inserted into the corresponding columns.

Description	Quantity	Length	Width	Part No
Part 1	1	500	400	ABC.000.01
Part 2	2	40	50	ABC.000.02
Part 3	10	50	100	ABC.000.03
Part 4	25	200	200	ABC.000.04
Part 5	1	1000	500	ABC.000.05

When inserting from external tables, it is important to consider the conditions described below:

- When copying only values, the order of their sequence is important.
- When copying values and column names, the order is not important.

For each project type, there is a minimum and maximum number of columns copied from the external tables. If less data is copied from the table than required in the project, then this data will not be added to the project. In other cases, the data is filled depending on the priority of the columns.

Minimal required data from external tables for different types of projects.

Project type	Length	Width	Quantity
Linear			
Guillotine			
True-shape			

The maximum amount of data is different for each type of project. Boolean value types such as **Allow Rotation**, **Allow Mirror**, **Exclude from Nesting** are not considered when pasting from external tables.

If the values are copied without headers, it is recommended to copy the minimum or maximum number of columns with data for the current project.

Adding Sheets

You can add sheets on the **Sheets** tab.

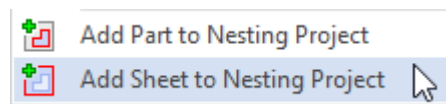
Parameters		Parts		Sheets		Layout	
+		-		+			
	Description	Sheet No	Material	Length	Width	Qua...	Excl...
1	Wood slab 16 mm		Chipboard 16	1200	2400	1	<input type="checkbox"/>

The blanks have the following parameters, similar to the parts parameters:

- **Description;**
- **Part No;**
- **Material;**
- **Length, Width;**
- **Quantity;**
- **Exclude.**

Adding sheets is similar to [adding parts](#), except that the sheets can not be added from external tables.

To add a sheet from the CAD drawing, select **Add Sheet** in the nesting project in the hatch context menu.



Use the **Update** button to update the sheet contour that was changed in the drawing.

Parameters		Parts		Sheets		Layout	
+		-		+			
	Description	Sheet No	Material	Length	Width	Qua...	Excl...
1	Wood slab 16 mm		Chipboard 16	1200	2400	1	<input type="checkbox"/>

Paste



Update

Parameters

For true-shape nesting the use of curvilinear sheets or sheets with cuts is possible.

Sheets Defects

For guillotine nesting, it is possible to take into account defects on the sheets. By defining defects, you can simulate chips, scratches, cuts, etc. Defects are set in the corresponding area on the **Sheets** tab. A defect is a rectangular area that occupies a certain position on the sheets. The calculation is carried out taking this area into account.

After creating a blank in the **Defects** block, use the  button (the  button is used to remove defects from the list). In the **Name** field, enter the name of the defect (for example, "Chipped", "Scratch", etc.) and specify the area of the workpiece in which it is located:

- **X, Y.** Specify the position of the defect. The origin of the XY coordinate system is the lower-left corner.
- **Width, Height.** Specify the size of the rectangular area in which the defect is located.

The **Ignore Defects** flag allows to ignore all defects specified for all sheets.

To set the defects, one or several sheets with defects must be picked out to a separate record. For example, if one sheet of 9 sheets pack has defects, then we create a separate record for it, where we specify the location and the size of the defects.

Parameters
Parts
Sheets
Layout

+
-
📄

	Description	Sheet No	Material	Length	Width	Qua...	Excl...
1	Wood slab 16 mm		Chipboard 16	2800	2080	8	<input type="checkbox"/>
2	Wood slab 16 mm		Chipboard 16	2800	2080	1	<input checked="" type="checkbox"/>
3	Wood slab 25 mm		Chipboard 25	2800	2080	4	<input type="checkbox"/>
4	HDF 3 mm		Hardboard 3	2800	2080	5	<input type="checkbox"/>

Defects
+
-
 Ignore Defects

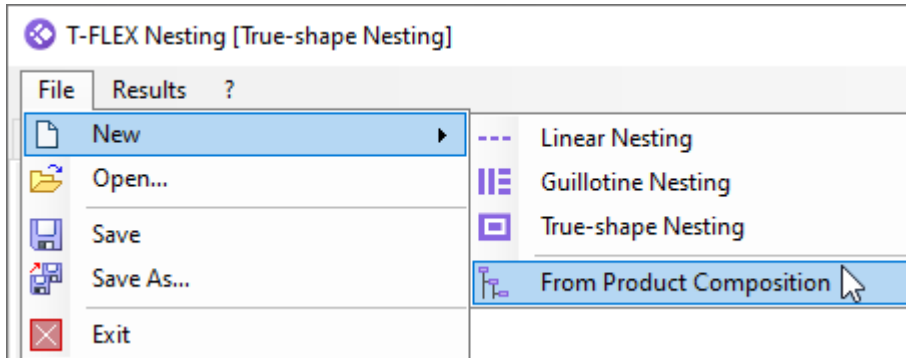
	Name	X	Y	Length	Width
1	Attrition	1200	730	300	400
2	Scatch	1940	1680	500	60

Selected sheets: 1 of 4

Specifying a defect on the sheet

Automatic Data Generation Based on the Product Composition

The great advantage of the T-FLEX CAD system is the creation of parametric models. Also in T-FLEX CAD there is a powerful system mechanism **Product Composition**, which collects data from the model, filters and sorts them as needed. This mechanism is used to collect data about the product composition and to generate the specifications. T-FLEX Nesting allows you to read data from the PC automatically and to compose a nesting project.



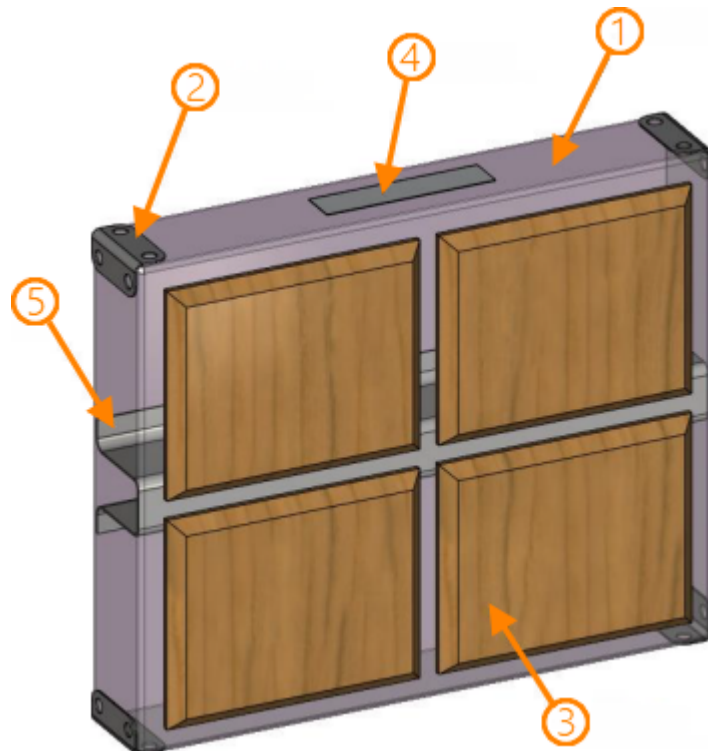
The command for generation of nesting project on the basis of PC

A project is created for an active T-FLEX CAD document containing a special product composition with parameters for T-FLEX Nesting. If the product composition changes as a result of model reconstruction, then these changes will be reflected in the newly created nesting project. In that way one of the most important and laborious tasks is solved: automatic generation of nesting project for an order, whose composition is not defined when the assembly is created.

Position			
Description	Lid 200x400	Lid 300x300	Lid 400x200
Order №1	10	7	3
Order №2	4	8	2
Total:	14	15	5

Order formation example

The mechanism for generating data for a nesting project based on the product composition is presented on the example of the "Lid" model, which takes into account different options for creating an assembly model, uses several materials and types of nesting of parts.



The composition of the "Lid" model: 1 - casing; 2 - angle; 3 - decor; 4 - tag; 5 - rib

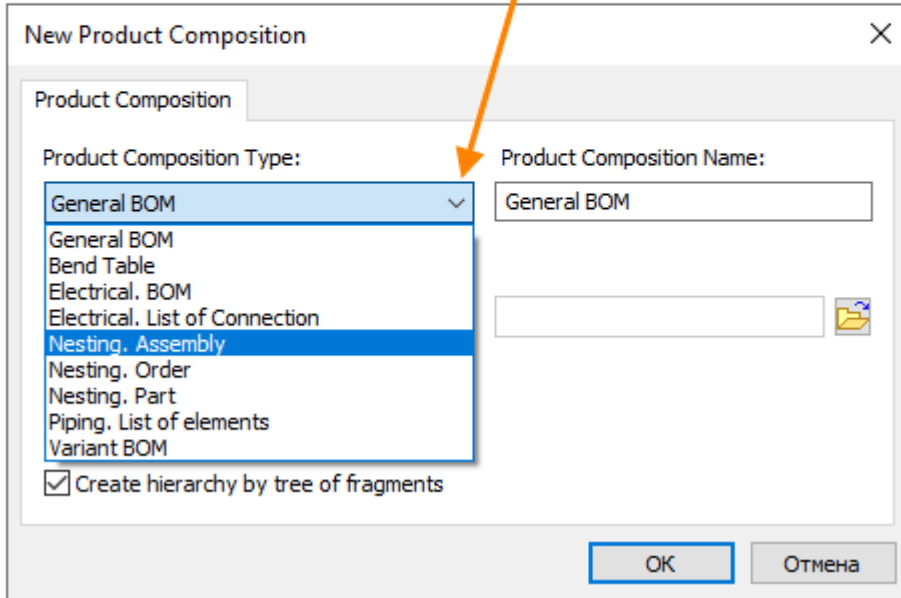
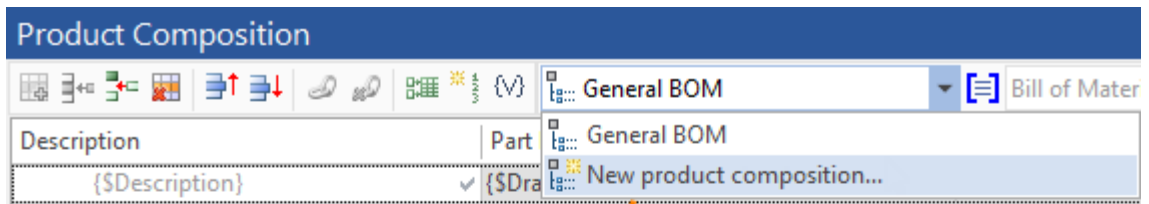
Assembly components are created in different ways: casing - a fragment that specifies the dimension of the product; angle is inserted as the single fragment and is symmetrically copied to the other corners; decor consists of four rectangular elements that are included into assembly as one adaptive fragment; tag is a body created directly in the assembly; rib - an adaptive fragment, whose existence in the assembly is determined by the height of the product (with a height of less than 250 mm, the rib is automatically excluded from the composition of the model).

Product Composition Types for Nesting

Several types of product composition can be simultaneously created in one model to solve specific tasks. Therefore, regardless of whether there is any type of PC in the model or not, it is necessary to choose the appropriate type for nesting tasks. These PC types are installed with the T-FLEX Nesting program.

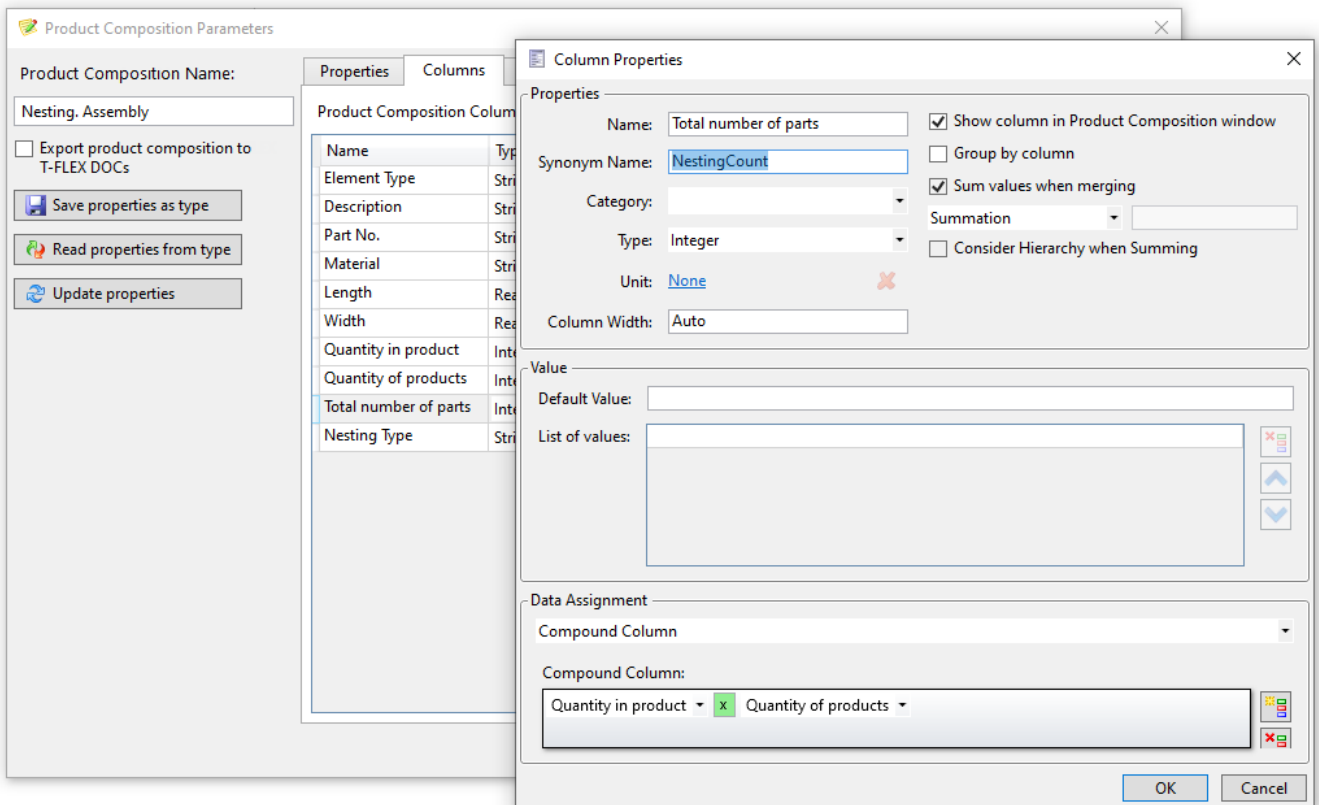
Types of PC vary for:

- parts - type "Nesting. Part" is applied to all parts that require nesting;
- assembly units - type "Nesting. Assembly" is used in cases when it is necessary to create a nesting project for an assembly unit or a product of a certain standard size in quantity of one or several pieces;
- orders - type "Nesting. Order" is used in cases when it is necessary to form a nesting project for assembly units or products of different standard sizes in required quantity.



Product Composition Types for Nesting

When self-configuring the PC types for nesting, it is necessary to take into account the predefined properties set used by T-FLEX Nesting, as well as the synonym names for them.

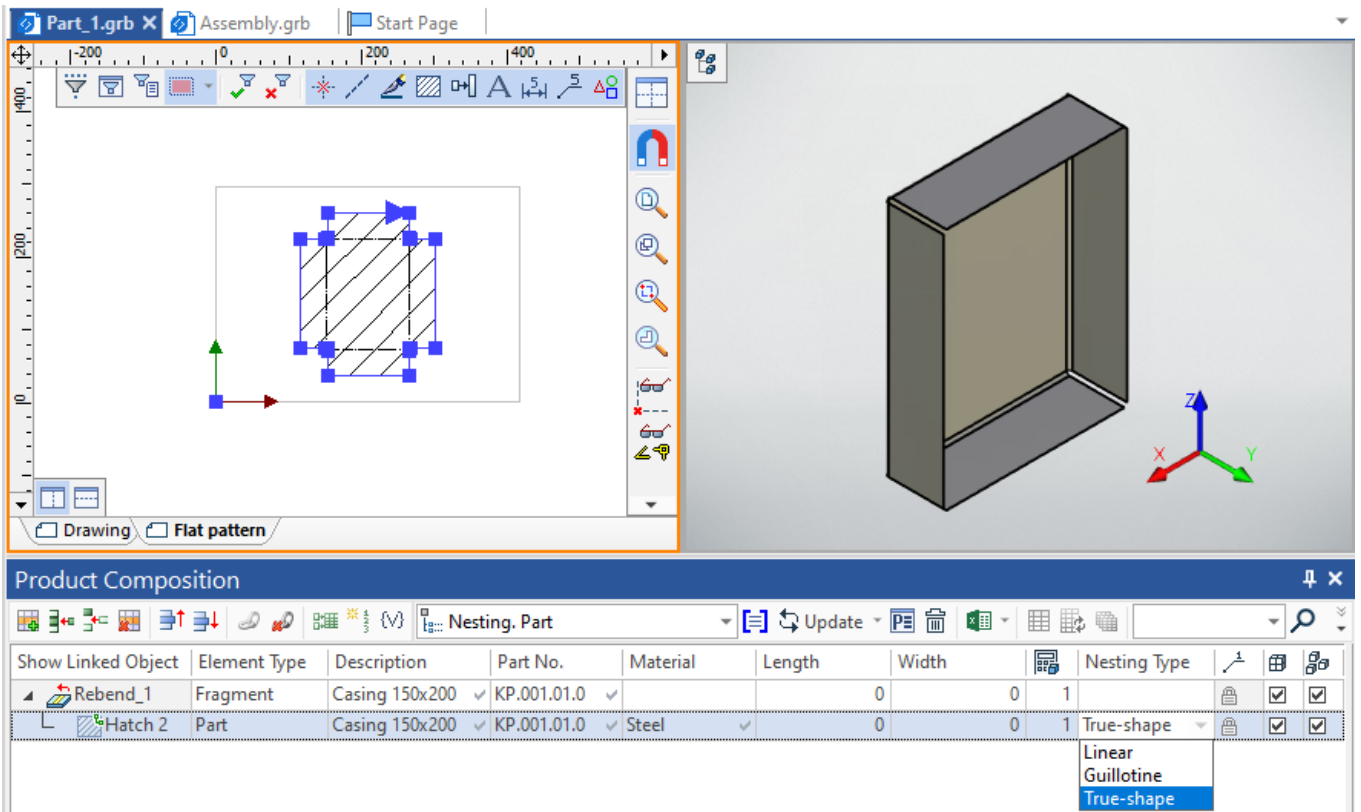


Settings

If necessary, the names of the parameters can be adjusted. Synonyms can not be renamed.

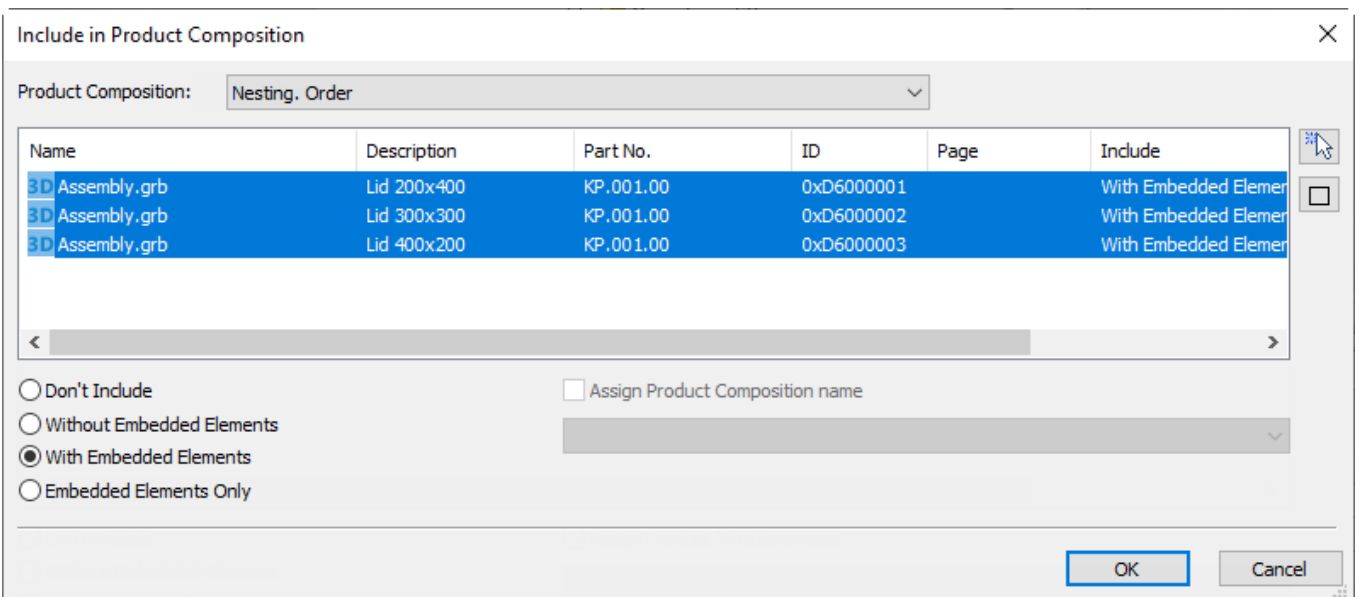
Parameter Name	Required parameters and its values	Synonym Name
Element Type	Yes (part, sheet, product)	<i>NestingElementType</i>
Description	No	<i>NestingName</i>
Part No.	No	<i>NestingNotation</i>
Material	No	<i>NestingMaterial</i>
Length	Yes (from hatch or explicitly)	<i>NestingLength</i>
Width	Yes (from hatch or explicitly)	<i>NestingWidth</i>
Quantity in product	No	<i>No synonym</i>
Quantity of products	No	<i>No synonym</i>
Total number of parts	Yes	<i>NestingCount</i>
Nesting Type	Yes (linear, guillotine, true-shape)	<i>NestingType</i>

For the automatic forming of PC in the assembly it is necessary to have completed data for each part. In this case, the data in the PC of the assembly will appear automatically. It should be taken into account that T-FLEX Nesting works with contours of parts based on hatches, therefore, the PC record for the part is associated with the corresponding hatch. In this case, the dimensions of the part are taken from the hatch geometry (**Length** and **Width** columns for them contain zero values). An exception is the linear nesting type, where the dimensions of the part must be specified explicitly. Also, if the detail has squared shape, then the hatch for it is not needed and the dimension can be explicitly specified in the corresponding PC columns.



The product composition for the "Casing" part

If the required parameters for the parts are specified and the fragments embedding is set in the assembly, the product composition of the assembly will be generated automatically.



Setting the embedding of fragments in the product composition

Product Composition												
Nesting. Assembly												
Show Linked Object	Element Type	Description	Part No.	Material	Length	Width	Quantity of ...	Total number...	Nesting Type			
Guillotine												
3D Fragment_...	Part	Decor 1...	KP.001.0...	Light W...	135	115	4 *	1 *	4	Guillotine	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	Sheet	MDF 8 mm		Light Wood	1200	2400	1 *	0 *	0	Guillotine	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Linear												
	Sheet	Aluminium...	EN 2599	Aluminium	1100	20	1 *	0 *	0	Linear	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Hatch 1	Part	Tag	KP.001.05.0	Aluminium	90	20	1 *	1 *	1	Linear	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
True-shape												
3D Fragment_...	Part	Angle	KP.001.0...	Steel	0	0	4	4	4	True-shape	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
3D Fragment_...	Part	Casing ...	KP.001.0...	Steel	0	0	1 *	1 *	1	True-shape	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
3D Fragment_...	Part	Rib 304	KP.001.0...	Steel	0	0	1 *	1 *	1	True-shape	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	Sheet	Steel sheet ...	EN 10111	Steel	3000	1500	1 *	0 *	0	True-shape	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Default												
	Product	Lid 300x2...	KP.001.00		0	0	1 *	1 *	1		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

The automatically generated product composition for an assembly unit

The parameters of the sheets can also be transferred to the appropriate section of the nesting project. To do this, you need to set the appropriate nesting type for them.

To create an order, you can use either a special document prototype containing the necessary settings, or follow the next sequence of actions:

- Create a new T-FLEX CAD document.
- Insert fragments with the required parameters.
- Create a new product composition type "Nesting. Order".
- Check the inclusion of fragments in the product composition by setting **With Embedded Elements**:

Product Composition							
Nesting. Order							
Sho...	Element Type	Description	Part No.	Material	Length	Width	
Element Type: Product							
3.	Product	Lid 200x400	KP.001.00		0	0	

- Apply the product composition representation and check the correctness of the data generation for nesting:

Product Composition							
Nesting. Order							
Sho...	Element Type	Description	Part No.	Material	Length	Width	
Guillotine							
	Part	Decor 85...	KP.001.04.0	Light Wo...	85	185	
	Part	Decor 13...	KP.001.04.0	Light Wo...	135	135	
	Part	Decor 18...	KP.001.04.0	Light Wo...	185	85	
	Sheet	MDF 8 mm		Light Wo...	1200	2400	

- Set the required products quantity for each standard size by sequentially changing the calculating modes of the **Quantity of Products** column for the products:



Show ...	Element Type	Description	Part No.	Material	Length	Width	Quantity of pro...	Total number o...	Nesting Type	✓	✓	
+	Part	Decor 85x1...	KP.001.04.0	Light Wood	85	185	4 *	7 *	28	Guillotine	✓	✓
+	Part	Decor 135x...	KP.001.04.0	Light Wood	135	135	4 *	4 *	16	Guillotine	✓	✓
+	Part	Decor 185x...	KP.001.04.0	Light Wood	185	85	4 *	2 *	8	Guillotine	✓	✓
+	Sheet	MDF 8 mm		Light Wood	1200	2400	3	0	0	Guillotine	✓	✓
+	Sheet	Aluminium...	EN 2599	Aluminium	1100	20	3	0	0	Linear	✓	✓
+	Part	Tag	KP.001.05.0	Aluminium	90	20	3	13	13	Linear	✓	✓
+	Part	Angle	KP.001.03.0	Steel	0	0	12	52	52	True-shape	✓	✓
+	Part	Casing 200...	KP.001.01.0	Steel	0	0	1 *	7 *	7	True-shape	✓	✓
+	Part	Casing 300...	KP.001.01.0	Steel	0	0	1 *	4 *	4	True-shape	✓	✓
+	Part	Casing 400...	KP.001.01.0	Steel	0	0	1 *	2 *	2	True-shape	✓	✓
+	Part	Rib 204	KP.001.02.0	Steel	0	0	1 *	7 *	7	True-shape	✓	✓
+	Part	Rib 304	KP.001.02.0	Steel	0	0	1 *	4 *	4	True-shape	✓	✓
+	Sheet	Steel sheet ...	EN 10111	Steel	3000	1500	3	0	0	True-shape	✓	✓
+	Product	Lid 200x400	KP.001.00		0	0	1	7 *	7		✓	✓
+	Product	Lid 300x300	KP.001.00		0	0	1	4 *	4		✓	✓
+	Product	Lid 400x200	KP.001.00		0	0	1	2 *	2		✓	✓

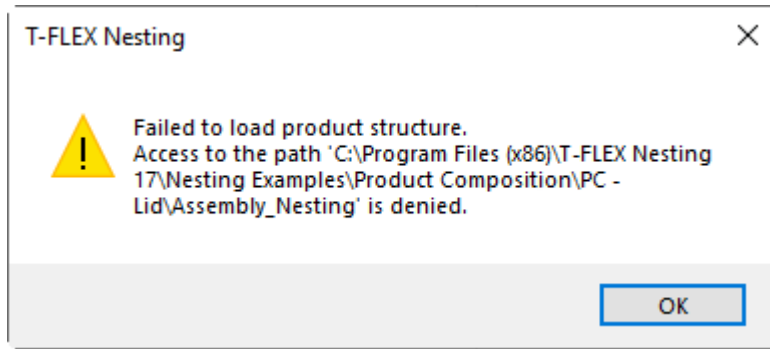
If several nesting types are specified in the PC, then after launching the T-FLEX Nesting command **New > From Product Composition**, a folder of the type **<File name> _ <Nesting>** is created where the project files for the corresponding type are saved.

> Nesting Examples > Product Composition > PC - Lid > Order_Nesting

Name ^

- ⊗ Guillotine Nesting
- ⊗ Linear Nesting
- ⊗ True-shape Nesting

T-FLEX CAD documents used for creating of nesting project on the base of PC must be available for the edit. Otherwise the system will give a notification message.



After the project is formed, you need to set the project parameters and start the nesting optimization in the T-FLEX Nesting.

T-FLEX Nesting [True-shape Nesting] - C:\Nesting Examples\Product Composition\PC - Lid\Order_Nesting\True-shape...

File Results ?

Parameters Parts Sheets Layout

Materials

	Description	Parts Nested	Sheets Used	Utilization
1	Steel	76 / 76	1 / 3	0.4648

Sheets

	Description	Sheet No	Material	Nu...	Utilizati...
1	Steel sheet 2mm	EN 10111	Steel	1	0.4648

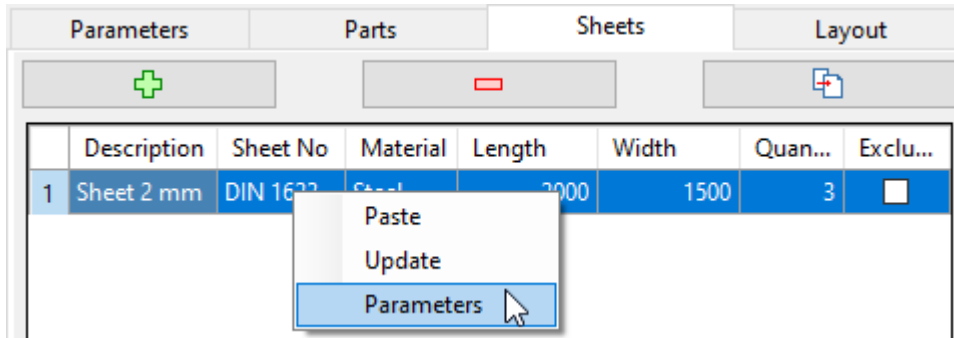
Parts

	Description	Part No	Quantity
1	Rib 204	KP.001.02.0	7
2	Casing 200x400	KP.001.01.0	7
3	Angle	KP.001.03.0	52
4	Rib 304	KP.001.02.0	4
5	Casing 300x300	KP.001.01.0	4
6	Casing 400x200	KP.001.01.0	2

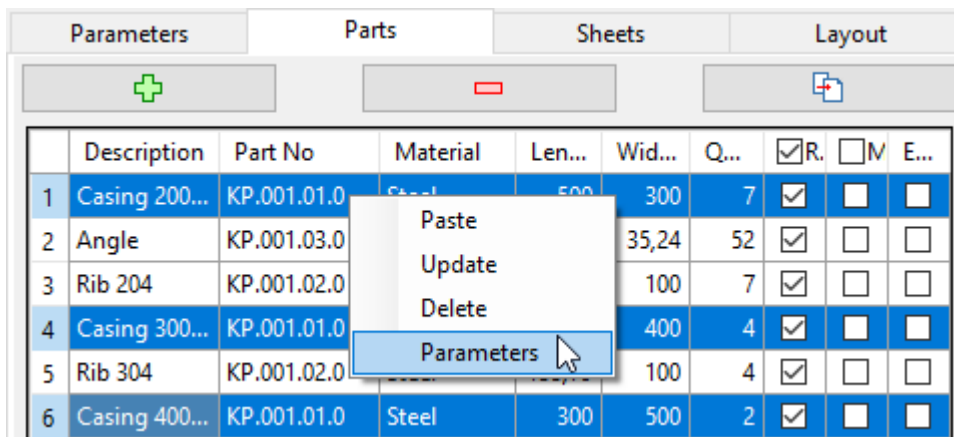
The optimization results of true-shape nesting for the order

Parameters of Parts and Sheets

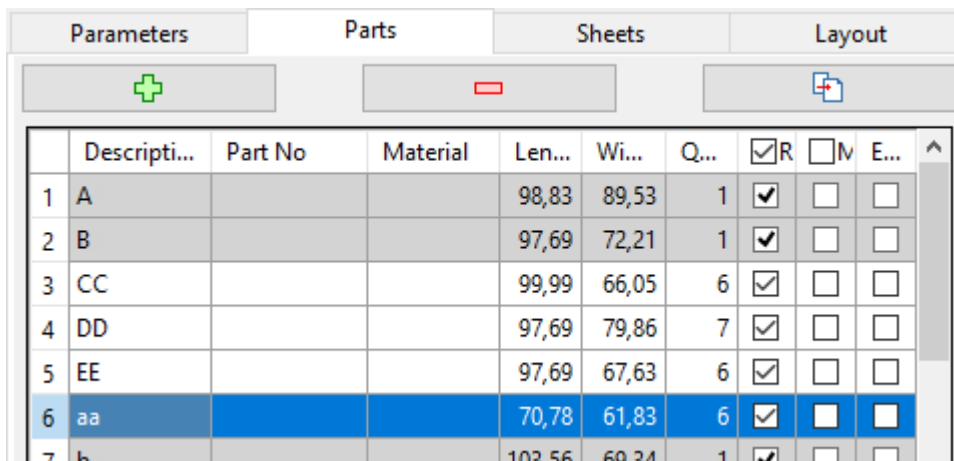
An extended set of parameters for parts and sheets is displayed in a special dialog called from the context menu of the selected record in the nesting project window.



You can select several parts at once and set common parameters for them. To do this, select the details holding <Ctrl>.



There may be a situation where the source contour of the part has been changed. Parts whose contours lost relevance will be highlighted in the project window in gray.



One of the following actions is required for out-of-date records:

- Update using the context menu of the selected record;
- Update using the button in the dialogue recording parameters;
- Delete the part and re-add it to the project.

If the contours of parts are not updated, changes in the contours of the parts will not be taken into account when recalculating the nesting layout.

You should first save the T-FLEX CAD document to be able to update changed contours. Otherwise, links with the source contours can be lost.

General Tab

The following parameters are available for parts and sheets:

- **Description.** Specifies the name of the part/sheet.
- **Part No.** Specifies the part/sheet designation.
- **Material.** The field indicates the material of the part/sheet. Parts for which the material is specified will be placed on sheets with the same material. Utilization ratio is calculated separately for each of the materials.
- **Length, Width.** Specify the overall dimensions of the part/sheet. The **Width** parameter is not specified for linear nesting (determined in the project parameters).

These parameters in the T-FLEX Nesting interface remain unchanged for parts and sheets downloaded from T-FLEX CAD document drawings. Changing the dimensions of the part is made in the drawing and can be updated in the part parameters.

- **Quantity.** Number of parts/sheets of this type.
- **Exclude part from Nesting.** Allows you to ignore the selected parts/sheets in the calculation.

The image displays two side-by-side dialog boxes from the T-FLEX Nesting software. The left dialog is titled 'Part Parameters' and has two tabs: 'General' (selected) and 'Part Contour'. It contains the following fields and options:

- Description: Casing 200x400
- Part No.: KP.001.01.0
- Material: Steel
- Length: 500,0000
- Width: 300,0000
- Quantity: 7
- To Stock: 0
- Rotation Increment, degree: 0,00
- Allow Rotation
- Allow Mirror
- Use Rotation Increment from Project Settings
- Exclude Part from Nesting
- Color: (represented by a black square)

 The right dialog is titled 'Sheet Parameters' and also has two tabs: 'General' (selected) and 'Sheet Contour'. It contains the following fields and options:

- Description: Steel sheet 2mm
- Sheet No.: EN 10111
- Material: Steel
- Length: 3000
- Width: 1500
- Quantity: 3
- Exclude Sheet from Nesting

 Both dialogs have 'OK' and 'Cancel' buttons at the bottom.

The following additional parameters are available for the parts:

- **To stock.** An additional number of parts that need to be nested apart from the number specified in the **Quantity** field. Nesting to stock is made on the residual principle when the main parts are placed on the sheet, and there is still enough material of the sheet for nesting to stock.

To stock parameter can't be applied for the true-shape nesting.

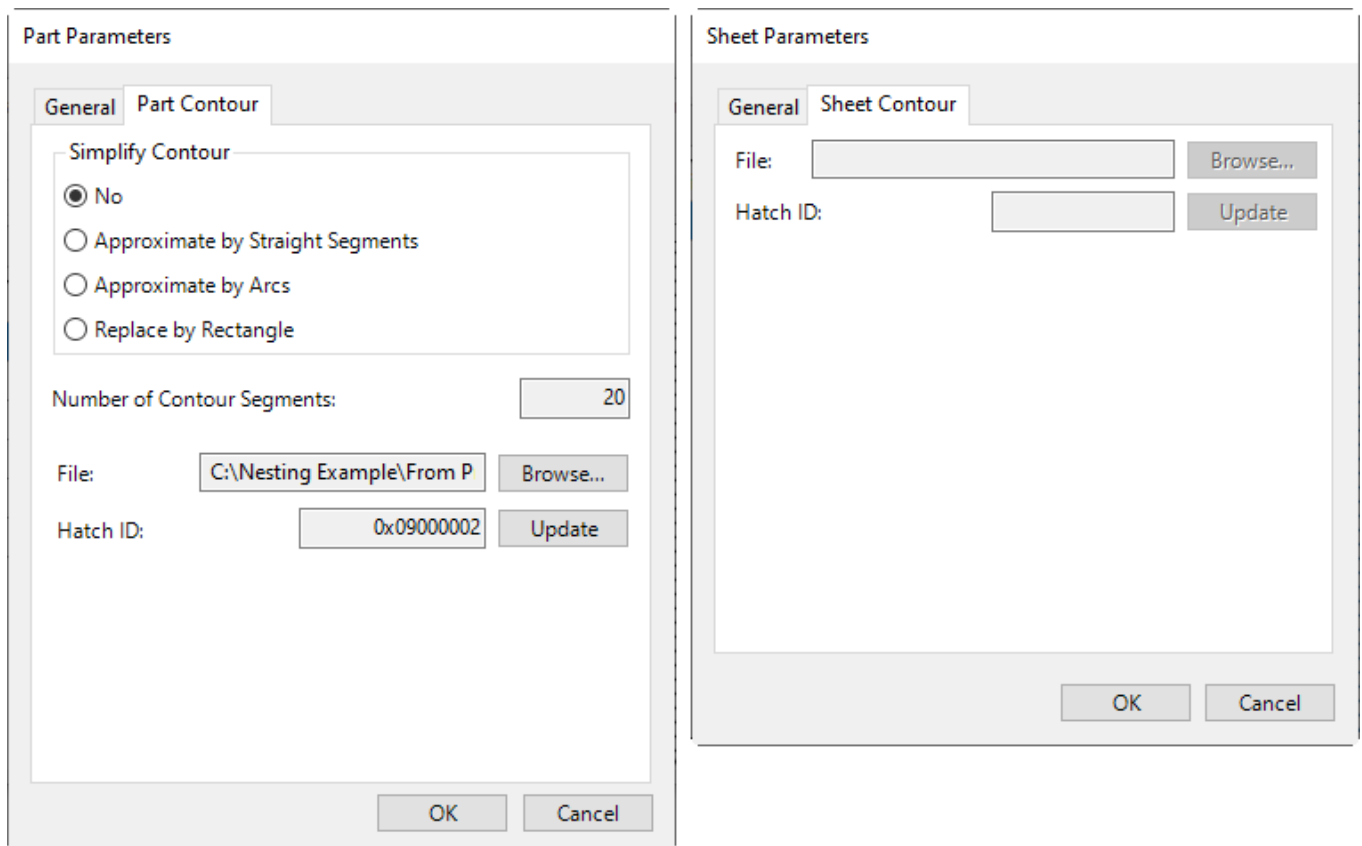
- **Color.** Specifies the color of the part in the nesting layout.

- **Allow Mirror.** Allows the turning of parts during the calculation of the cutting pattern.
- **Allow Rotation.** Allows you to specify rotation of part or group of parts in the plane of the sheet. For guillotine nesting - 90 degrees rotation; for linear - the rotation is specified by the **Rotation increment** parameter in the project settings; for the linear nesting the rotation of the parts is not provided.

Contour Tab

The **Part / Sheet Contour** tab contains auxiliary parameters:

- **File.** Contains the path to the T-FLEX CAD drawing from which the shading was loaded. The **[Browse]** button allows you to select a directory for a file with the hatch manually.
- **Hatch ID.** Contains the hatch identifier from the T-FLEX CAD drawing. The **Update** button allows you to take into account the modification of the part contour in the T-FLEX CAD drawing and transfer the new width and length values to the T-FLEX Nesting project.



A set of **Simplify Contour** settings is used to simplify the spline geometry of the contours of parts, allowing you to speed up the calculation:

- **No** - the calculation is made without simplifying the contour.
- **Approximate by Straight Segments** - replacement of the contour by linear segments.
- **Approximate by Arcs** – replacement of the contour by arcs.
- **Replace by Rectangle** - is used in those cases when the shape of a part is rectangular, and possible cutouts or bevels should be ignored in calculation.

The degree of approximation of curvilinear contours of true-shape parts is specified by the **Permitted increase of part to part distance** parameter on the **Parameters** tab for the true-shape nesting.

The number of approximating elements is determined automatically and is displayed in the **Number of contour segments** field.

Specifying of approximation for the contours of parts is also available in the dialog of parameters of polygonal or curvilinear parts, as well as in their context menu.


Parameters										Parts			Sheets			Layout		
+										-			+					
	Description	Part No	Material	Len...	Wid...	Q...	<input checked="" type="checkbox"/> R.	<input type="checkbox"/> M	E...									
1	Casing 200...	KP.001.01.0	Steel	500	300	7	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>									
2	Angle			46,28	35,24	52	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>									
3	Rib 204			135,79	100	7	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>									
4	Casing 300...			100	100	1	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>									
5	Rib 304						<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>									
6	Casing 400...	KP.001.01.0	Steel				<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>									

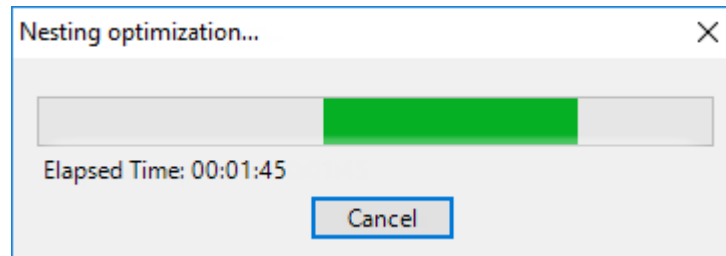
Paste	
Delete	
Simplify	▶
Parameters	

<input checked="" type="checkbox"/> No
<input type="checkbox"/> By Segments
<input type="checkbox"/> By Arcs
<input type="checkbox"/> By Rectangle

Performing the Calculation

Layout Tab

Select the  [Start Nesting] button on the **Layout** tab to start the calculation. The calculation with a progress indication starts. You can cancel the calculation with the [Cancel] button.

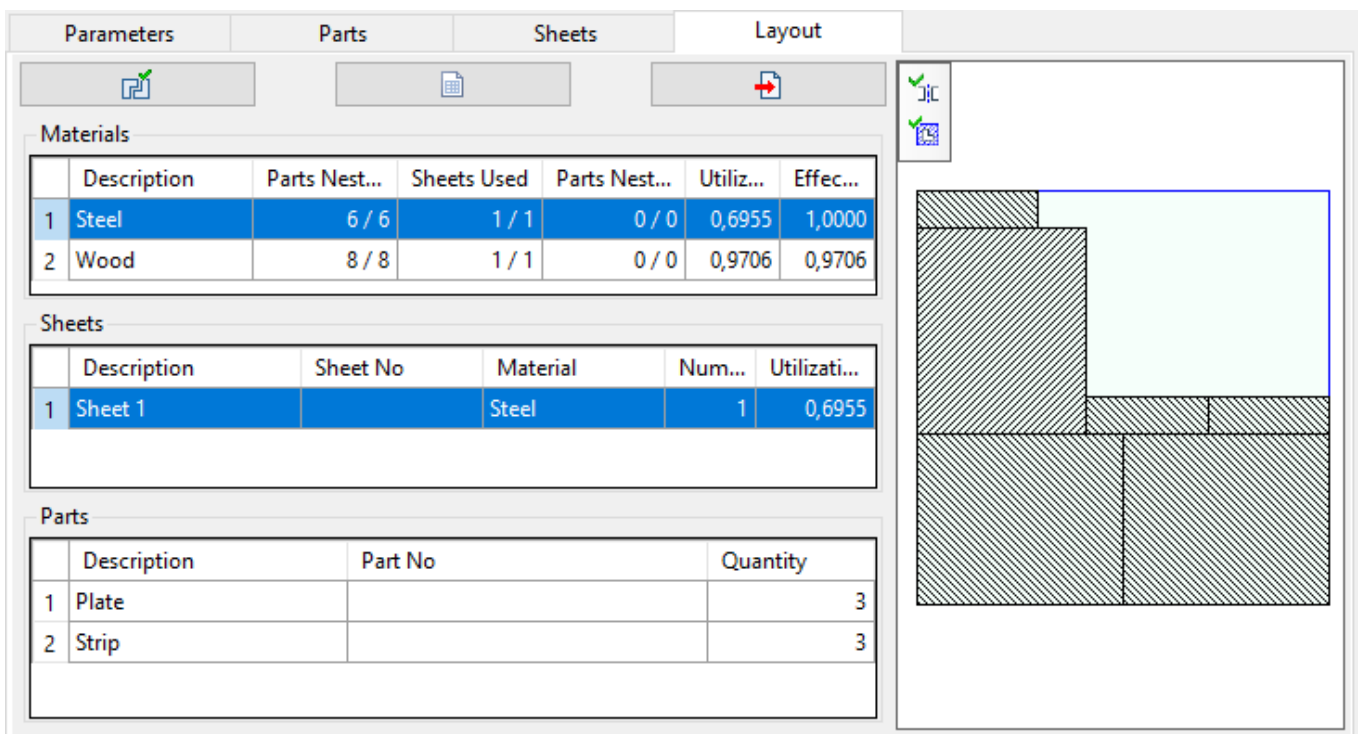


If there are no parts in the project or there is not a single sheet, the material of which corresponds to the material of the part, the calculation will not be started and a corresponding warning will appear.

The results of the calculation are the optimal nesting layouts for the sheets and the summary information on the nesting (the number of specified and nested parts, the number of used sheets, the value of material utilization ratio).

Information on the results will be provided in the respective columns after completion of the calculation. The results are updated after each calculation.

Columns displayed in the window may differ depending on the type of nesting.



Materials		Parts Nest...	Sheets Used	Parts Nest...	Utiliz...	Effec...
1	Steel	6 / 6	1 / 1	0 / 0	0,6955	1,0000
2	Wood	8 / 8	1 / 1	0 / 0	0,9706	0,9706

Sheets		Sheet No	Material	Num...	Utilizati...
1	Sheet 1		Steel	1	0,6955

Parts		Part No	Quantity
1	Plate		3
2	Strip		3

The window is divided into groups.

The **Materials** group displays information about all sheets of the same material:

- **Description.** Displays the name of the material, if it is specified.

- **Parts Nested.** Displays the total number of parts and number of nested parts from the specified material.
- **Sheets Used.** Displays the total number of sheets and number of used sheets from the specified material.
- **Parts Nested to Stock.** Displays the number of parts nested to stock.
- **Utilization.** The column displays the utilization ratio of the material.
- **Utilization Ratio.** Displays Utilization with the **Minimal size of usable remnants** specified for the project.

Parts with the same materials will be placed on the sheets with the same material.

Materials						
	Description	Parts Nest...	Sheets Used	Parts Nest...	Utiliz...	Effec...
1	Steel	6 / 6	1 / 1	0 / 0	0,6955	1,0000
2	Wood	8 / 8	1 / 1	0 / 0	0,9706	0,9706

Sheets					
	Description	Sheet No	Material	Num...	Utilizati...
1	Sheet 1		Steel	1	0,6955

Parts			
	Description	Part No	Quantity
1	Plate		3
2	Strip		3

The **Sheets** group displays information about the sheets.

- **Number.** Displays the number of the sheet record in the table on the **Sheets** tab.
- **Utilization.** Displays the material utilization ratio of the sheet.



Under the **Sheets** groups is the **Parts** group. When selecting a part from the group all the parts of the same type are highlighted on the nesting layouts.

The nested sheets are listed in the order in which they were processed.

The nesting layout of the selected workpiece is displayed to the right. To view several sheets at once, select them by holding down the <Shift> key.

Nesting layout can be approximated and removed in the preview window by rotating the mouse wheel, and moving in the preview window by holding the mouse wheel.

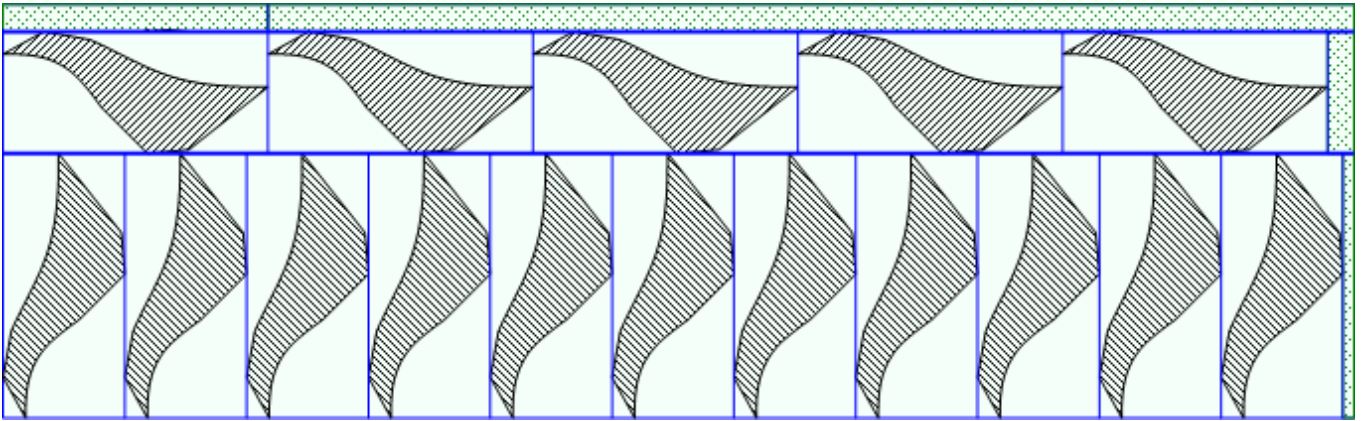
Parameters		Parts	Sheets	Layout															
Materials		<table border="1"> <thead> <tr> <th>Description</th> <th>Parts Nested</th> <th>Sheets Used</th> <th>Utilization</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>212 / 212</td> <td>2 / 2</td> <td>0.5410</td> </tr> </tbody> </table>			Description	Parts Nested	Sheets Used	Utilization	1	212 / 212	2 / 2	0.5410							
Description	Parts Nested	Sheets Used	Utilization																
1	212 / 212	2 / 2	0.5410																
Sheets		<table border="1"> <thead> <tr> <th>Description</th> <th>Sheet No</th> <th>Material</th> <th>Numb...</th> <th>Utilization</th> </tr> </thead> <tbody> <tr> <td>1 Sheet 1</td> <td></td> <td></td> <td>1</td> <td>0.6244</td> </tr> <tr> <td>2 Sheet 2</td> <td></td> <td></td> <td>1</td> <td>0.4576</td> </tr> </tbody> </table>			Description	Sheet No	Material	Numb...	Utilization	1 Sheet 1			1	0.6244	2 Sheet 2			1	0.4576
Description	Sheet No	Material	Numb...	Utilization															
1 Sheet 1			1	0.6244															
2 Sheet 2			1	0.4576															
Parts		<table border="1"> <thead> <tr> <th>Description</th> <th>Part No</th> <th>Quantity</th> </tr> </thead> <tbody> <tr> <td>1 Part 1</td> <td></td> <td>12</td> </tr> <tr> <td>2 Part 2</td> <td></td> <td>120</td> </tr> <tr> <td>3 Part 3</td> <td></td> <td>80</td> </tr> </tbody> </table>			Description	Part No	Quantity	1 Part 1		12	2 Part 2		120	3 Part 3		80			
Description	Part No	Quantity																	
1 Part 1		12																	
2 Part 2		120																	
3 Part 3		80																	

Using the **Show cuts**  and **Show offcuts**  options you can display the cutting lines and sheet remnants in the layout for linear and guillotine projects. Options are located in the upper left corner of the preview window.

Parameters		Parts	Sheets	Layout																		
Materials		<table border="1"> <thead> <tr> <th>Description</th> <th>Parts Nest...</th> <th>Sheets Used</th> <th>Parts Nest...</th> <th>Utiliz...</th> <th>Effec...</th> </tr> </thead> <tbody> <tr> <td>1 Steel</td> <td>6 / 6</td> <td>1 / 1</td> <td>0 / 0</td> <td>0,6955</td> <td>1,0000</td> </tr> <tr> <td>2 Wood</td> <td>8 / 8</td> <td>1 / 1</td> <td>0 / 0</td> <td>0,9706</td> <td>0,9706</td> </tr> </tbody> </table>			Description	Parts Nest...	Sheets Used	Parts Nest...	Utiliz...	Effec...	1 Steel	6 / 6	1 / 1	0 / 0	0,6955	1,0000	2 Wood	8 / 8	1 / 1	0 / 0	0,9706	0,9706
Description	Parts Nest...	Sheets Used	Parts Nest...	Utiliz...	Effec...																	
1 Steel	6 / 6	1 / 1	0 / 0	0,6955	1,0000																	
2 Wood	8 / 8	1 / 1	0 / 0	0,9706	0,9706																	
Sheets		<table border="1"> <thead> <tr> <th>Description</th> <th>Sheet No</th> <th>Material</th> <th>Num...</th> <th>Utilizati...</th> </tr> </thead> <tbody> <tr> <td>1 Sheet 1</td> <td></td> <td>Steel</td> <td>1</td> <td>0,6955</td> </tr> </tbody> </table>			Description	Sheet No	Material	Num...	Utilizati...	1 Sheet 1		Steel	1	0,6955								
Description	Sheet No	Material	Num...	Utilizati...																		
1 Sheet 1		Steel	1	0,6955																		
Parts		<table border="1"> <thead> <tr> <th>Description</th> <th>Part No</th> <th>Quantity</th> </tr> </thead> <tbody> <tr> <td>1 Plate</td> <td></td> <td>3</td> </tr> <tr> <td>2 Strip</td> <td></td> <td>3</td> </tr> </tbody> </table>			Description	Part No	Quantity	1 Plate		3	2 Strip		3									
Description	Part No	Quantity																				
1 Plate		3																				
2 Strip		3																				


1 - cuts; 2 - remnants

If the part for guillotine nesting is not rectangular, then the contour is displayed for it.

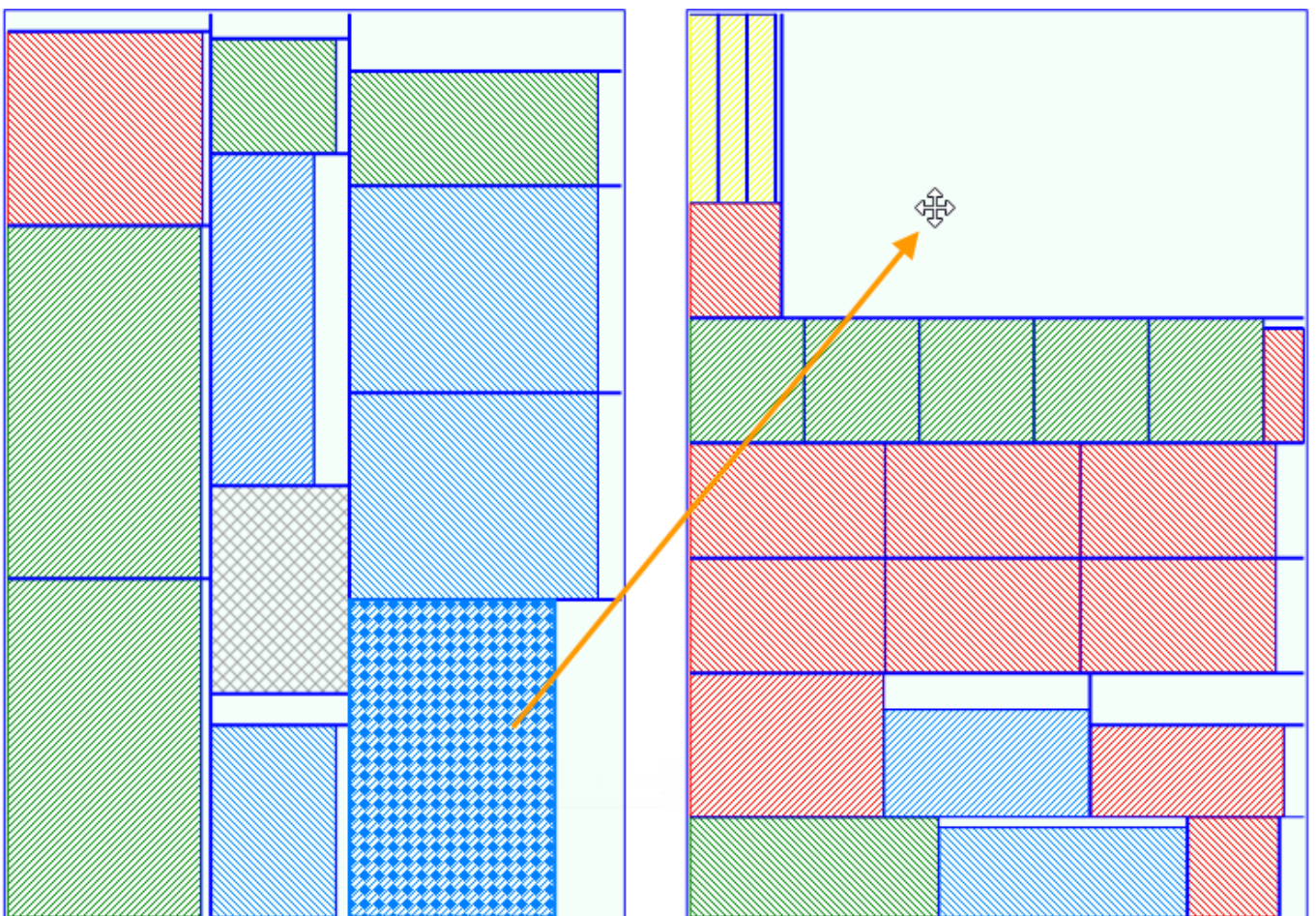


Reallocation of Parts for Guillotine Nesting

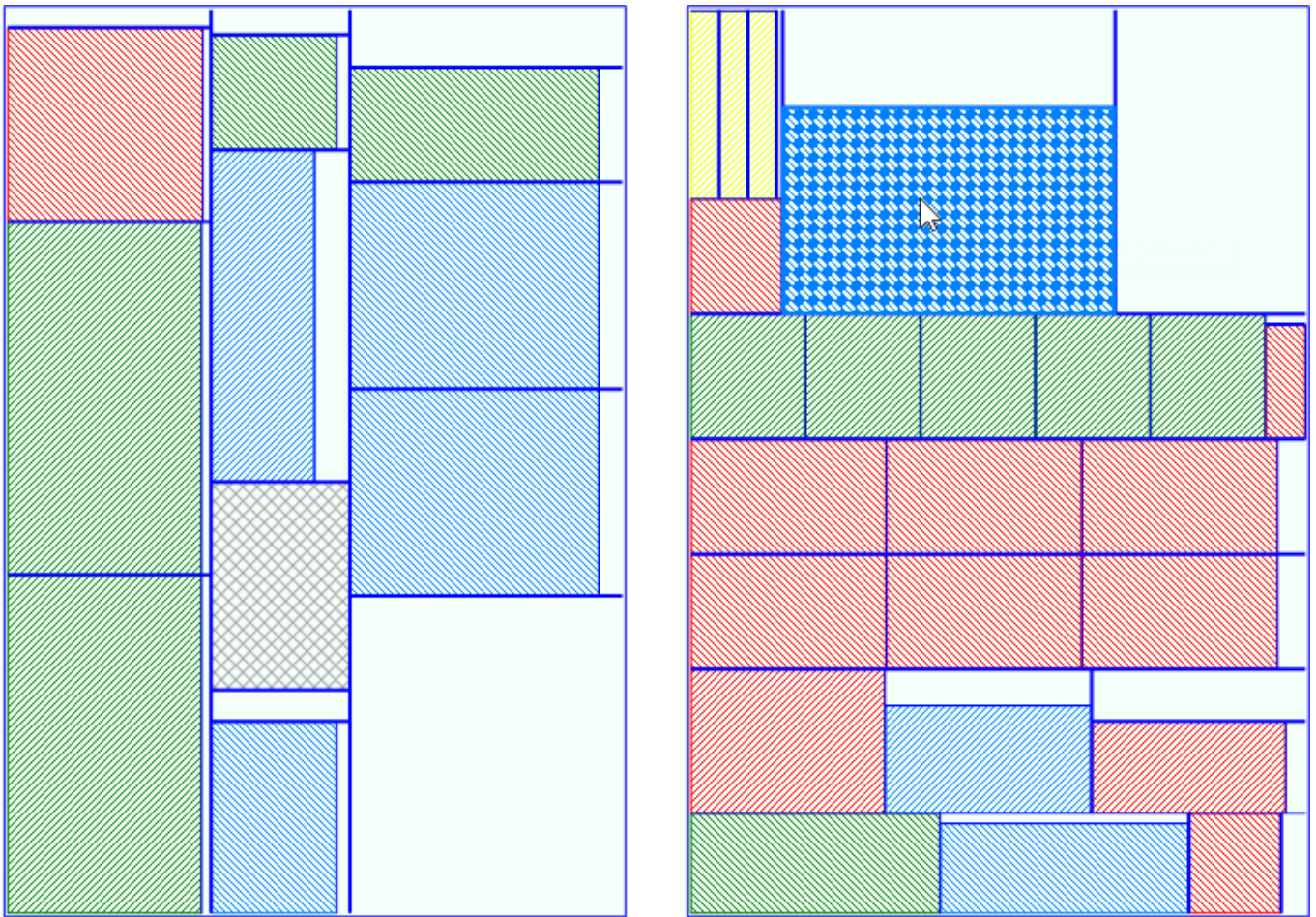
It is possible to manually reallocate the parts on the nesting layout for guillotine nesting. So, for example, the user has the opportunity to select a part on the nesting layout and move it to a new location. The part can be moved to any of the existing sheets, if there is a remnant sufficient for its placement. You can reallocate one or more parts by highlighting them with <Shift>.

The item is selected at the first click . The second click you need to specify the remnant.

Manual reallocation of parts on the nesting layout:




a) The initial position of the part



b) The new position of the part on the sheet

Nesting Results Usage

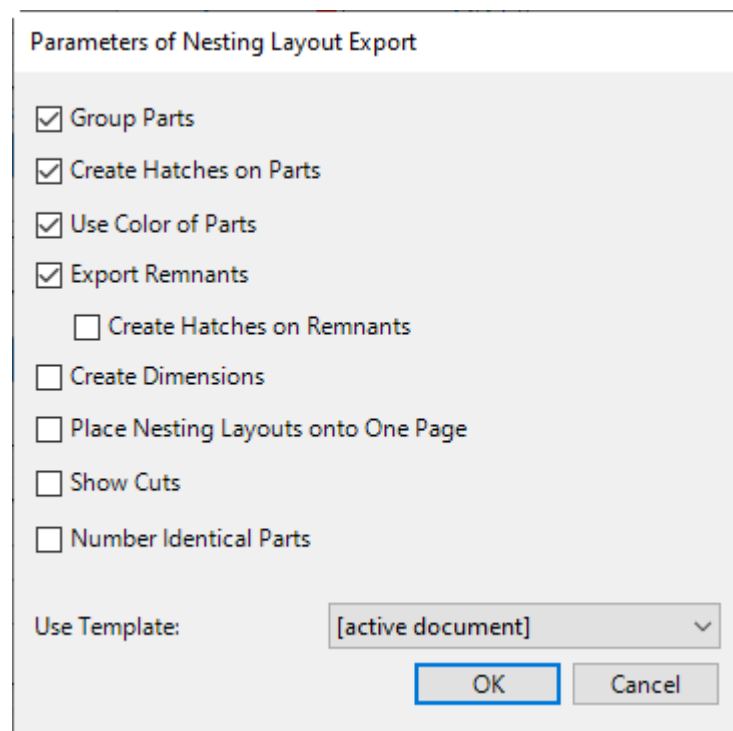
Export Layout to T-FLEX CAD

The resulting nesting layout can be exported to T-FLEX CAD for designing nesting drawings. To do this, select the  **Export Layout to T-FLEX CAD** command on the **Layout** tab. Set the parameters for export of nesting layout in T-FLEX CAD in the appeared **Parameters of Nesting Layout Export** dialog:

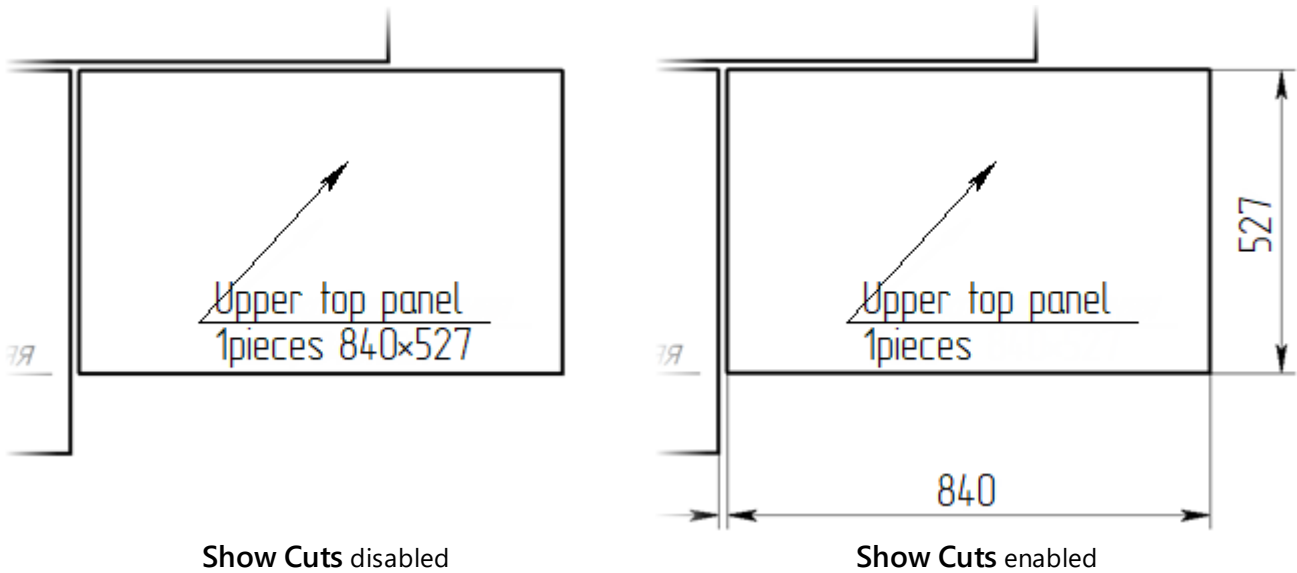
- **Group Parts.** All parts will be grouped after exporting to T-FLEX CAD. The group should be exploded to edit the contour of a part in T-FLEX CAD.
- **Create Hatches on the Parts.** If the option is active, hatches will be created for the parts in T-FLEX CAD.

The hatch step is applied automatically when exported.

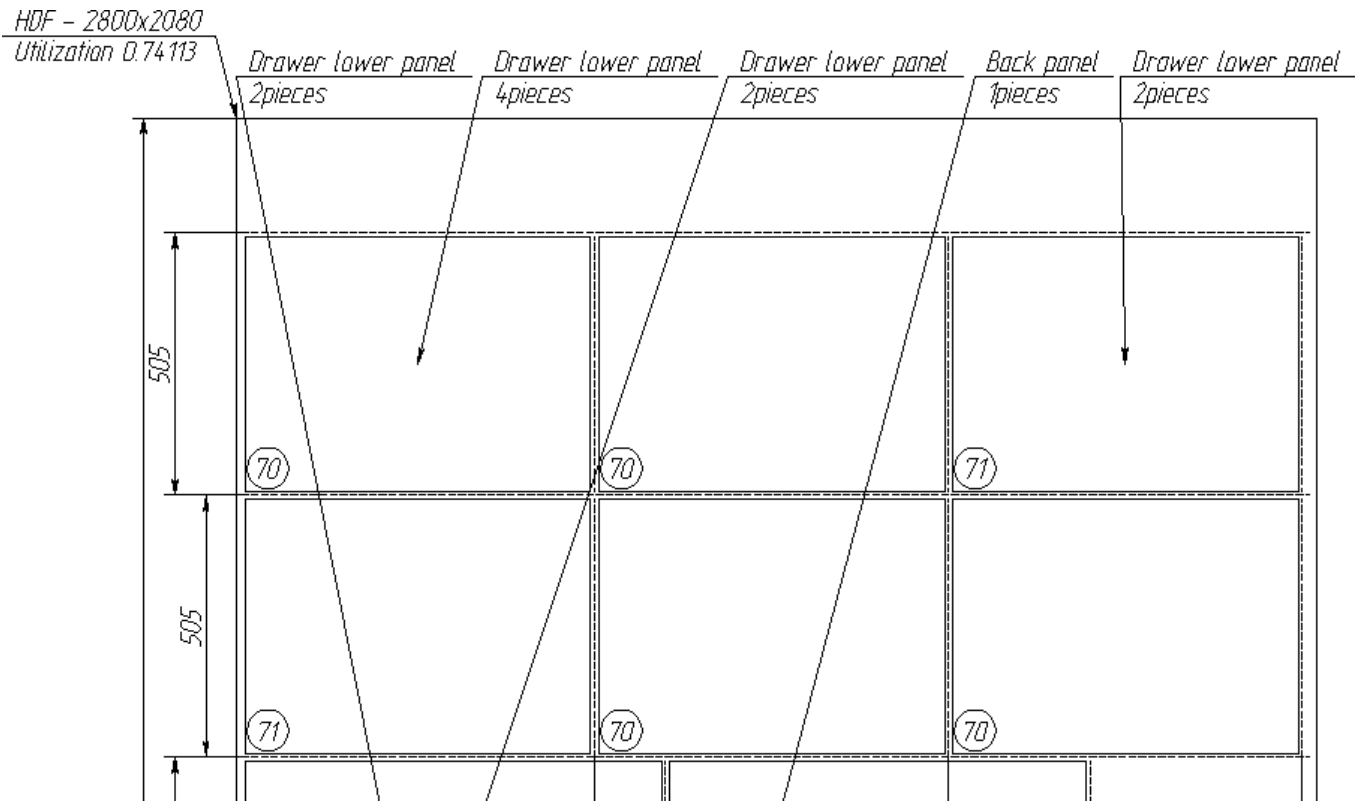
- **Use Color of Parts.** If the option is active, all parts will be displayed in T-FLEX CAD in the same color as in T-FLEX Nesting.
- **Export Usable Remnants.** If the option is active, then usable remnants will be unloaded into the document.
- **Create Hatches on Usable Remnants.** If the option is active, hatching will be created for the unloaded usable remnants.



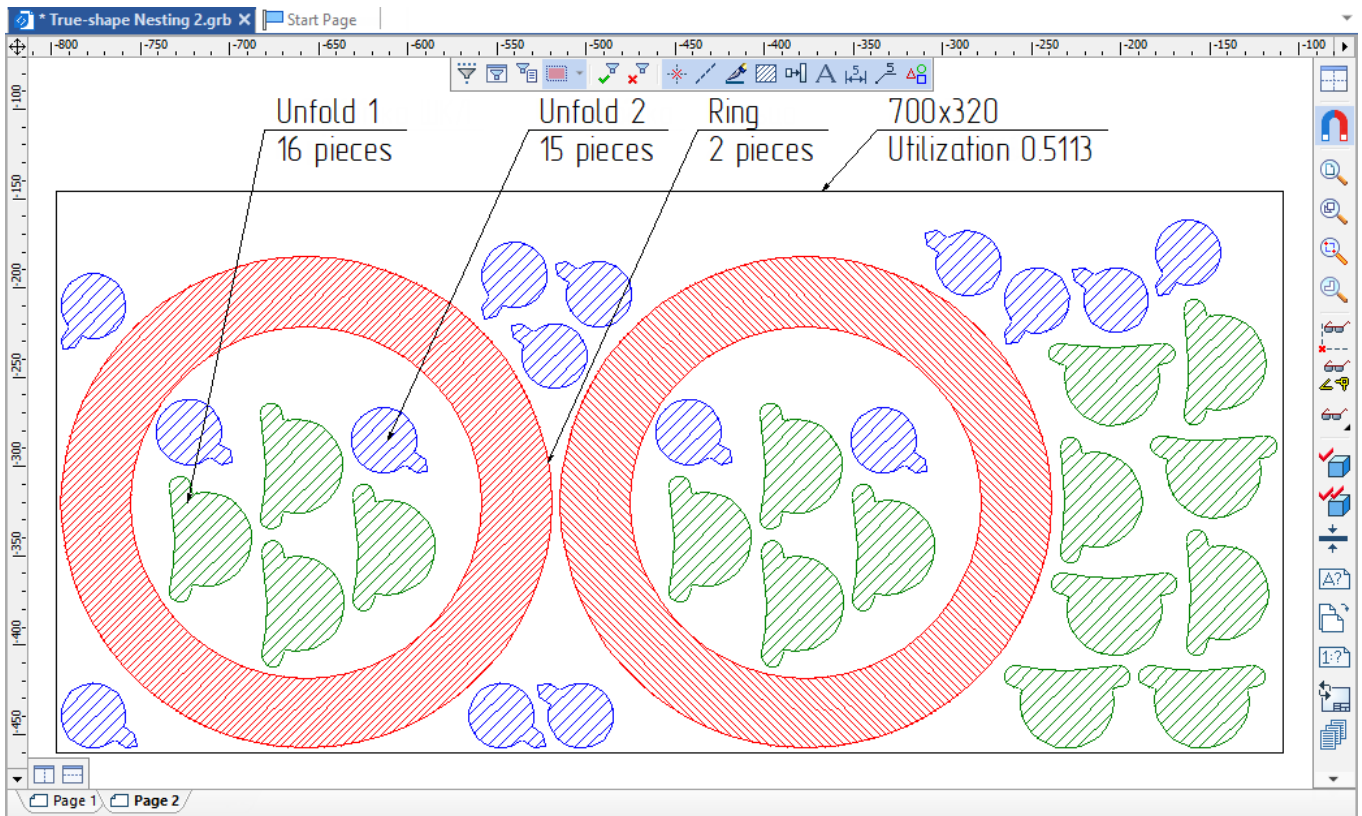
- **Create Dimensions.** Dimensions will be created for all parts and sheets exported to T-FLEX CAD. Quantity of parts and utilization ratio will be also displayed on the drawing. If the option is not set, then the detail dimension will be displayed in the title block. When export a nesting layout to T-FLEX CAD with the **Create Dimensions** option enabled, the dimensioning depends on the **Show Cuts** option. If the display of cuts is enabled, then the dimensions are created on them. If the option is disabled, the dimensions are created on the details. Depending on the use of **Create Dimensions** option when exporting the nesting layout to T-FLEX CAD, part number may change.



- **Place Nesting Layouts on One Page.** It is convenient to use the option for exporting the linear nesting layout, where used sheets in "whips".
- **Show Cuts.** Graphic lines that show the location of the cutting lines will be created. The option is available only for guillotine nesting projects.
- **Number Identical Parts.** All similar parts in the drawing will be numbered. The option is available only for guillotine nesting projects.




- **Use Template.** You can select a document to create a nesting layout in the list: active document or a standard prototype of the document. The nesting layouts are placed on separate pages in the T-FLEX CAD document.

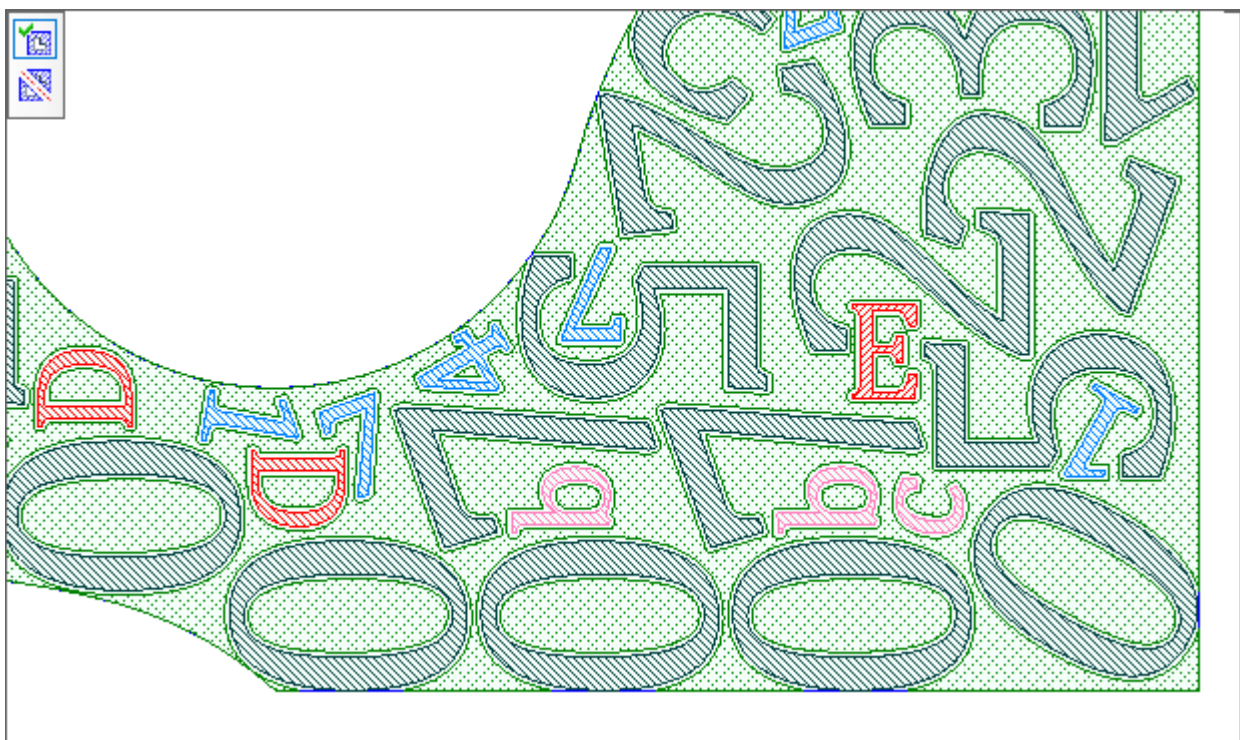



Nesting layout, exported to T-FLEX CAD

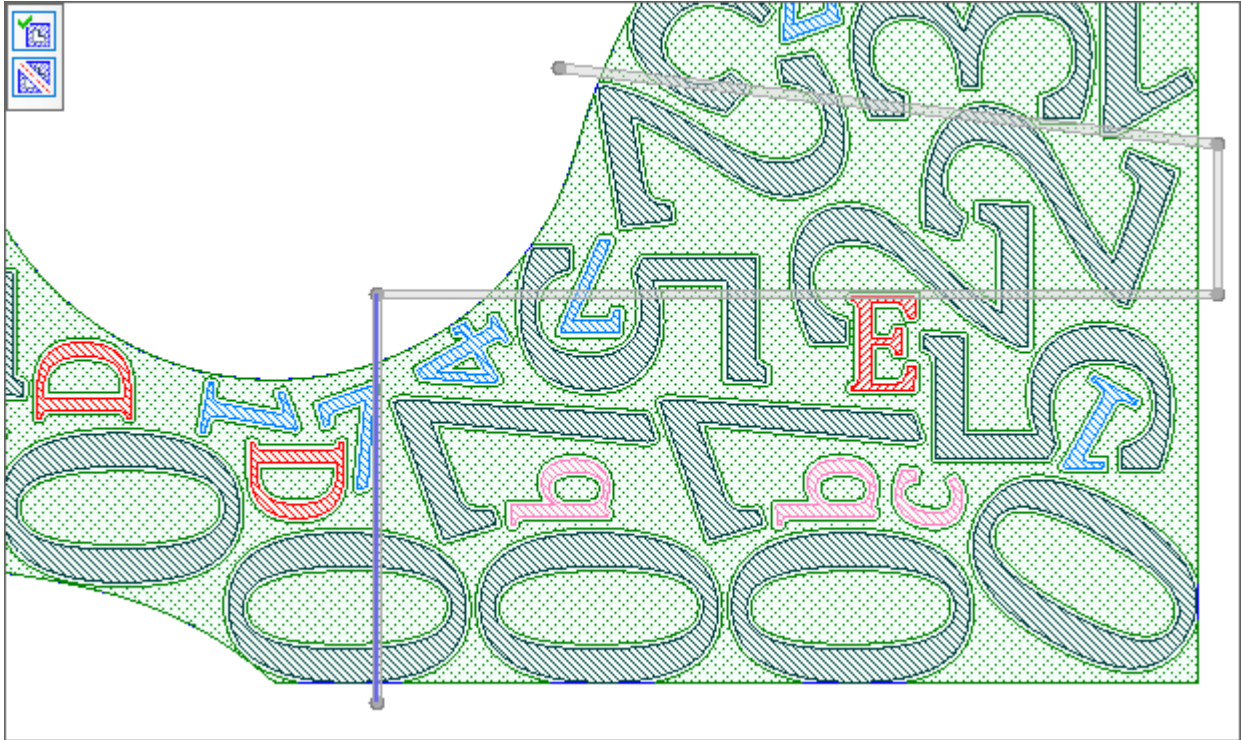
Splitting of Sheet Remnants

Remains obtained on the sheet after true-shape nesting can be of irregular shape and inconvenient to use. T-FLEX Nesting allows to divide the sheet remains into smaller elements that will be displayed in accordance with the parameter **Minimal Size of Usable Remnants**. Smaller elements will not be displayed.

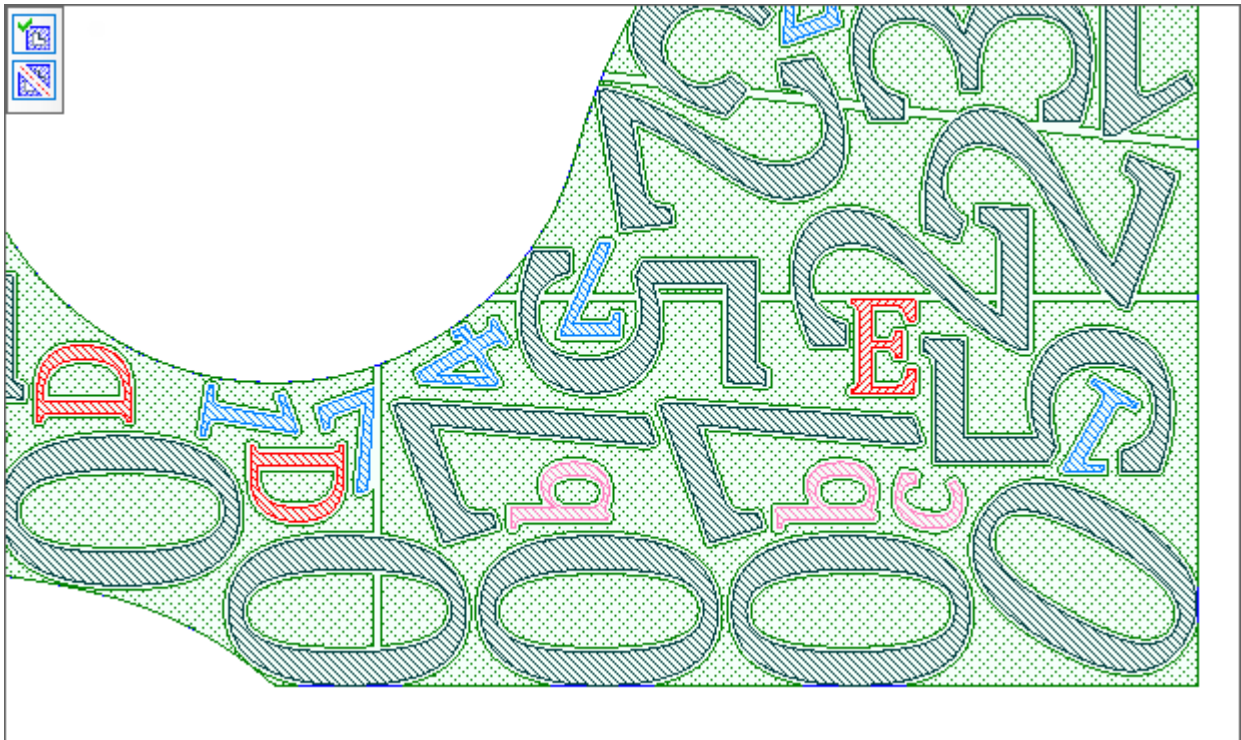
To separate remnants, you must display the remnants using  **Show Remnants** option:



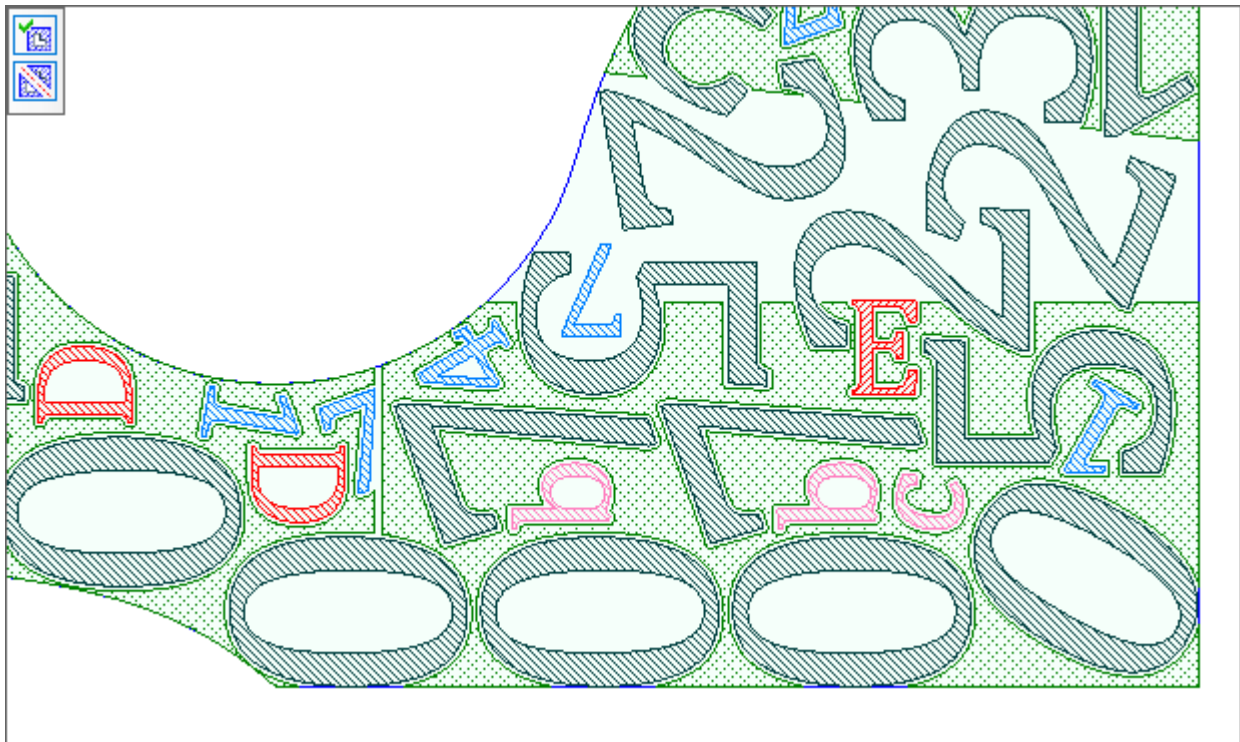
After activating of  **Split Remnants Manually** option, you need to specify the splitting points:



The program creates cuts:



Small elements (smaller than **Minimal Size of Usable Remnants** value) will be automatically hidden:



It is allowed to delete any any element by selecting it on the nesting layout and pressing the key. Another displayed remnants are considered as usable remnants, which will appear in the corresponding section of the reports:

Reports		—	□	×
General		Detailed Info		
Remnants				
Description	Size			
Remnants-Sheet (rectangle)	1 365,01			
Remnants-Sheet (rectangle)	1 365,01			
Remnants-Sheet (rectangle)	1 373,39			
Remnants-Sheet (rectangle)	1 501,26			
Remnants-Sheet (rectangle)	1 501,27			
Remnants-Sheet (rectangle)	1 373,39			
Remnants-Sheet (usable remnant)	2 161,57			
Remnants-Sheet (usable remnant)	2 161,57			
Remnants-Sheet (usable remnant)	2 161,57			
Remnants-Sheet (usable remnant)	2 161,57			
Remnants-Sheet (usable remnant)	139 309,40			

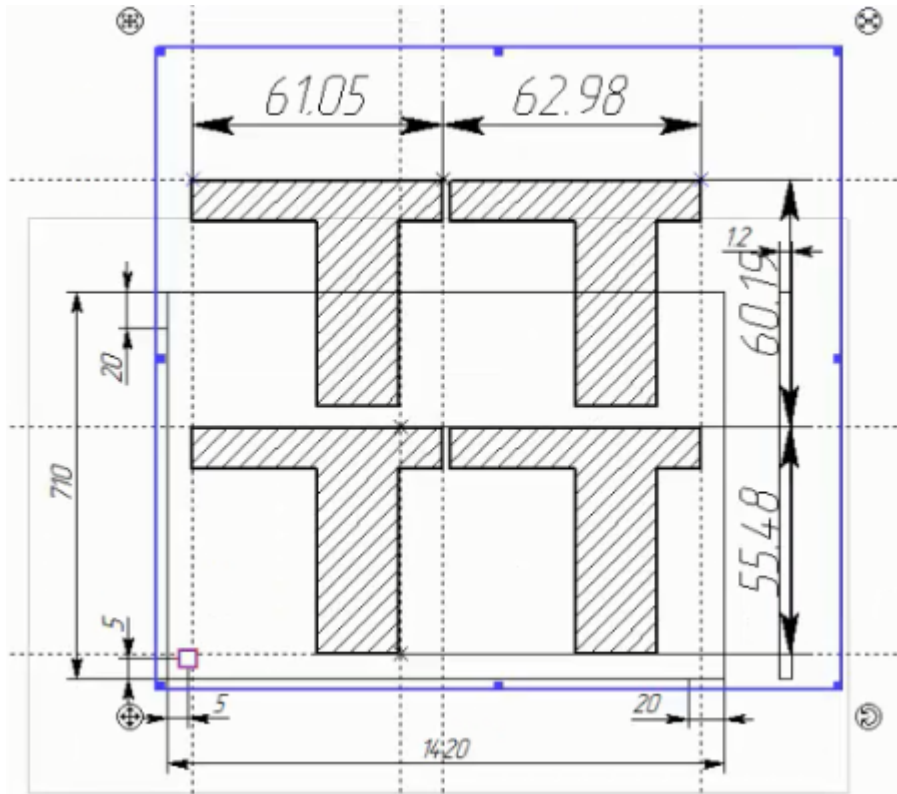
Export... Close

Thus, the user has the opportunity to control the amount and form of usable remnants in real time. If you change the value of **Minimal Size of Usable Remnants**, the remnants will be updated automatically, without recalculating the project.

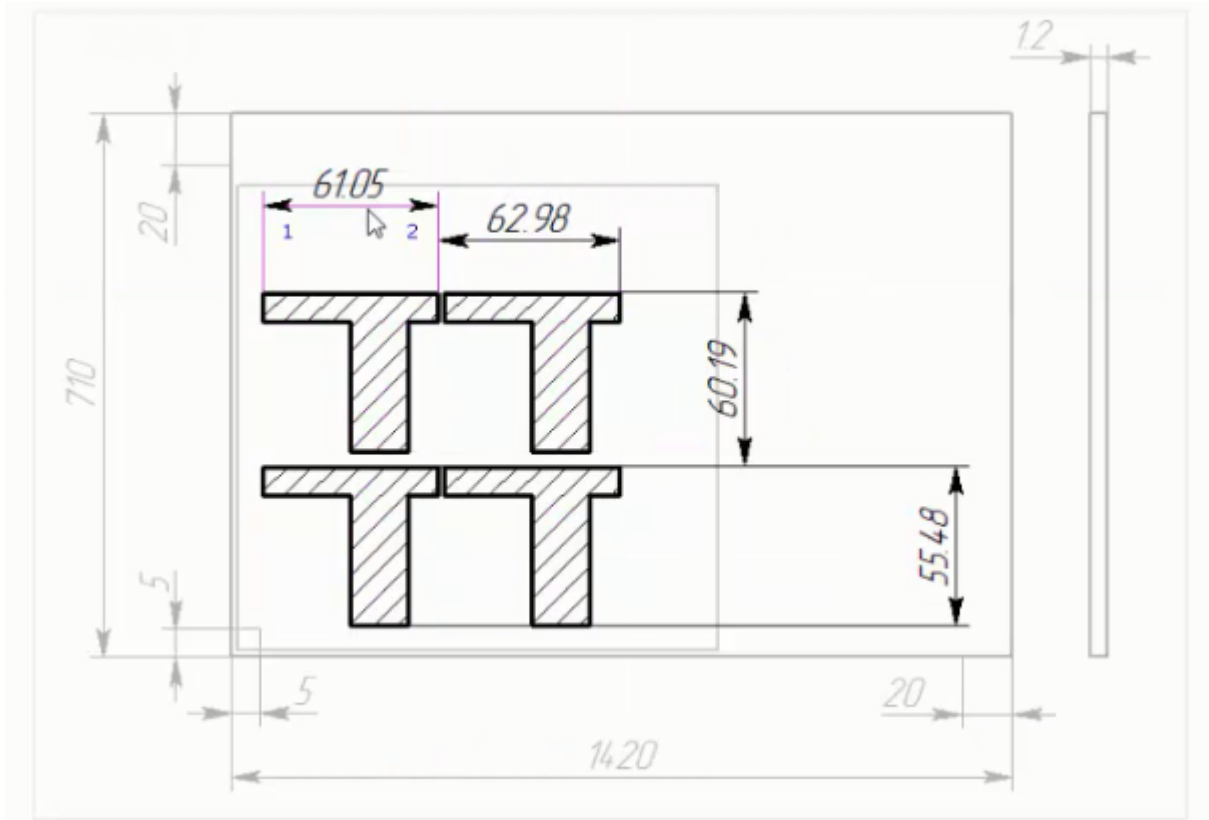
After recalculation of the nesting project the changes will not be saved. Therefore, the splitting of remnants should be carried out only for the final nesting layout.

Preparation of Documentation

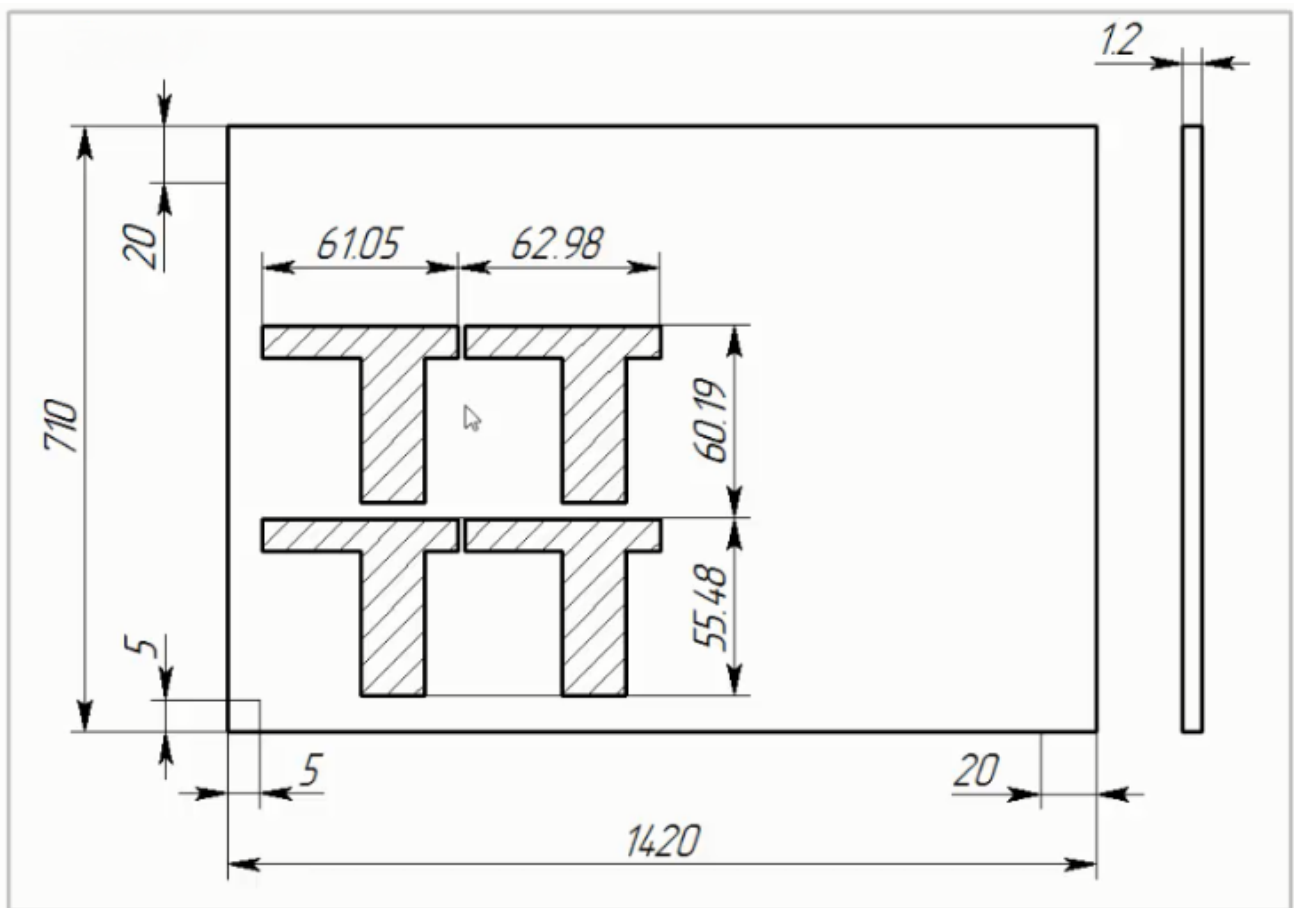
If you want to prepare a document using the prototype of document with title block, it is convenient to use the copying of the nesting layout with simultaneous scaling.



Copying of nesting layout

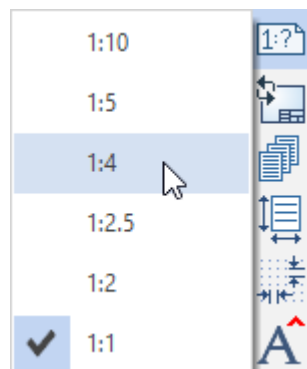


Inserting a nesting layout onto the pattern




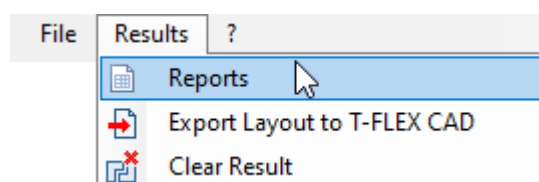
Ready Drawing

If necessary, you can choose the scale of the page for the nesting layout in the dialog **ST: Set Document Parameters** on the **Paper** tab using the **Scale** parameter or by using the drop-down list in the **View** panel.



Report Creation

To create a report, use the  **Reports** button on the **Layout** tab or select **Results > Reports**.



In the dialog that appears, on the **General**, **Detailed Info** and **Remnants** tabs, information on the calculation results is provided.

Reports						
General Detailed Info Remnants						
Sheets						
	Description	Sheet No.	Quantity	Material	Used	Unused
1	Sheet Chipboard 18 mm	Chipboard18_Egger	6	Chipboard 18	6	0

Parts							
	Description	Part No.	Quantity	Material	Nested	Nested to Sto...	Not Nested
1	Floor/Lid	FL1_Chipboard18	2	Chipboard 18	2	2	0
2	Partition	P1_Chipboard18	6	Chipboard 18	6	2	0
3	Facade	F1_Chipboard 18	1	Chipboard 18	1	6	0
4	Floor/Lid	FL2_Chipboard18	2	Chipboard 18	2	0	0
5	Facade	F2_Chipboard 18	2	Chipboard 18	2	0	0
6	Floor/Lid	FL3_Chipboard18	2	Chipboard 18	2	0	0
7	Partition	P3_Chipboard18	4	Chipboard 18	4	4	0
8	Facade	F3_Chipboard 18	1	Chipboard 18	1	0	0
9	Floor/Lid	FL4_Chipboard18	6	Chipboard 18	6	0	0
10	Facade	F4_Chipboard 18	1	Chipboard 18	1	0	0
11	Facade	F5_Chipboard 18	3	Chipboard 18	3	0	0
12	Partition	P6_Chipboard18	6	Chipboard 18	6	0	0
13	Facade	F6_Chipboard 18	1	Chipboard 18	1	0	0

Export... Close

Click the **[Export]** button to create a report. The report can be saved in the TXT, XML or XLSX formats. The **Clear result** option is used when you need to clear result, for example, before sending by mail.

Use Prototype for a Drawing Design

When using the active T-FLEX CAD document, the parameters of this document will be taken into account as a prototype. It means that there will be similar fonts, thickness of lines etc. on new pages with nesting layouts. Therefore, it is recommended to use similar projects to improve the convenience of nesting layouts designing. It is possible, for example, to open in T-FLEX CAD an already designed nesting layout with similar dimensions of the sheet as a prototype. The new layout will be generated in a similar way, which will save time on designing of the drawing.

It should be noted that the nesting layouts are always exported to a new page, without affecting the already existing drawings. Therefore, the page with the sample design can always be deleted.

Contact us to request information about T-FLEX software, our Academic Program, or if you have ideas on cooperating with Top Systems

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