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ZW **Textile**



# ZWTextile 2021

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# ZWTextile Full Package

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## I. Introduction

ZWTextile is a program created for clothes designers. It allows people from the textile industry to create various clothing templates.

## II. Requirements

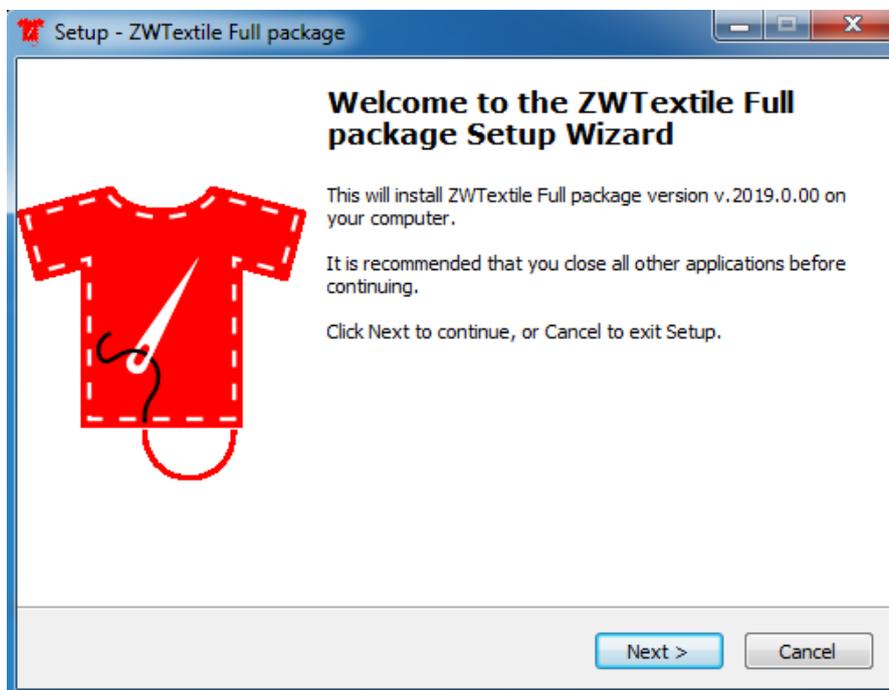
ZWTextile Works as an add-on application for ZWCAD 2021. Hardware requirements of ZWTextile do not exceed the requirements of ZWCAD 2021.

Hardware requirements of ZWTextile do not exceed the requirements of ZWCAD 2021.

## III. Installation

ZWTextile installation must be completed on an account with administrative privileges!

The installation begins after running the \*.exe. file.



The default installation path is C:\Szansa\ZWTextile\2021\Full\EN. It is possible to choose a different installation path, however it is not recommended. Installing the program in the folder Program Files on the operating systems such as Windows Vista, Windows 7, Windows 8 and Windows 10 can cause major implications because of the built in User Account Control in the given operating systems. The User Account Control can Block numerous functions of the program.

After the process of installation, a button called Run ZWTextile, this will start the application once installation ends.

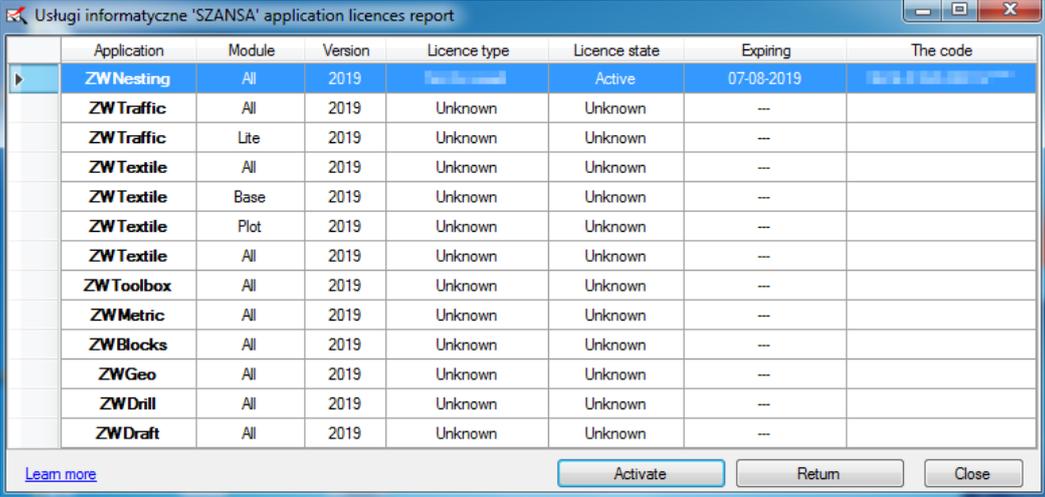
### 1) Activation

**Activation must be completed on an account with administrative privileges.**

Once the trial period of 30 days runs out, a license will be needed in order to use the program. After receiving the payment, an e-mail with an activation code will be sent.

In order to activate the program, use the command ZWTextile:Activate or click on this icon  in ZWTextile toolbar. The following window will appear:

**Please note:** This is an activation example of one of our brand add-ons. Reproduce the same steps to activate ZWTextile.

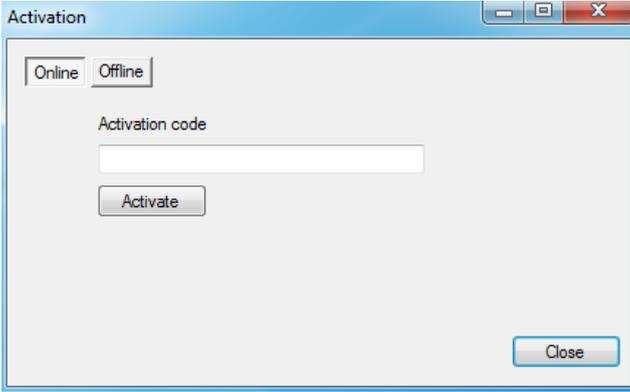


Application	Module	Version	Licence type	Licence state	Expiring	The code
ZWNesting	All	2019	Free for download	Active	07-08-2019	
ZW Traffic	All	2019	Unknown	Unknown	--	
ZW Traffic	Lite	2019	Unknown	Unknown	--	
ZW Textile	All	2019	Unknown	Unknown	--	
ZW Textile	Base	2019	Unknown	Unknown	--	
ZW Textile	Plot	2019	Unknown	Unknown	--	
ZW Textile	All	2019	Unknown	Unknown	--	
ZW Toolbox	All	2019	Unknown	Unknown	--	
ZW Metric	All	2019	Unknown	Unknown	--	
ZW Blocks	All	2019	Unknown	Unknown	--	
ZW Geo	All	2019	Unknown	Unknown	--	
ZW Drill	All	2019	Unknown	Unknown	--	
ZW Draft	All	2019	Unknown	Unknown	--	

Learn more Activate Return Close

Please click on “Activate”.

A choice between activating the application online or offline will be present.



Activation

Online  Offline

Activation code

Activate

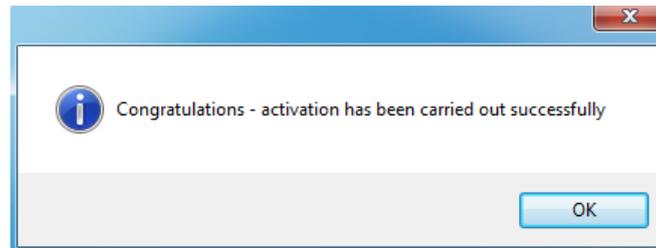
Close

## Online Activation

**Please note:** Online activation requires an Internet connection. If there is no internet connection available please use Offline Activation.

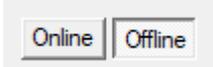
In the field “**Activation code**” please type in the information sent during realization of the order, afterwards click on “**Activate**”.

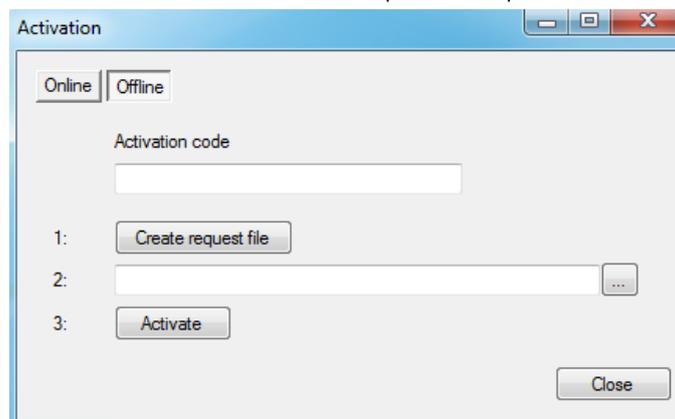
An information window will pop up confirming the activation.



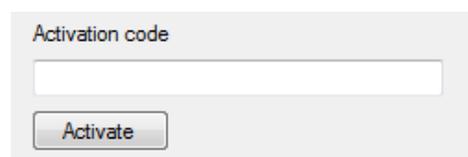
Once ZWCAD is launched, all functions of the program should be loaded and available.

## Offline Activation

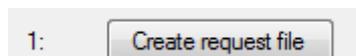
In the “**Offline**” tab  additional steps are required to complete the activation.



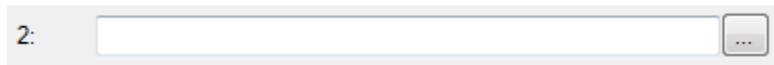
In the field “**Activation code**” please type in the information sent during realization of the order.



Afterwards it is necessary to click on “Create a request file”, it will create an additional file which needs to be saved on the desktop or in any other directory of the computer.



The file needs to be sent in a form of an attachment to, [pomoc@zwcad.pl](mailto:pomoc@zwcad.pl) and a reply will consist of response file which then needs to be loaded in the activator:

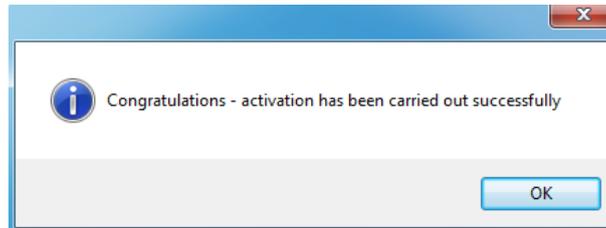


Response file needs to be saved on the computer and its localization needs to be determined by clicking on the following icon .

Once the response file is loaded, click on **“Activate”**.



An information window will pop up confirming the activation.



Once ZWCAD is launched, all functions of the program should be loaded and available.

## 2) Transfer of a license

The license of UISZANSA applications in the form of a program code can be transferred to a different workstation. In order to transfer the license to a different computer, it is necessary to return the active license and once that is done, it will be possible to activate the license on a different Workstation.

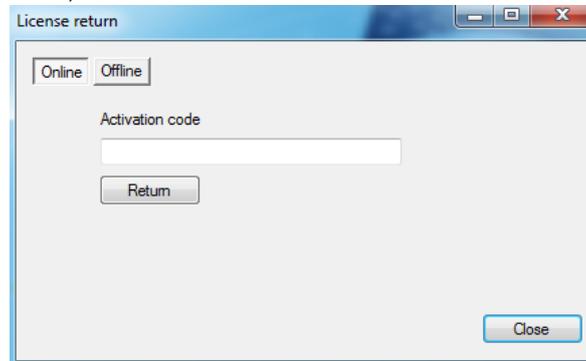
### Returning the license

License return is available in the UISZANSA Activator window.

	Application	Module	Version	Licence type	Licence state	Expiring	The code
▶	ZWNesting	All	2019	Unknown	Active	07-08-2019	
	ZWTraffic	All	2019	Unknown	Unknown	---	
	ZWTraffic	Lite	2019	Unknown	Unknown	---	
	ZWTextile	All	2019	Unknown	Unknown	---	
	ZWTextile	Base	2019	Unknown	Unknown	---	
	ZWTextile	Plot	2019	Unknown	Unknown	---	
	ZWTextile	All	2019	Unknown	Unknown	---	
	ZWToolbox	All	2019	Unknown	Unknown	---	
	ZWMetric	All	2019	Unknown	Unknown	---	
	ZWBlocks	All	2019	Unknown	Unknown	---	
	ZWGeo	All	2019	Unknown	Unknown	---	
	ZWDrill	All	2019	Unknown	Unknown	---	
	ZWDraft	All	2019	Unknown	Unknown	---	

Learn more Activate Return Close

Once “Return” has been clicked on, an additional window will appear in which it will be possible to return the license, either online or offline.

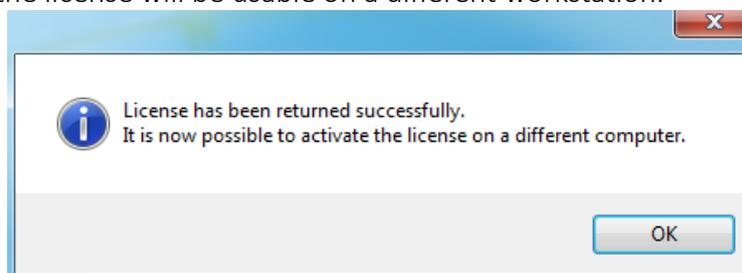


### Online return

**Please note:** Online return requires an Internet connection. If there is no internet connection available please use the Offline return.

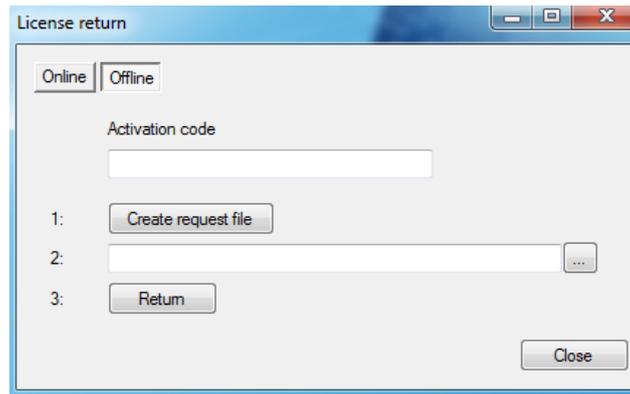
To carry out the online return, please type in your license details followed by clicking on “Return”.

Once confirmed, the license will be usable on a different workstation.



### Offline return

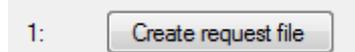
In the „Offline” tab  additional steps are required to complete the return of a license.



In the field „Activation code” please type in your license details.



Afterwards it is necessary to click on “Create a request file”, it will create an additional file which needs to be saved on the desktop or in any other directory of the computer.

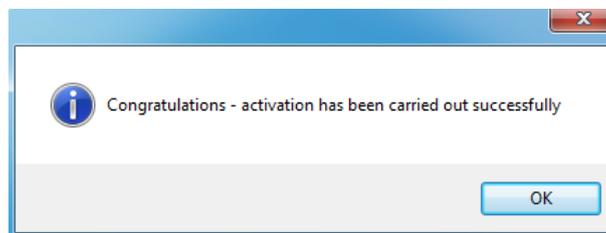


The file needs to be sent in a form of an attachment to, [pomoc@zwcad.pl](mailto:pomoc@zwcad.pl) and a reply will consist of response file which then needs to be loaded in the activator:



Response file needs to be saved on the computer and its localization needs to be determined by clicking on the following icon .

Once the response file is loaded, click on “Return”

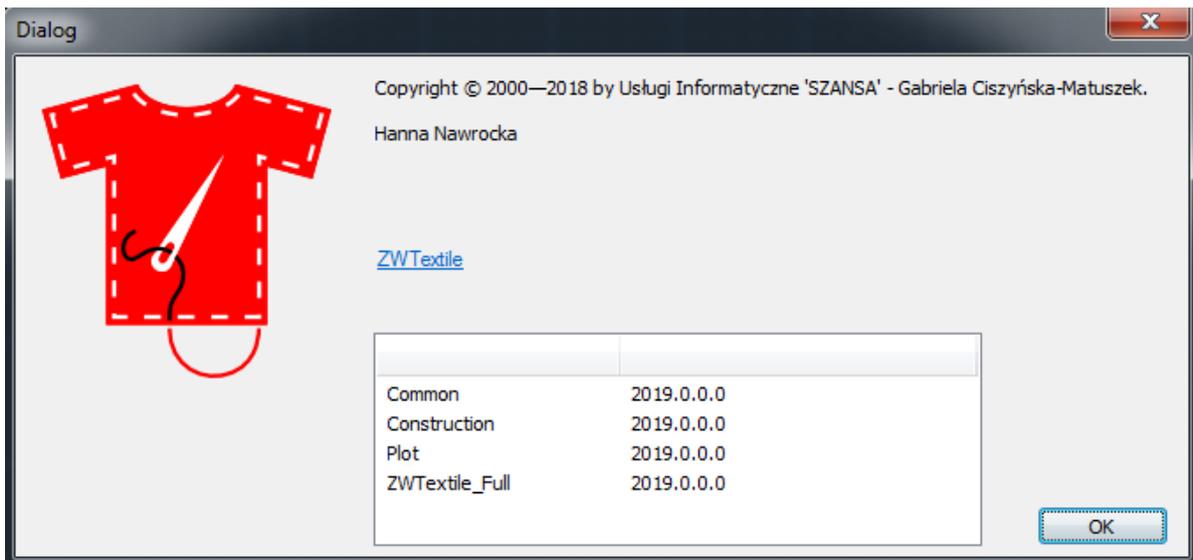


Once ZWCAD is launched, all functions of the program should be loaded and available.

### 3) About ZWTextile

This function informs the user about currently installed version of ZWTextile.

Command: `ZWTextile:About`



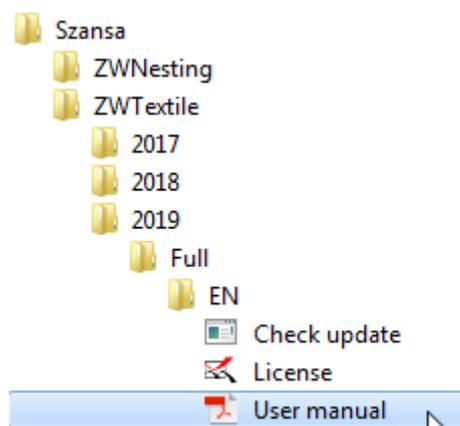
#### 4) Support

Once the function is called, a file containing the user manual will load.

The manual is also available in the Menu Start:

Menu Start -> All Programs -> Szansa -> ZWTextile -> 2021 ->  
Full -> EN

Windows 10: Menu Start -> Szansa -> User manual



Command: ZWTextile:Help

#### 5) Updating ZWTextile

ZWTextile license allows the user to update the program for as long as it will be supported.

Example:

The user buys ZWTextile 2021 and versions such as ZWTextile 2021 v.2.1 appear, the user will



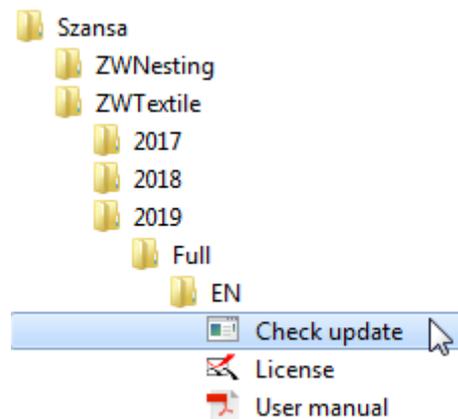
be able to update their ZWTextile for free.

However if ZWTextile 2021 comes out, the user will have to buy the new version in order to use it.

ZWTextile has the option to enable automatic updates if the license is up to date. In order to enable it you need to run the function from Menu Start and ZWCAD needs to be turned off:

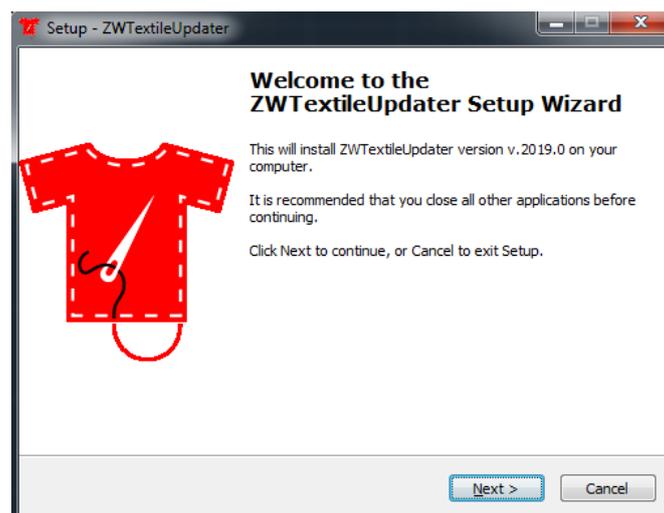
Menu Start -> All Programs -> Szansa -> ZWTextile -> 2021 -> Full -> EN

Windows 10: Menu Start -> Szansa -> Check update



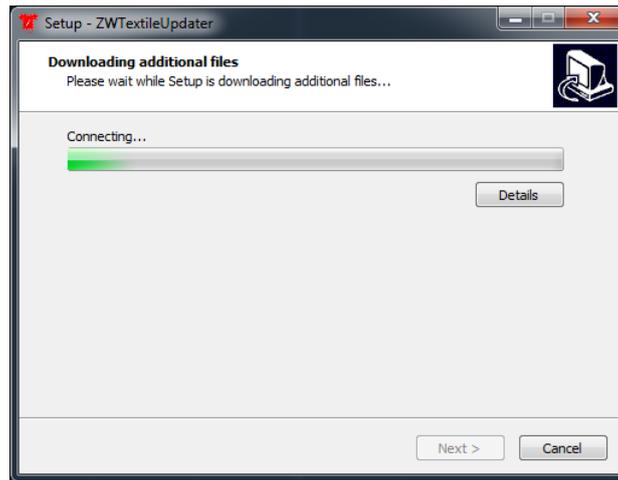
Command: ZWTextile:Update

Once the function has been turned on this window will appear:



Press Next to continue or cancel to stop the update.



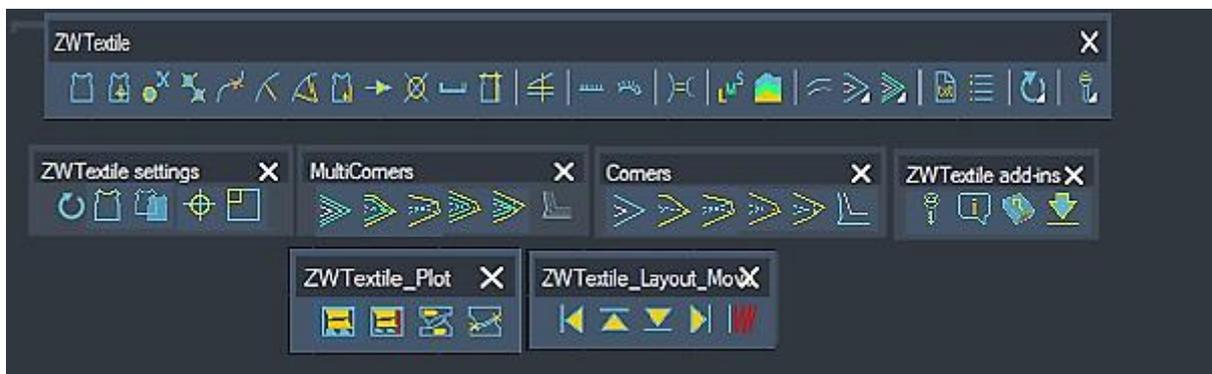


Once ZWTextile is update a window will appear confirming the action.

Clicking on `Finish` will launch ZWCAD.

## IV. Settings

Please enter the command `ZWTEXTILE` in the drawing space and confirm by pressing `Enter`. A toolbar will appear that allows for usage of all ZWTextile features. All functions of the add-on begin with `ZWTextile` and can be used from the command window.



**Note:** If a new version is installed it is important to reload the menu. In order to do that please enter the command `ZWTEXTILE` which will turn off the menu and retype the command `ZWTEXTILE` to load the menu.

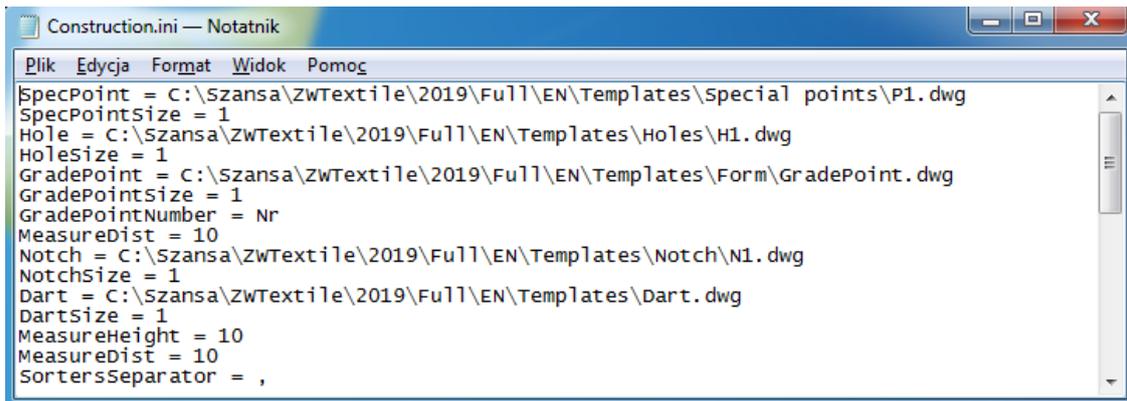
Depending on the user's needs, it is possible to change the view and size of objects inserted into the drawing with ZWTextile.

## ❖ Object size

In order to change the object size, open the file `Construction.ini` which can be found in the following folder:

`C:\Szansa\ZWTextile\2021\Full\EN\Config`

A file will open with defined object paths and their size. You will have the option to choose the size of the object by change the value within `Construction.ini` and by saving it.



Object save path: `SpecPoint =`

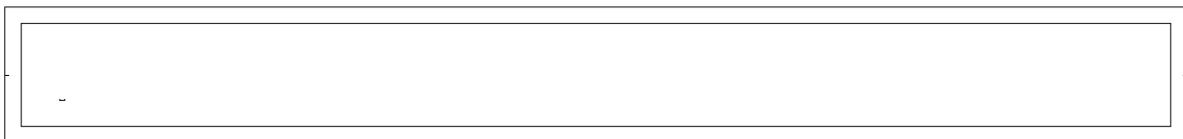
`C:\Szansa\ZWTextile\2021\Full\EN\Templates\Special points\P1.dwg`

Object size: `SpecPointSize = 1`

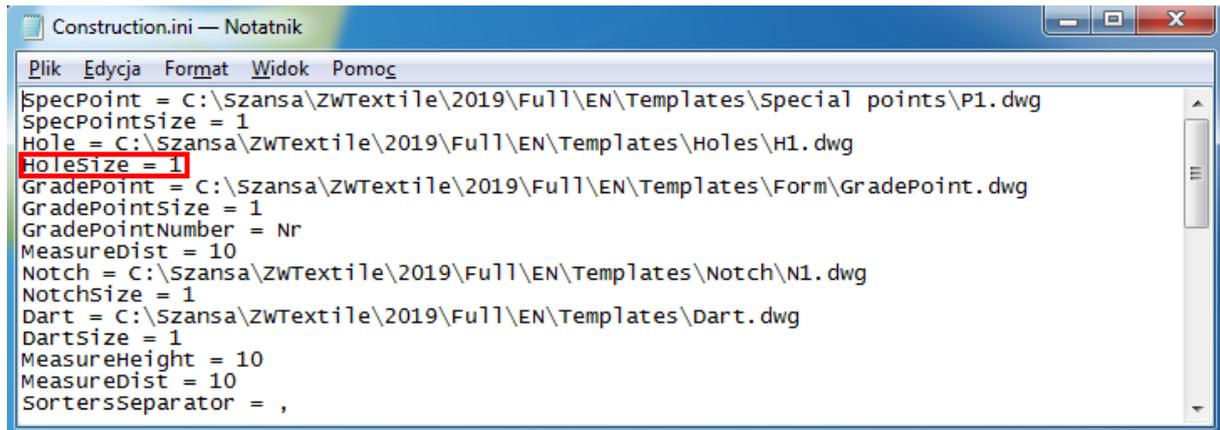
**Note:** The template file path may differ.

For example:

The command `ZWTEXTILE:HOLE` will insert a template of a hole into the drawing. When inserted, it is disproportionate to the sizes of the existing element.



Default value: `HoleSize=1`.



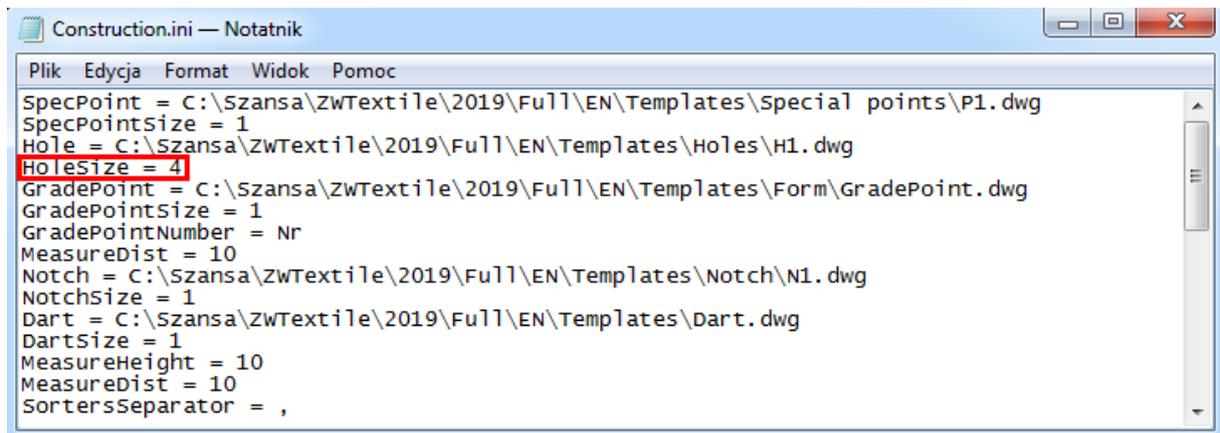
```

Construction.ini — Notatnik
Plik Edycja Format Widok Pomoc
SpecPoint = C:\Szansa\ZWTextile\2019\Full\EN\Templates\Special points\P1.dwg
SpecPointSize = 1
Hole = C:\Szansa\ZWTextile\2019\Full\EN\Templates\Holes\H1.dwg
HoleSize = 1
GradePoint = C:\Szansa\ZWTextile\2019\Full\EN\Templates\Form\GradePoint.dwg
GradePointSize = 1
GradePointNumber = Nr
MeasureDist = 10
Notch = C:\Szansa\ZWTextile\2019\Full\EN\Templates\Notch\N1.dwg
NotchSize = 1
Dart = C:\Szansa\ZWTextile\2019\Full\EN\Templates\Dart.dwg
DartSize = 1
MeasureHeight = 10
MeasureDist = 10
SortersSeparator = ,

```

In the file `Construction.ini` we can change `HoleSize=1` to `HoleSize=4`.

Now we have to save the changes `File->Save`.



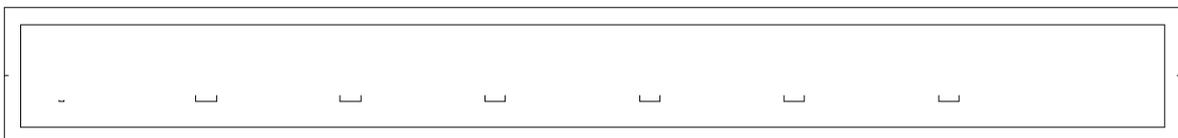
```

Construction.ini — Notatnik
Plik Edycja Format Widok Pomoc
SpecPoint = C:\Szansa\ZWTextile\2019\Full\EN\Templates\Special points\P1.dwg
SpecPointSize = 1
Hole = C:\Szansa\ZWTextile\2019\Full\EN\Templates\Holes\H1.dwg
HoleSize = 4
GradePoint = C:\Szansa\ZWTextile\2019\Full\EN\Templates\Form\GradePoint.dwg
GradePointSize = 1
GradePointNumber = Nr
MeasureDist = 10
Notch = C:\Szansa\ZWTextile\2019\Full\EN\Templates\Notch\N1.dwg
NotchSize = 1
Dart = C:\Szansa\ZWTextile\2019\Full\EN\Templates\Dart.dwg
DartSize = 1
MeasureHeight = 10
MeasureDist = 10
SortersSeparator = ,

```

After changing the value it is important to **close and reopen** the program because if we do not reopen it the changes will not load.

In a newly opened drawing the difference can be clearly seen.



#### ❖ Changing the template

The symbol that is inserted into the drawing via ZWTextile can be easily edited or even extended by the user. In order to do that we have to edit the template which can be found in the folder `Templates` or create a new file and save it in the same folder.

C:\Szansa\ZWTextile\2021\Full\EN\Templates

If a new template has been created, it needs to be loaded in ZWTextile. To do that open the file `Construction.ini` and change the file save path and save the changes.

#### ❖ Editing existing template of an object

It is necessary to open the defined template that is going to be edited e.g.

C:\Szansa\ZWTextile\2021\Full\EN\Templates\Special points



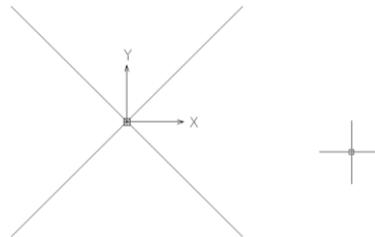
P1

2018-12-09 09:40

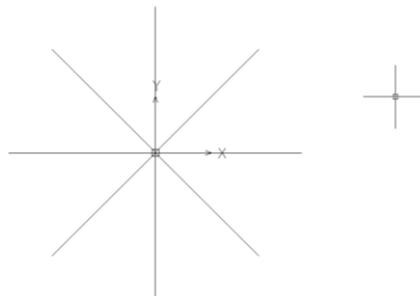
ZWCAD.Drawing

46 KB

Once opened, you will be able to see the template of special points. (Command: ZWTEXTILE:SPECIALPOINT).

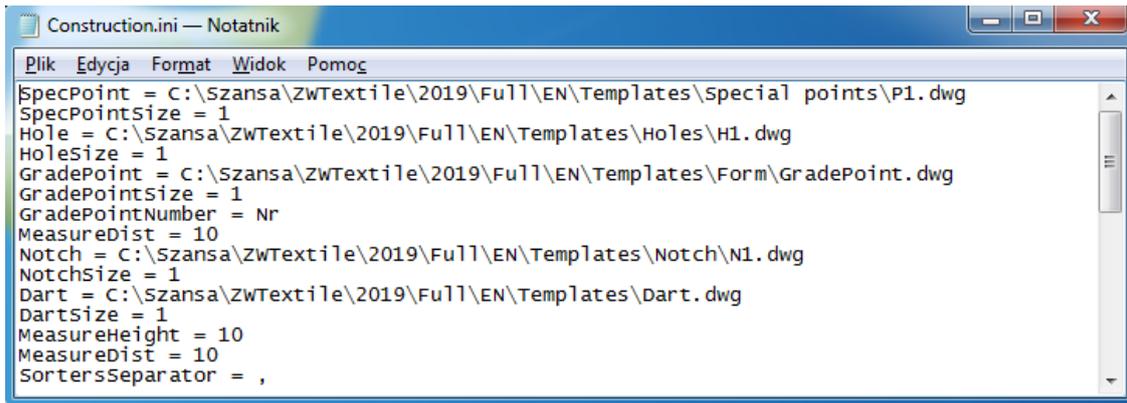


The user can make any changes but the save needs to be created under a different name.



The new template with a new name will have to be loaded into `Construction.ini`.

Please open the file `Construction.ini`.



```

Construction.ini — Notatnik
Plik Edycja Format Widok Pomoc
SpecPoint = C:\Szansa\zwTextile\2019\Full\EN\Templates\Special points\P1.dwg
SpecPointSize = 1
Hole = C:\Szansa\zwTextile\2019\Full\EN\Templates\Holes\H1.dwg
HoleSize = 1
GradePoint = C:\Szansa\zwTextile\2019\Full\EN\Templates\Form\GradePoint.dwg
GradePointSize = 1
GradePointNumber = Nr
MeasureDist = 10
Notch = C:\Szansa\zwTextile\2019\Full\EN\Templates\Notch\N1.dwg
NotchSize = 1
Dart = C:\Szansa\zwTextile\2019\Full\EN\Templates\Dart.dwg
DartSize = 1
MeasureHeight = 10
MeasureDist = 10
SortersSeparator = ,

```

In the first line we can see the path to load the special point into the drawing.

```
SpecPoint = C:\Szansa\zwTextile\2021\Full\EN\Templates\Special
points\P1.dwg
```

After saving the new template we have to input the new file path, it is recommended to save the new template in the same folder but with a different name.

The default template can also be edited in the default file. Remember that in order for the new template to be used you have to open a new drawing. In previous \*.dwg drawings the template will not change.

#### ❖ [Manually loading ZWTextile](#)

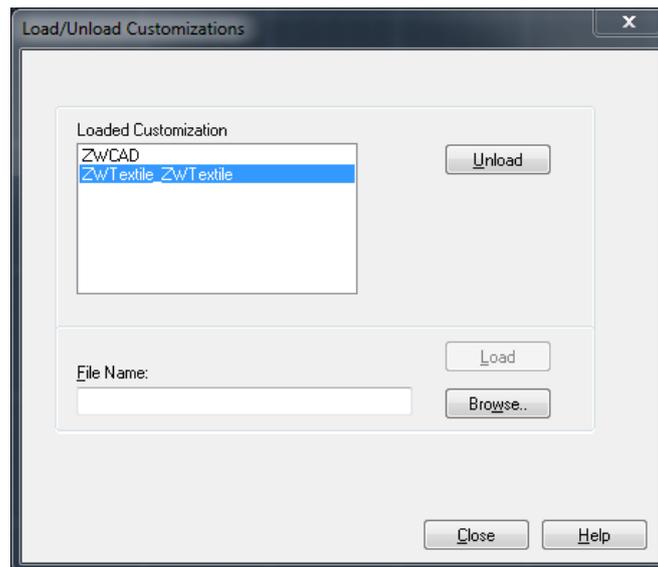
By default the program loads after clicking on the shortcut which is usually placed on the desktop after installation, however it is possible to load the add-on from ZWCAD.

#### [ZWTextile menu](#)

After ZWCAD loads enter the command `_MENULOAD`.

The following window will appear:

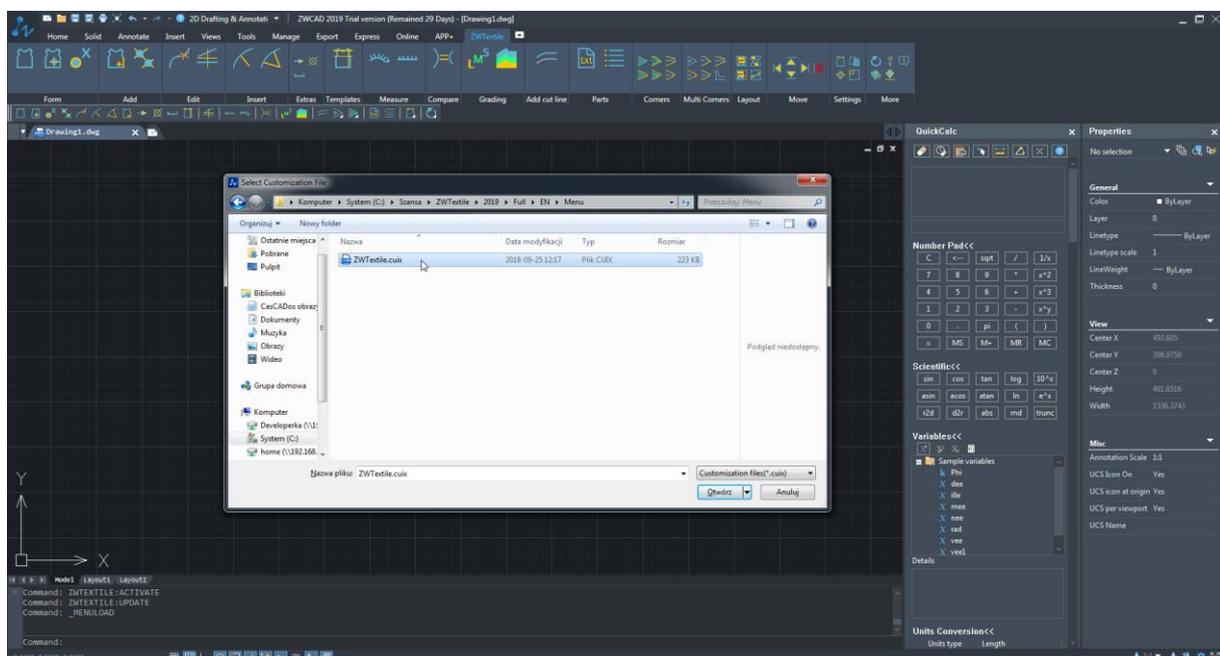




Click on **Browse** and choose the Menu of ZWT textile by selecting a file with the extension **\*.cuix**, which can be found in this folder:

C:\Szansa\ZWT textile\2021\Full\EN\Menu

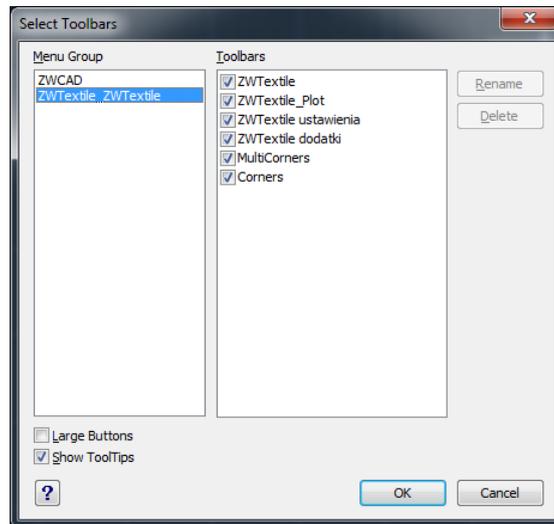
It is necessary to change the extension we are looking for in the windows window to **(\* .cuix)**.



After inputting the file, it is necessary to select it in the load menu by clicking **Load**. ZWT textile menu should appear in the program. If the menu is still not visible, please enter the command **TOOLBAR** in ZWCAD.



A window will appear in which you can select ZWTextile and then activate each and every ZWTextile toolbar:



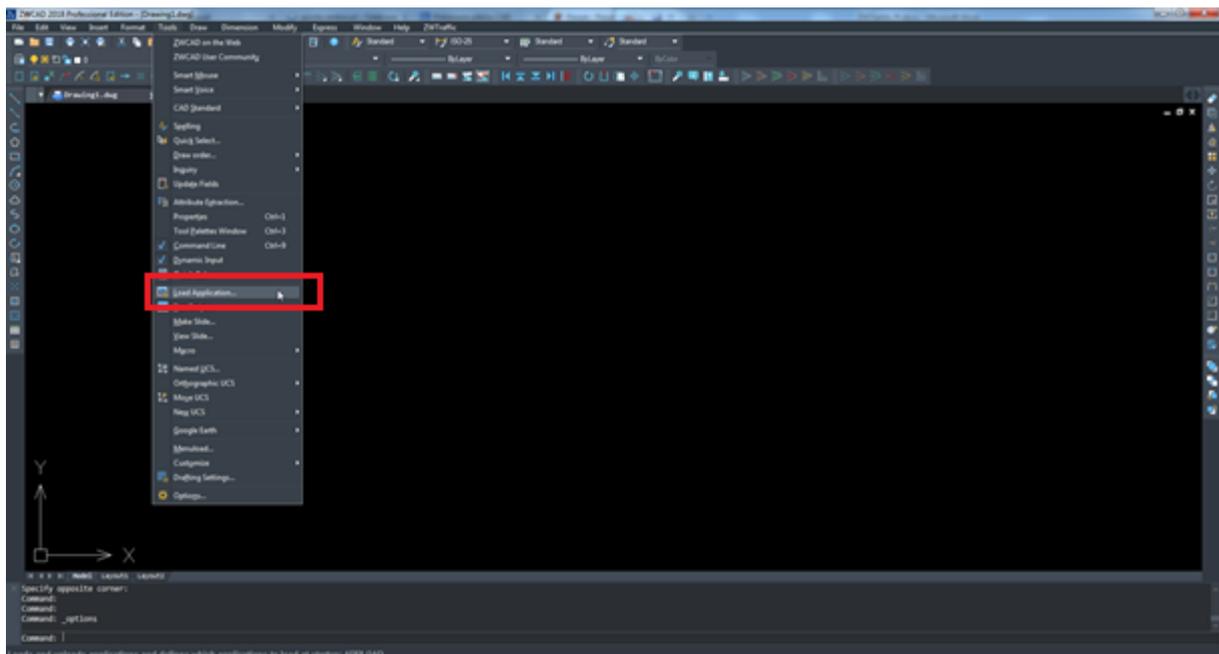
### Loading the add-on

Once ZWCAD is launched please enter the command `WCZYTAJAPL`.

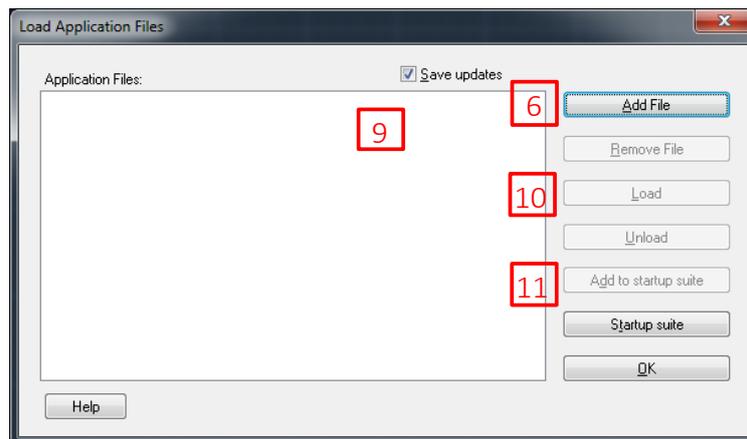
The load add-on window will appear where you will have to select the file `ZWTextile_Construction.zrx`. By default the folder which contains the file is located in this directory:

`C:\Szansa\ZWTextile\2021\Full\EN`

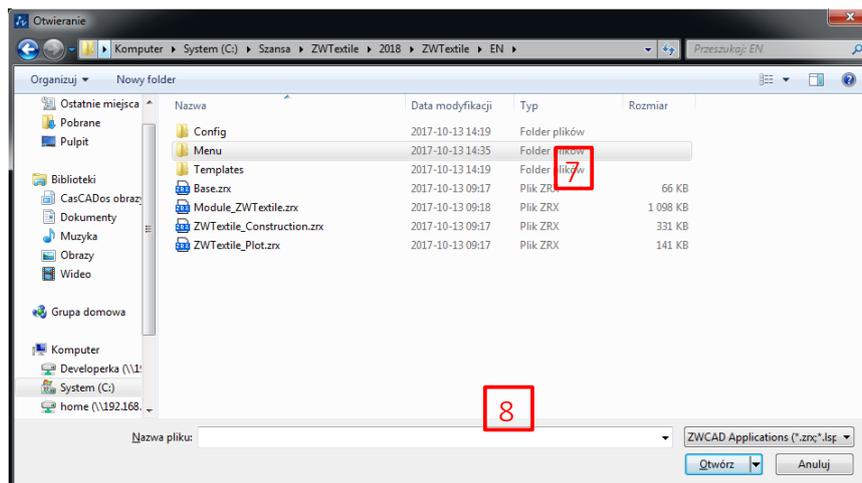
Tools -> Load application



This window will appear:



1. Here you need to click the button [Add file] [6], in the dialogue window that appears choose to display either extension „zrx” or „zel” if it’s not set by default.
2. Select the file with extension \*.zrx or \*.zel [7] and click on [Add] [8].



3. Afterwards, in the previous window select the file from the list [9] and load the file by clicking on the button [Load] [10]. Thanks to this, the functions of ZWTextile will be loaded into ZWCAD and they will be usable.
4. If the add-on is going to be automatically loaded every time ZWCAD starts up, please select [Add to start-up list] [11].

In order for the add-on to be loaded automatically in new drawings we need to add the file to the start-up list.

Select the file in the application load window and add it to the start-up list and confirm by

clicking OK.

### 1) Regen

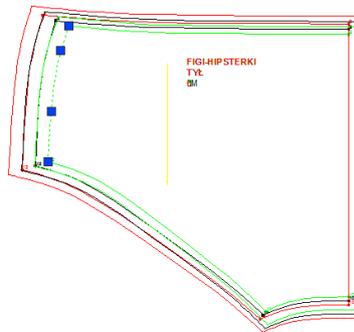
Regen regenerates the whole drawing and calculates coordinates of the screen for All objects in the current layout. It ensures efficiency, good quality of displaying and selecting objects.

Command: REGEN

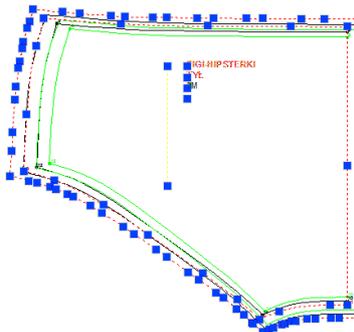
### 2) Group Selection Switch

This function allows for Turing on and off grouping of elements in a drawing.

The user can work on objects that are not connected with each other, which means that every line will be a separate element on a drawing:

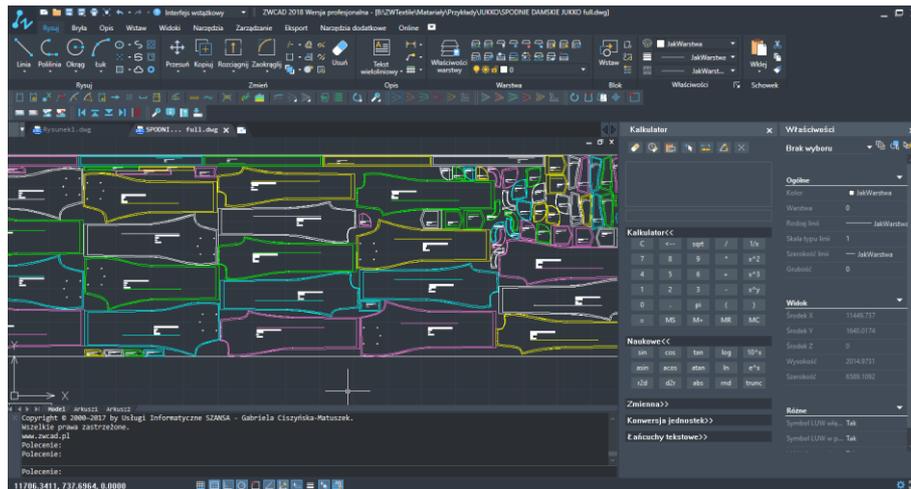


It is also possible to work on objects which are grouped, so that when selecting a single element, the highlight will show a number of them, because they are connected.

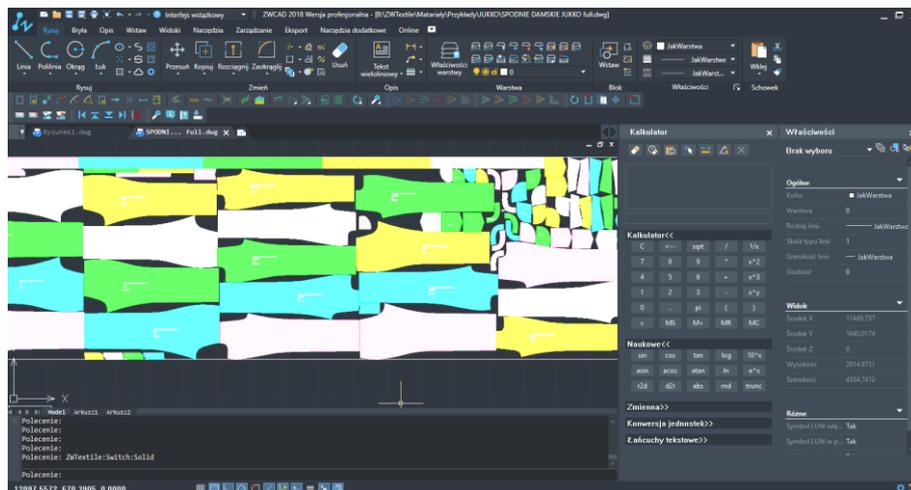


### 3) Fill/Solid

This function allows for filling with a colour of the inside area of used form in the layout



Once the function is turned on within the file that contains an array, the forms in the file will be filled in with colour:

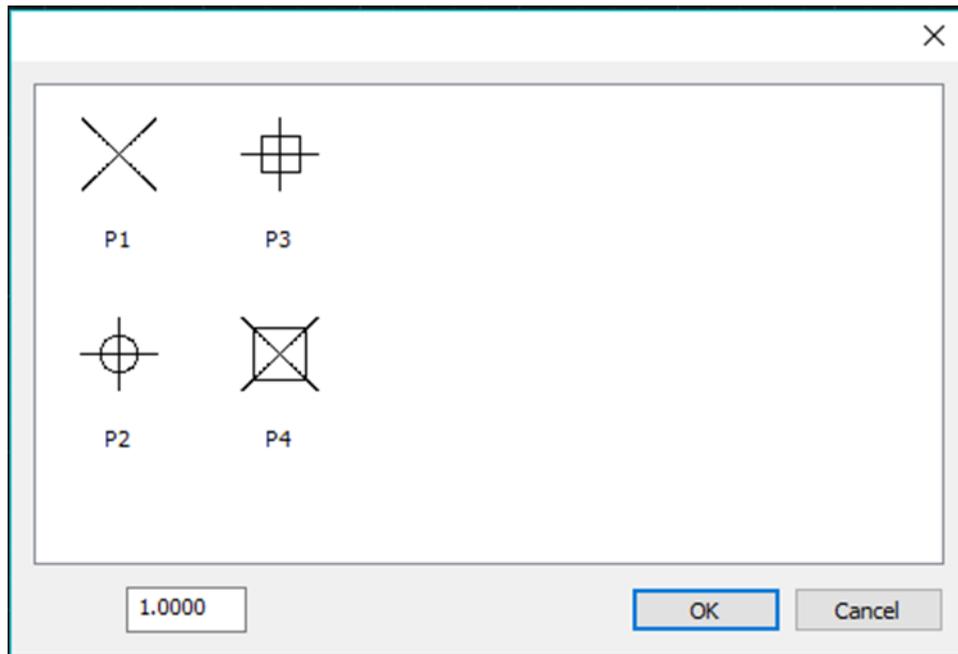


The fill can be activated and deactivated by using one function.

#### 4) Point

This command helps to define the style of points within the drawing.

Once the function is turned on, we will be able to see the following window in which you can choose the style of a point as well as its size.



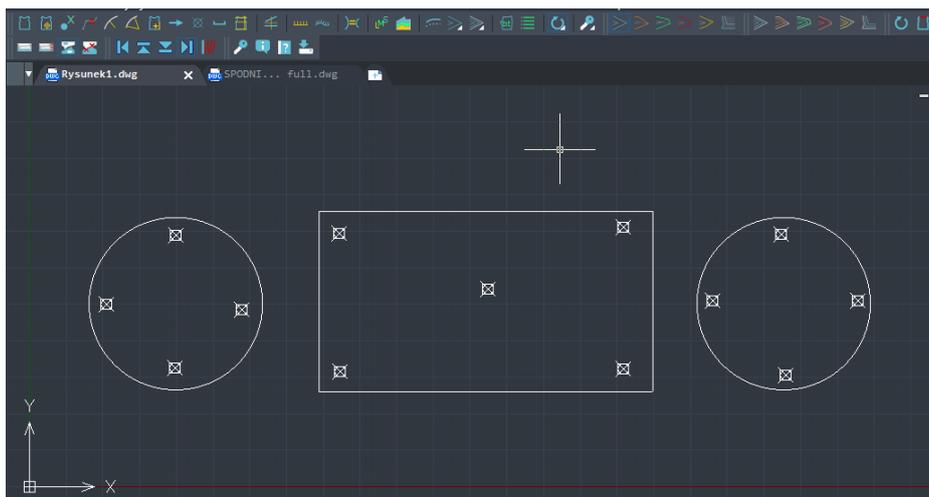
When changing the point style it is necessary to remember that points which were inserted into the drawing will also change.

In the dialogue window we can define the point style by clicking on a desired type.

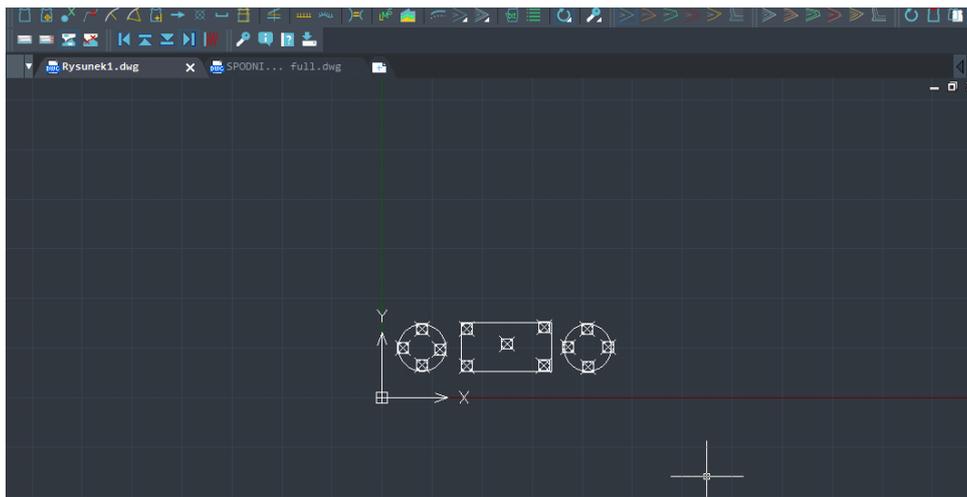
The size of points can be defined in screen units, % or in drawing units.

Points defined in screen units will be the same size, they will not change depending on the scale.

The view of the objects zoomed in:



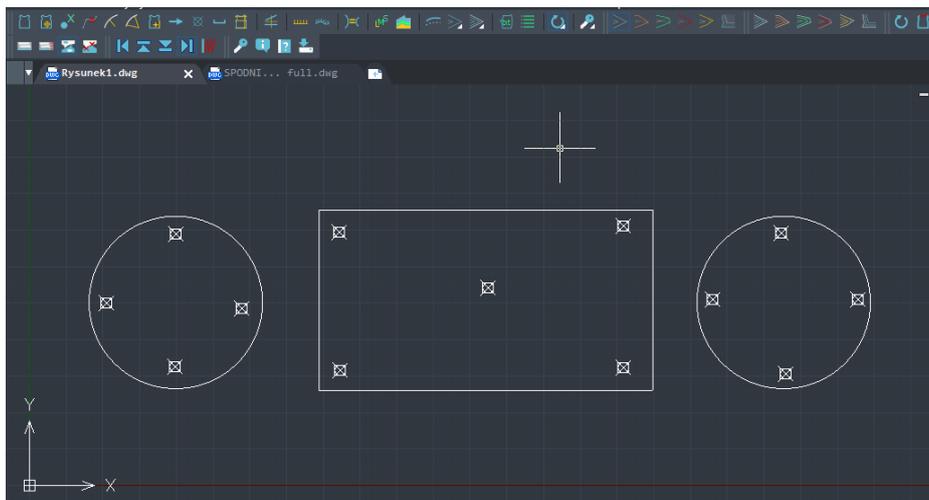
The view of the objects zoomed out:



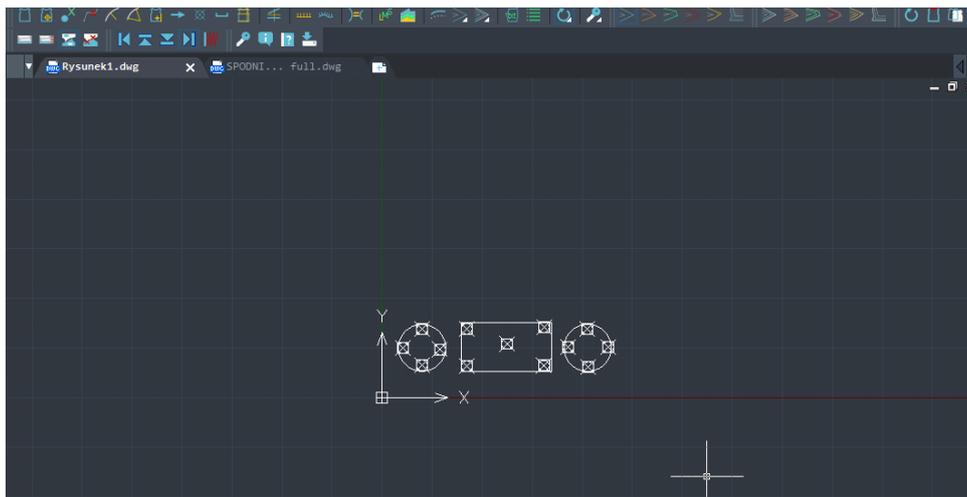
On the example above we can see that points are of the same size even though the view was zoomed in and out.

The point defined in drawing units will change its size depending on the view of the drawing.

The view of elements zoomed in:



The view of elements zoomed out:

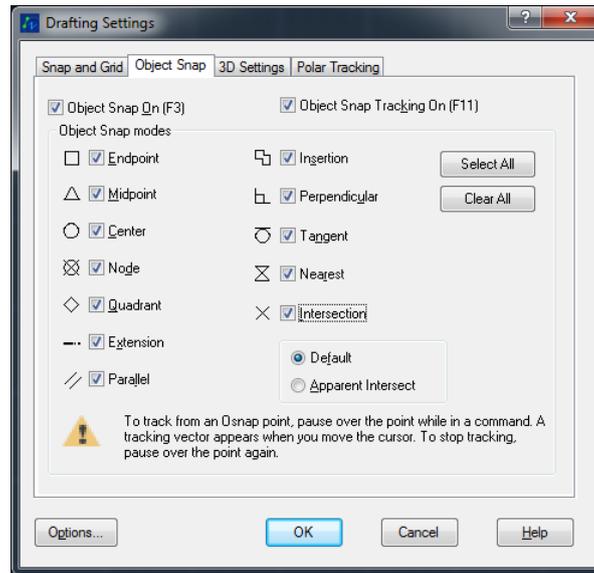


From the above example we can see that points did not change their size in respect to different objects on the drawing.

### 5) Object Snaps

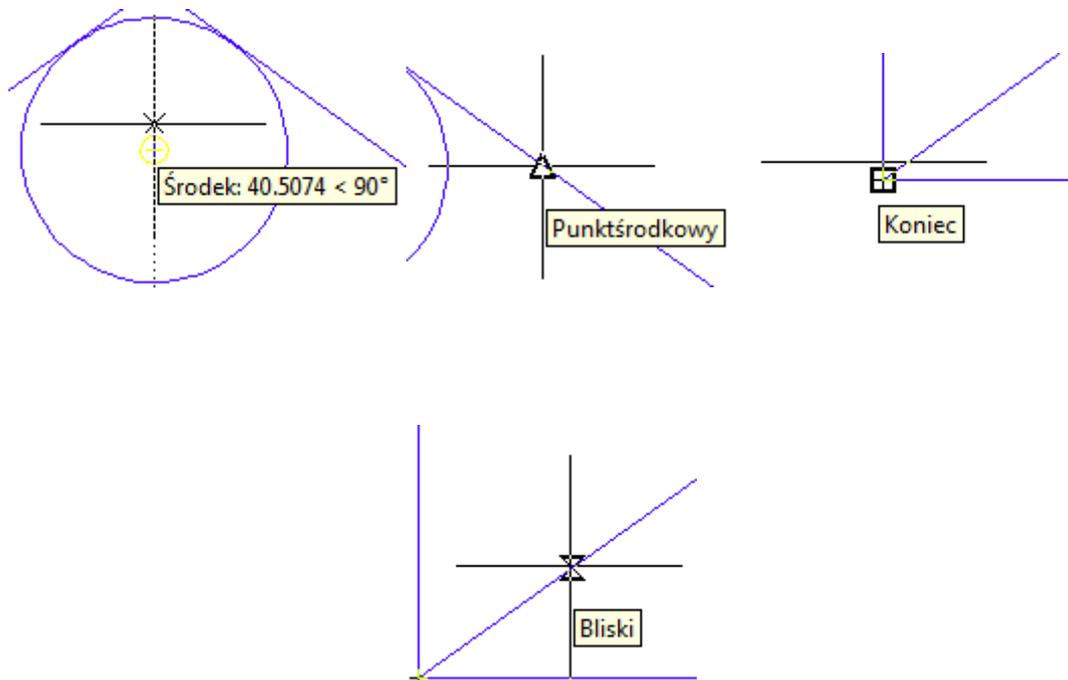
Object snaps are responsible for grabbing the cursor to the existing object on a drawing.

After turning the function on a window like the one below will appear, in which we can choose the elements to which the cursor will be connected.



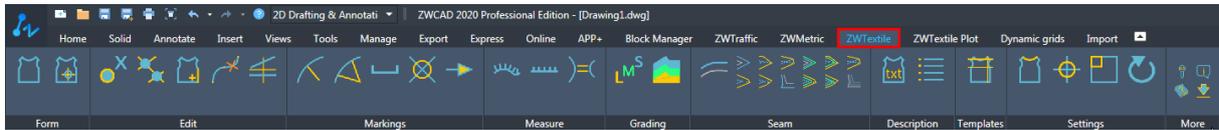
In the dialogue window we can choose certain elements by activating them one by one or clicking on Select All.

Below you can see some examples of Object Snaps:



## V. Working with ZWTextile – Base Module

Base module will be loaded automatically after installing ZWTextile.



After clicking on ZWTextile module, all functions in the base module will be available.

### 1. Step 1 : Construction and modeling of forms

#### 1) ZWCAD: Draw

The functions responsible for creating objects can be found in the ribbon Draw

##### ✓ Line

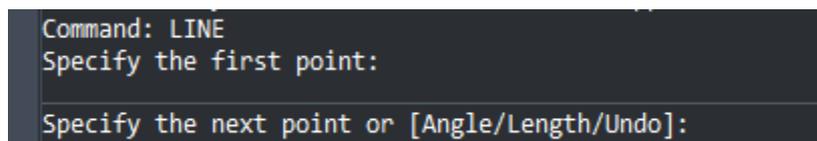
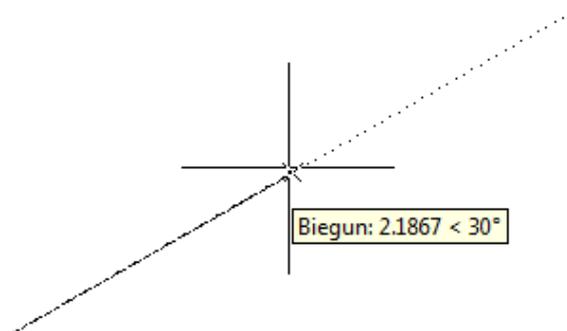
Creates straight lines

Create a line entity by clicking in the drawing area or inputting the coordinate values. Before pressing Enter to exit the command, users can create a series of continuous lines by specifying next points.



LINE

Create a line by specifying the endpoint of a line, confirm by enter and end by pressing escape on your keyboard.



**Tip:** In order to launch the function again, after it has finished press enter.

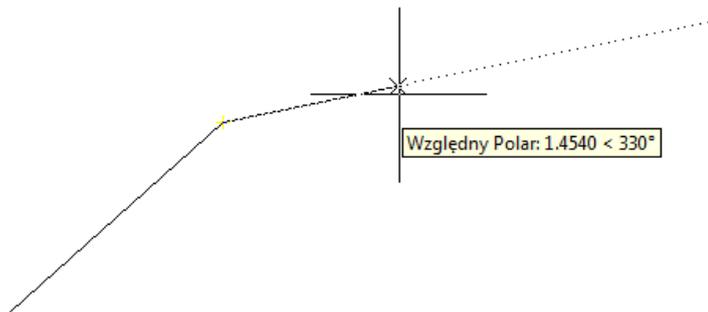
### ✓ Polyline

Creates a 2D polyline.

2D polyline is a single object containing segments of lines and arcs.

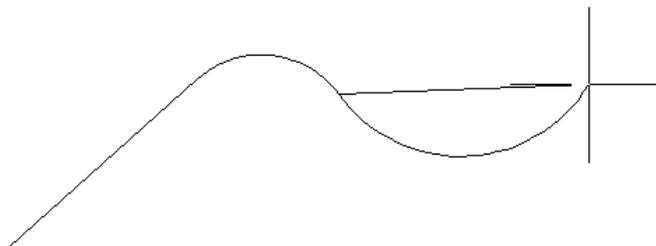


Specify the first point, next points or end.



```
× Command: PLINE
Specify the starting point of polyline:
Current width is 0.0000
Specify the next point or [Arc/Distance/Halfwidth/Width]:
Specify the next point or [Arc/Distance/Halfwidth/Width/Undo]: |
```

In the command bar the options regarding polylines appear, you can change the straight line into an arc for example. In order to do that Just type in the corresponding shortcut, in this case its U and confirm with enter.



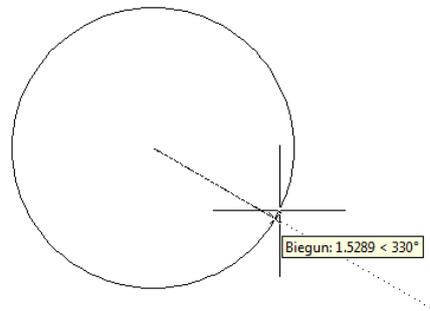
### ✓ Circle

Creates a circle with the given parameters.



Center, Radius

In order to Draw a circle of this kind, specify the center of the circle and its radius by entering it in the command bar.



```
Command: CIRCLE
Specify the center point of circle or [3P/2P/Ttr (tangency tangency radius)]: 3
Specify circle radius or [Diameter]: 80
```

The command bar will ask for the value of the radius but its diameter can also be entered by choosing the option D.

✓ Arc

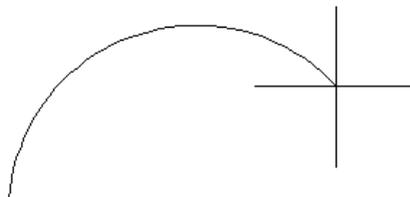
Command allows for the drawing of arcs.

In this kind of an arc it is necessary to specify 3 points on a drawing.



BY 3 POINTS

Once the function has been turned on, you will need to specify 3 points of an arc: the start, middle and end.



```

× Command: ARC
Specify the starting point of arc or [Center]:
Specify the second point of arc or [Center/End]:
Specify the endpoint of arc:
Command:

```

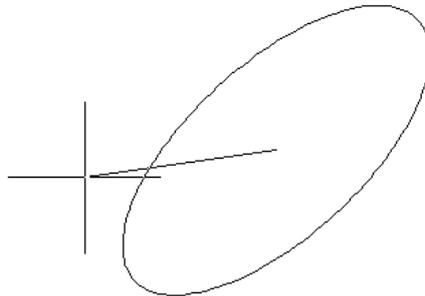
### ✓ Ellipse

Creates an ellipse by specifying its center point and two endpoints of the two ellipse axes.



ELLIPSE

Draw an ellipse by specifying two endpoints of the ellipse axis and another point in the ellipse.



```

× Command: ELLIPSE
Specify the first end of ellipse or [Arc/Center]:C
Specify the center of ellipse:
Specify the endpoint of axis:
Specify the other axis or [Rotation]:
Command:

```

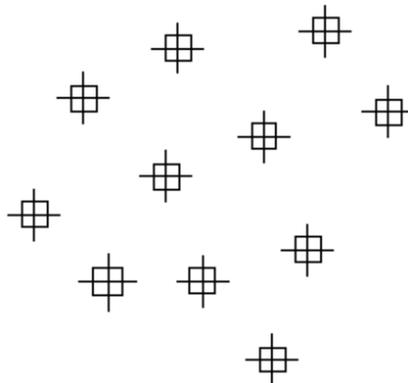
### ✓ Multiple Points

This function lets you create one or many points.



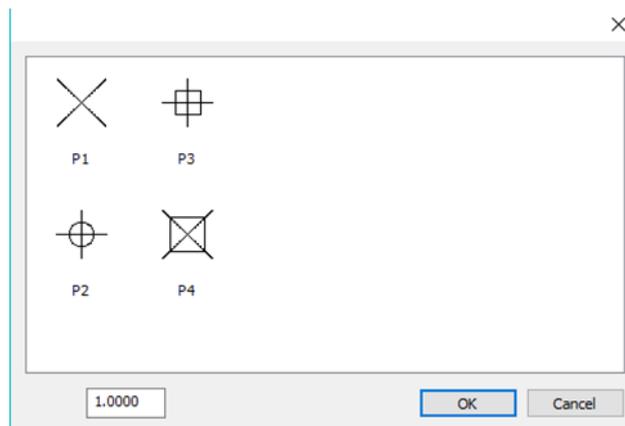
Multiple Points

Once activated, select the insertion points.



In the options that appear in the command bar, you will be able to Access the settings of points by typing in S. Once confirmed, a window with points settings will appear.

It is possible to choose the point style and its size.



Once confirmed by clicking on OK, you will be able to input the points within your drawing.

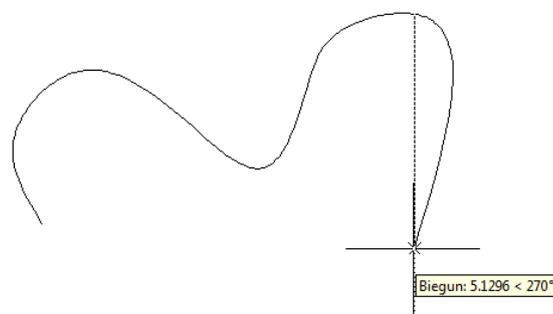
### ✓ Spline

This function lets you create a matching and smooth curve to an array of points with determined tolerance.



Creating a curve by using a spline consists of specifying points through which it will pass.

The curve will not be connected to points with straight lines but with matching arcs, which will pass through points that are specified by the user.

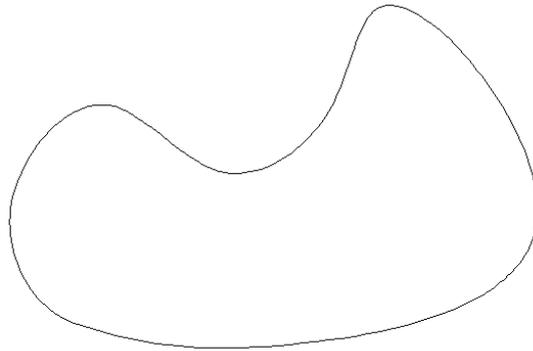


```

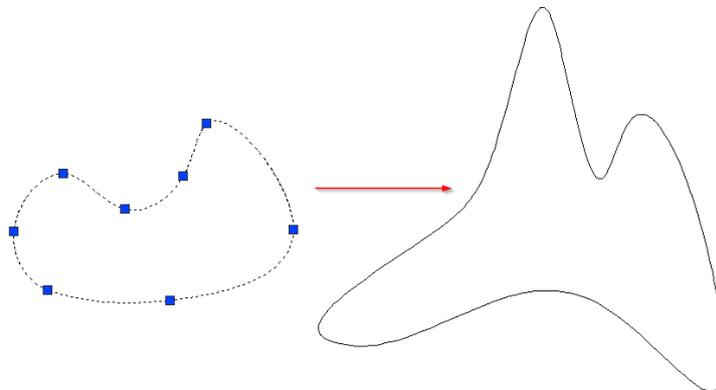
Command: SPLINE
Specify the first point or [Object]:
Specify the next point:
Specify the next point or [Close/Fit tolerance/Undo] <start tangent>:

```

In order for the envelope to be closed, you need to type in C when you see the option to do so, thanks to this the end point of the curve will be connected with its beginning.



Spline is created from one element – a curve. After left Mouse clicking on the element, it will be highlighted and grips will appear of points that are on the curve. Each one of those points will be clickable and movable therefore becoming an editable object.



### ✓ Editing splines

Spline can easily be modified, there is a specific tool which helps to do that.



Editing splines

When editing a spline we have the following options available:

```

Command: SPLINEDIT
Select a spline:
Enter an option [Fit data/Close/Move vertex/convert to Polyline/Refine/rEverse/Undo/eXit] <eXit>: |

```

In order to choose the wanted option, type in the correct shortcut.

- **Fit data**– Adds a new point to the envelope.

- **Close** – Modifies the object depending on whether the spline is opened or closed.
- **Move vertex** – This option allows you to change the positioning of the vertex.
- **Convert to polyline** – Converts a spline to polyline.
- **Refine** – Changes the properties of a spline.
- **Reverse**
- **Undo**

## 2) ZWCAD: MODIFICATION

The functions responsible for creating objects can be found in the ribbon `Modify`

### ✓ Move

Moves the selected object to a specified position.

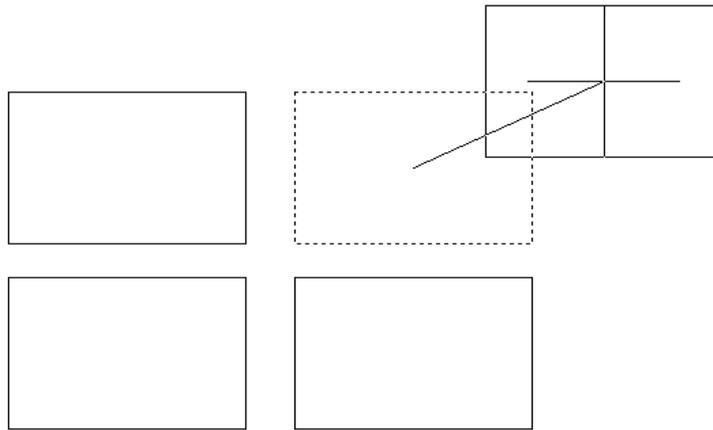


To move an element of the drawing, activate the command and select the object. The command bar will ask for a base point or to determine a displacement.

In order to offset with a coordinate, type in the shortcut `O` in the command bar and then the value of coordinates displacement.

```
× Command: MOVE
Select objects:
1 found
Select objects:
Specify the base point or [Displacement] <Displacement>: D
Specify the displacement <0.0000, 0.0000, 0.0000>:
```

You can also achieve the move function manually, firstly specify the base point of an object and then move it by using the mouse in a chosen direction.



```
Command: MOVE
Select objects:
1 found
Select objects:
Specify the base point or [Displacement] <Displacement>:
```

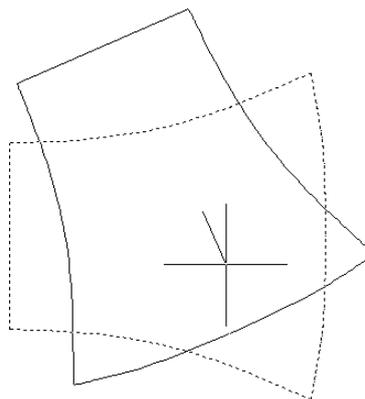
### ✓ Rotate

Moves the selected object around its base point.



Rotate

In order to rotate the object you need to activate the function and specify the base point of the object that is going to be rotated.



```
× Command: ROTATE
Select objects: Specify opposite corner:
2 found
Select objects:
Specify the base point:
Specify the rotation angle or [Copy/Reference] <0>:
```

In the command bar you can enter the angle of rotation or rotate it by using the mouse. To confirm press enter or use the left mouse button once.

### ✓ Copy

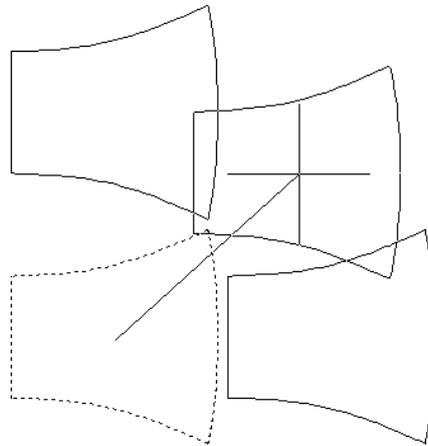
Copies the objects in a set distance.



Copy

Thanks to this function it is possible to copy existing objects on a drawing.

Activate the command and select the objects that are to be copied. There will be a message in the command bar which will ask you to specify the base point of objects or a move value.



```
Command: COPY
Select objects:
1 found
Select objects:
Specify the base point or [Displacement/mOde] <Displacement>:
Specify the displacement <0.0000, 0.0000, 0.0000>:
```

Until the function has been completed, the elements will appear underneath the mouse cursor.

### ✓ Mirror

This function creates a mirror copy of objects.

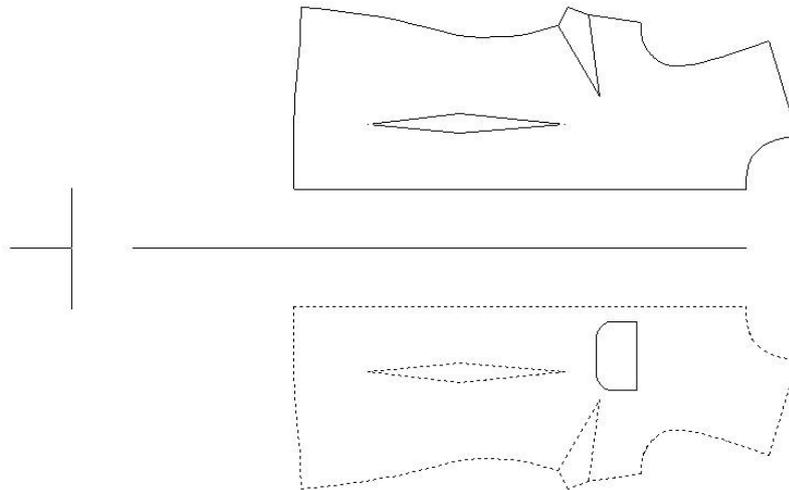
The program adapts a line made with two points as a reference for the mirror copy of a selected object.



Mirror

Activate the command and select the elements individually or collectively.

Afterwards determine the first and the second point on the mirror axis.



```
Command: MIRROR
Select objects:
1 found
Select objects:
Specify the first point of mirror line:
Specify the second point of mirror line:
Delete the source objects? [Yes/No] <No>: N
Command:
```

There will be a message in the command bar asking you whether you would like to remove the source objects from which the mirror was created.

Select YES if you want the source elements to be removed or NO if you would like for them to remain.

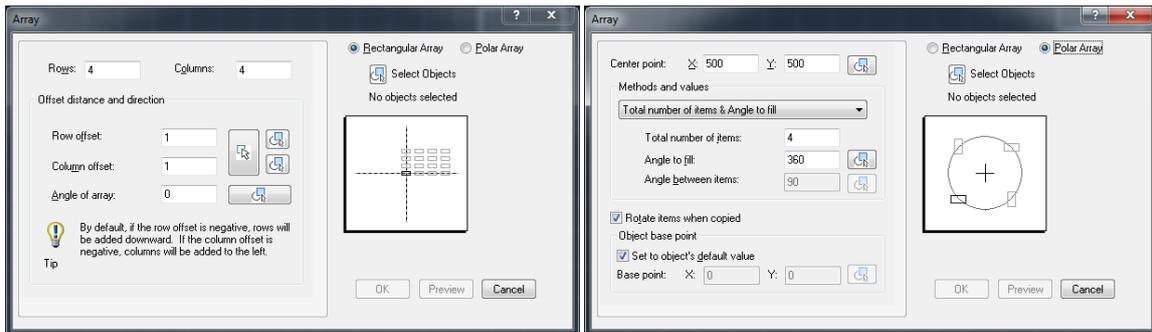
#### ✓ Array

Creates many copies of an object according to the set pattern.

This command lets you create a single as well as multiple object array. When executing the command, the program will consider multiple array as one.

#### Array

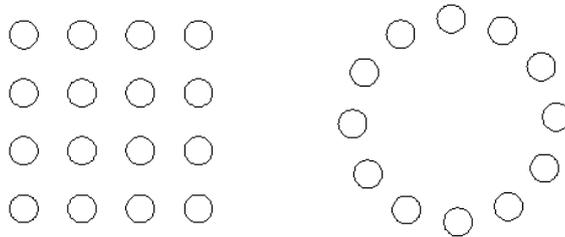
The array function has two options, rectangular array and polar array.



Depending on the users choice, parameters need to be specified.

Activate the command, Define the type of array and input the values. Afterwards click on the

icon Select Objects  and specify the object from which an array will be created.



Once confirmed with OK, the array will be entered within the drawing.

#### ✓ Stretch

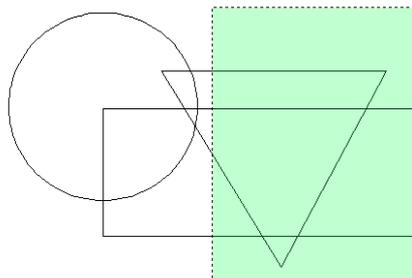
Stretches and moves the objects



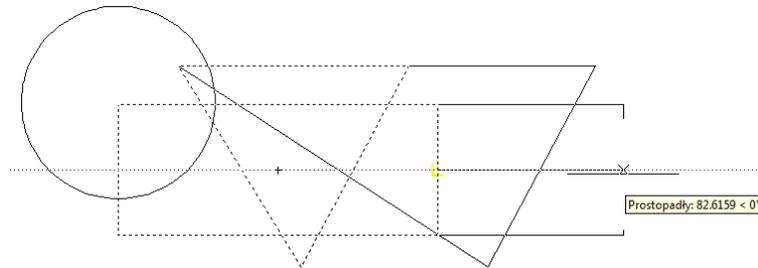
Stretch

By using this function it is possible to stretch selected elements and move part of objects whilst ensuring that they are still connected with other parts.

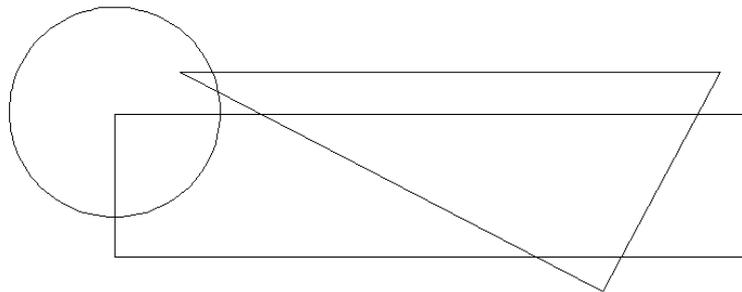
Activate the command and select using your mouse the objects that are to be stretched.



Determine the base point and specify the move value in the command bar or by using the mouse.



After stretching selected elements, an object like this is formed:



#### ✓ Scale

Zoom in or zoom out the selected object in a certain scale.



Scale

Select a point to act as the scale center point. The selected object will zoom in or out according to the movement range of the cursor.

If the scale value input is greater than 1, the object will be zoomed in; if the value is a decimal between 0 and 1, the object will be zoomed out.

```
Command: SCALE
Select objects: Specify opposite corner:
3 found
Select objects:
Specify the base point:
Specify the Scale factor or [Copy/Reference] <1.0000>: 2
Command: |
```

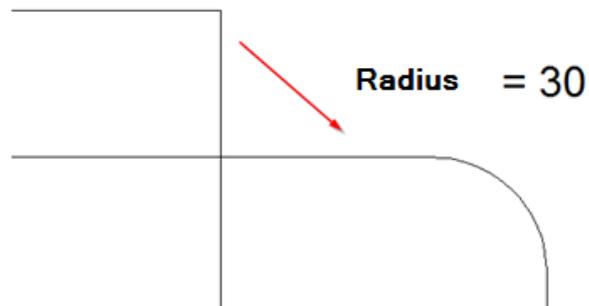
#### ✓ Fillet

Fillets the objects.



Zaokrąglij

Create fillet for two segments of arcs, circles, elliptic arcs, lines, polylines, rays, splines and construction lines in the specified radius.



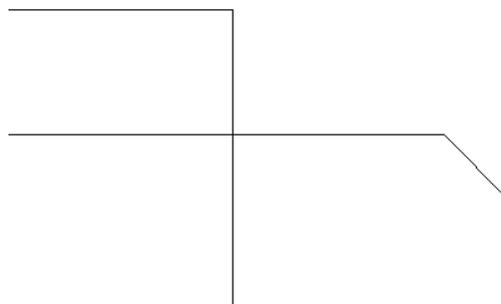
```
Command: FILLET
Current settings: mode = TRIM, radius = 0
Select the first entity or [Polyline/Radius/Trim/Multiple/Undo]:
Fillet radius <0>: 30
Current settings: mode = TRIM, radius = 30
Select the first entity or [Polyline/Radius/Trim/Multiple/Undo]:
Select second object or shift-select to apply corner: |
```

#### ✓ Chamfer

Create a chamfer.



Create a chamfer on two lines, polylines, rays and construction lines. If the entities you want to chamfer are not intersected, the system will automatically trim or extend them for chamfering.

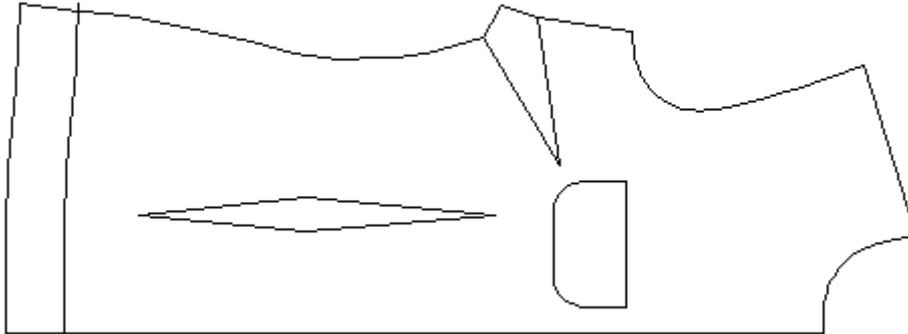


```
Command: CHAMFER
Current settings: mode = TRIM, dist1 = 0, dist2 = 0
Select the first line or [Polyline/Distance/Angle/mEthod/Trim/Multiple/Undo]: D
Chamfer mode now set to Distance method.
Specify the chamfer distance on base entity <0>: 20
Specify the chamfer distance on the other entity <20>:
Please specify second point to get distance:
Select the first line or [Polyline/Distance/Angle/mEthod/Trim/Multiple/Undo]: |
```

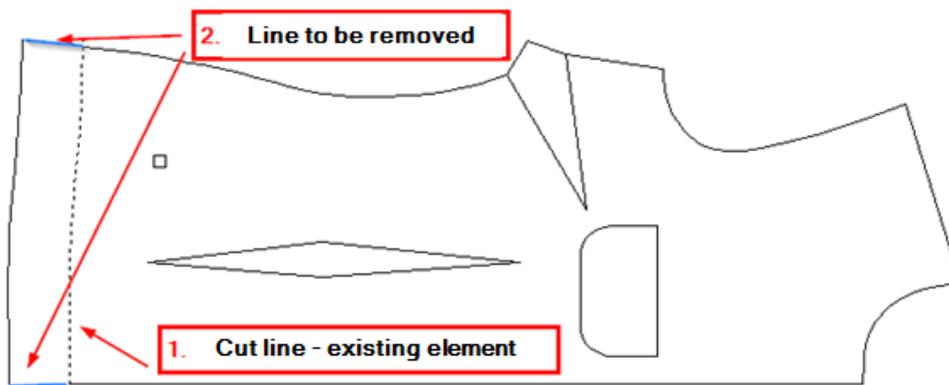
✓ Trim

--- Trim

Trim the part Beyond the boundary relative to the entity. Elements that can be trimmed include an arc, circle, elliptic arc, straight line, open 2D or 3D polyline, ray, spline and Xline.

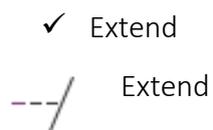


For example we have decided to trim the template below:

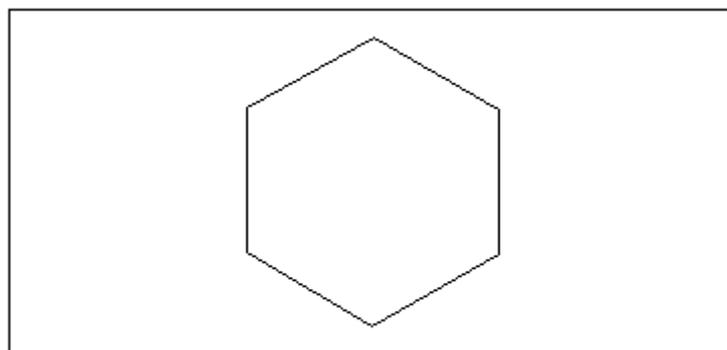


1. Activate the command.
2. Specify the trim line.
3. Select the elements that are to be cut.

**Note:** Remember that if the cut line does not go through the element which we want to cut, the function will not carry out the action.

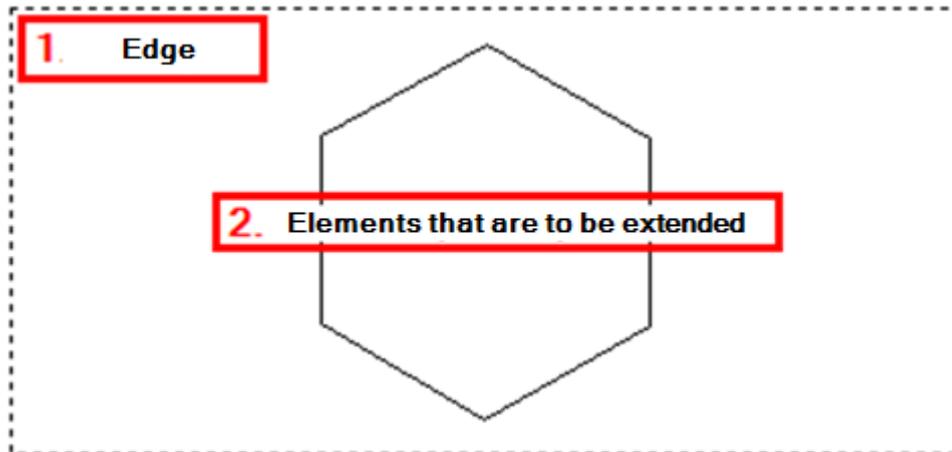


Extend a line, an arc, a 2D polyline or a ray to another object. Such entities as a polyline, an arc, a circle and an ellipse could be used as boundary entities.

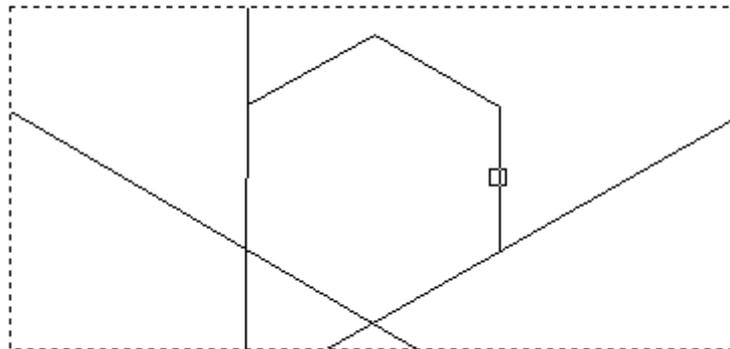


For example we will extend the object above.

The rectangle is used to create a boundary to extend the element to it.



After specifying the elements that we would like to extend, each one of them gets extended to the edge of the rectangle.

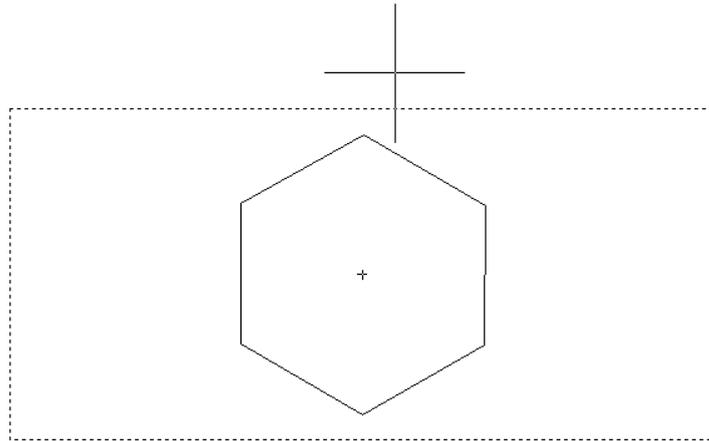


✓ Offset



Offset

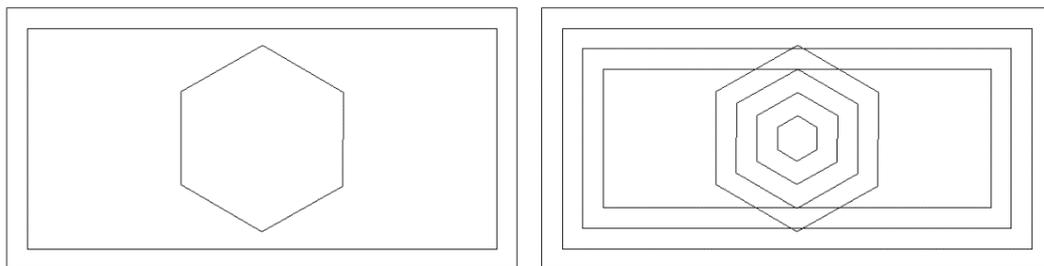
Offset and copy the chosen entity based on a specific point or specified distance to make the entity copy parallel to the original entity. If the chosen entity is a circle, a concentric circle will be created. If the chosen entity is a line, a line parallel to it will be created.



Once the command is activated, you need to choose the object that is going to be moved.

```
Command: OFFSET
Specify an offset distance or [Through point]: T
Select object to offset or [Undo/Exit] <Exit>:
Through point:
```

In the command bar you can enter an offset value or specify it directly on the drawing. After selecting an object and specifying the offset value, you need to choose the offset direction.



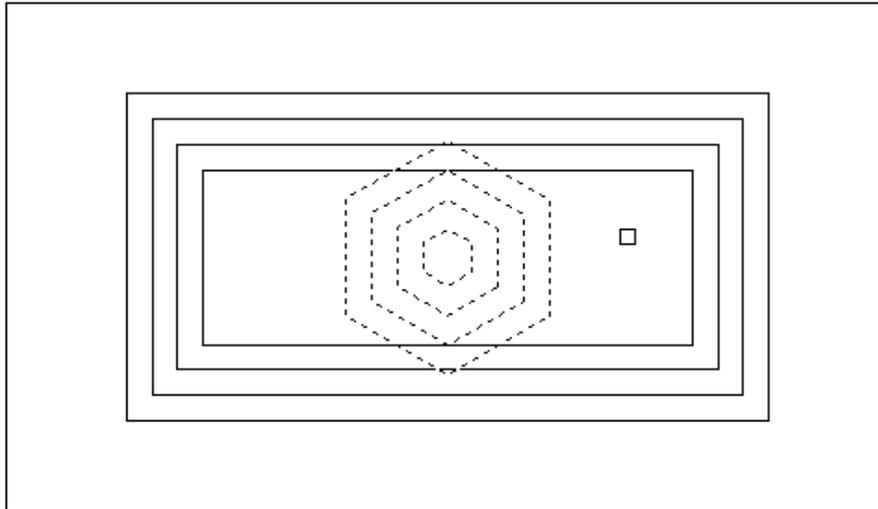
✓ Align



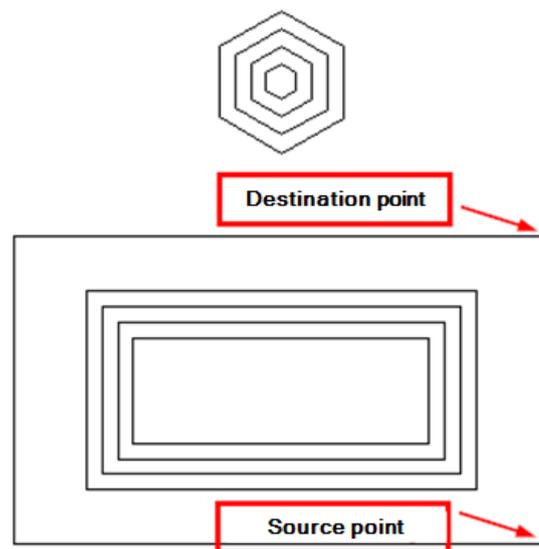
Align

Align the selected object to other objects in 2D and 3D space.

Once activated it is necessary to add source point to the selected object and add destination point to object to be aligned, and align the source object to the destination object.



Once specified, the objects will be aligned just like on the example below:



The source point is a point which is responsible for alignment of selected elements. Punt  
The target point is responsible for the distance of the aligned elements.

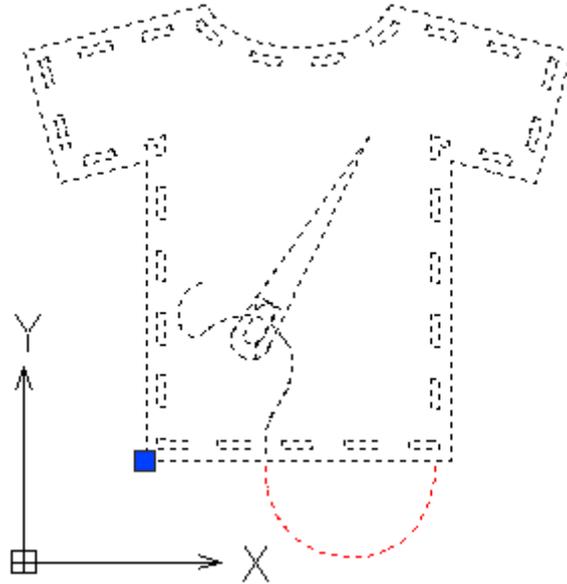
✓ Explode



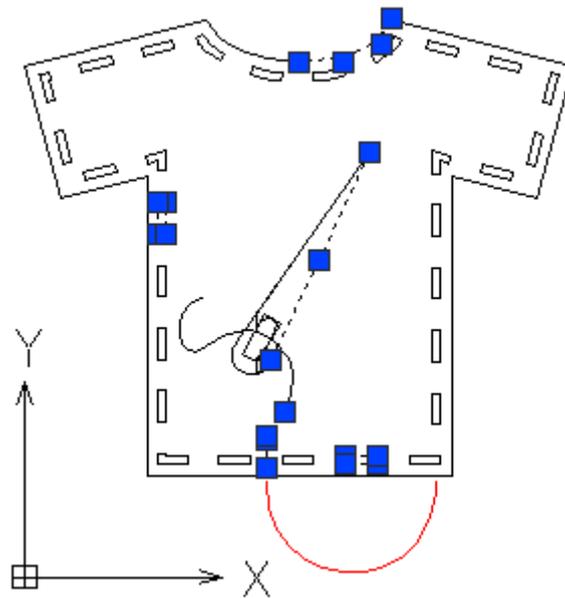
Explode

Break compound entities into stand-alone objects.

This block is created from many single entities which create a whole object.



After activating the command and specifying the block to explode, elements that create the whole object will be divided and they will be selectable.



### 3) ZWCAD: DIMENSIONING

Dimensioning options can be found in the ribbon *Dimensions*

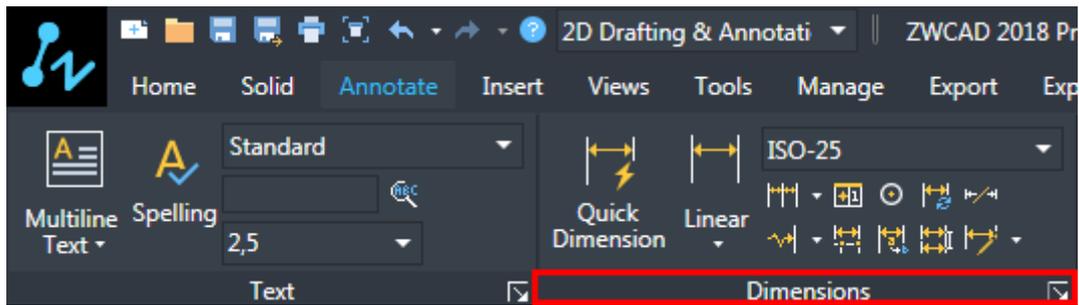
Start the mode of Dimension, and label the entities in the drawing in various ways. With the DIMENSION command, the mode of Dimension will remain after the command is executed.

Editing the dimension style:

The dimensions can be edited before they are inputted into the drawing.

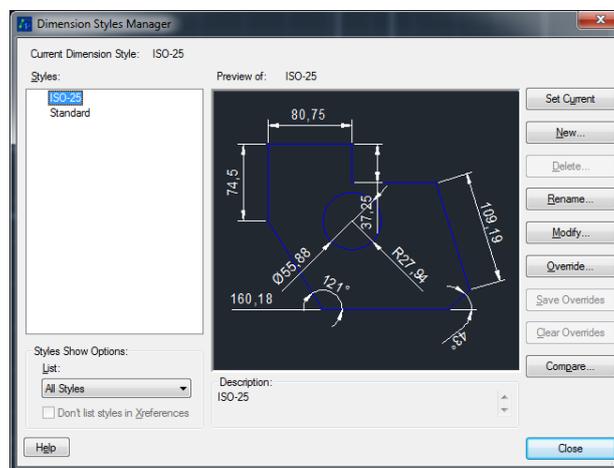
In order to do so, it is necessary to launch the *Dimension Styles Manager*

The manager window can be found in the ribbon Annotate -> Dimensions



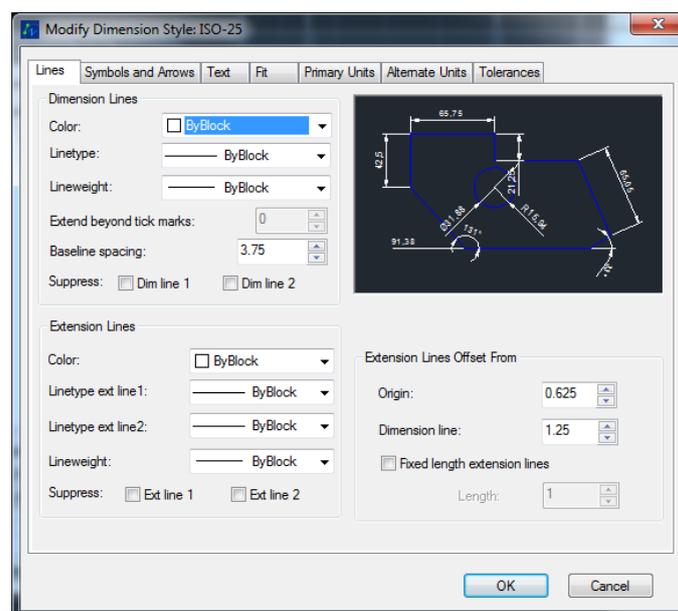
Click the icon:  in order to access the Dimension Styles Manager

A window will appear that will let you choose your preferred style or that will allow for creation of new dimension styles.



By clicking on 'New...' a new dimension style will be created that can be edited any time according to needs of the user.

'Modify...' will allow you to edit the style in various tabs.



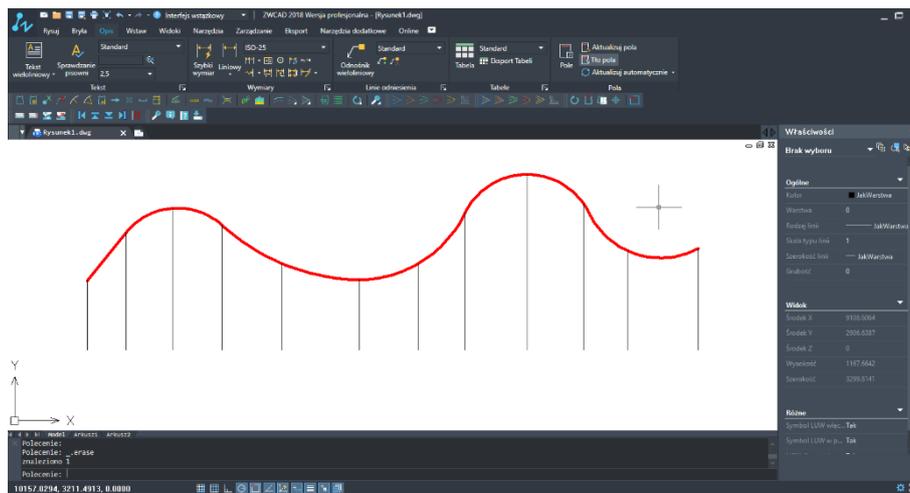
## ✓ Quick Dimension,

This command creates or edits a series dimensions for specified objects. The dimensions created with this function are not connected so they will not change if the object does.



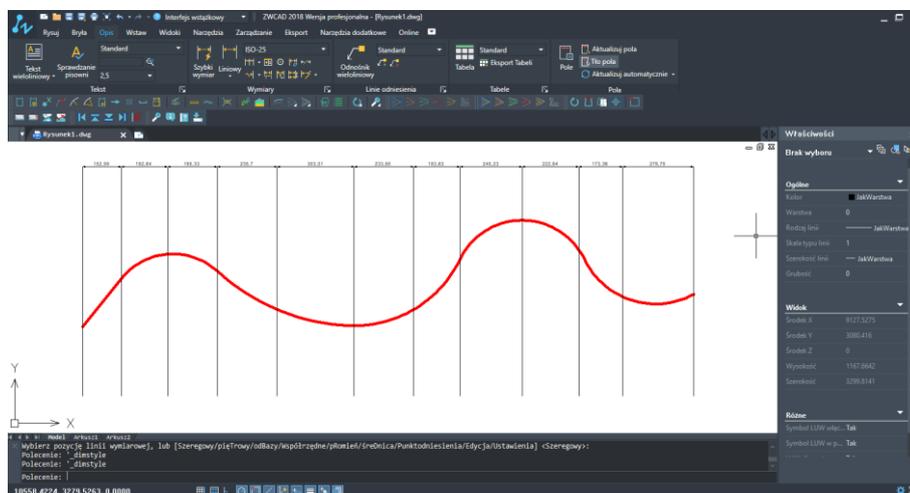
Quick Dimension

Once the command is activated, you will need to specify objects which are to be dimensioned:

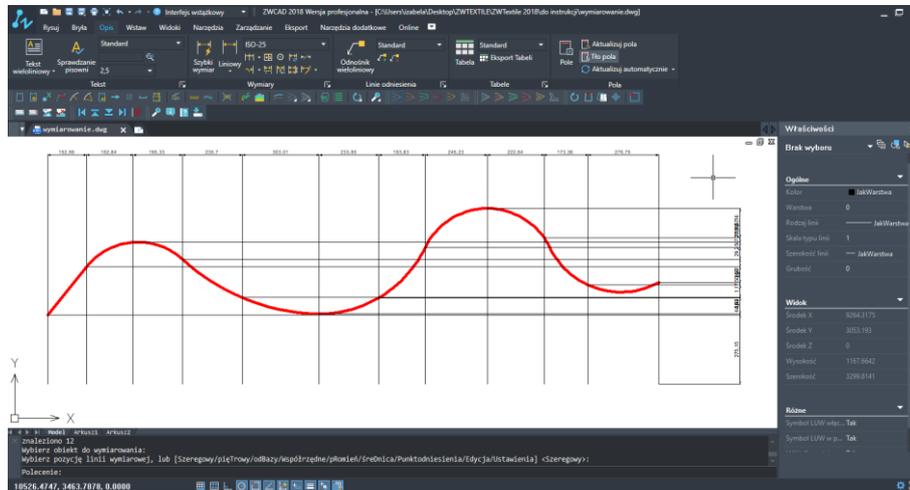


Afterwards please confirm by pressing Enter on your keyboard.

After confirming the function, reference lines will appear underneath the mouse cursor and those are the dimensions. Now choose the place in which you would like to have the dimensions.

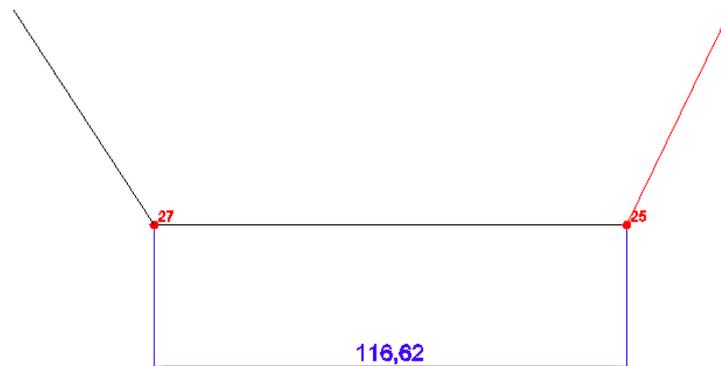


Once points were identified the dimension values will appear. Dimensioning can be completed vertically and horizontally after specifying the same elements on the drawing.

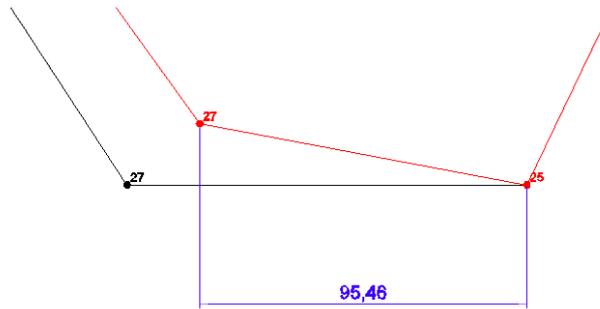


### ✓ Linear,

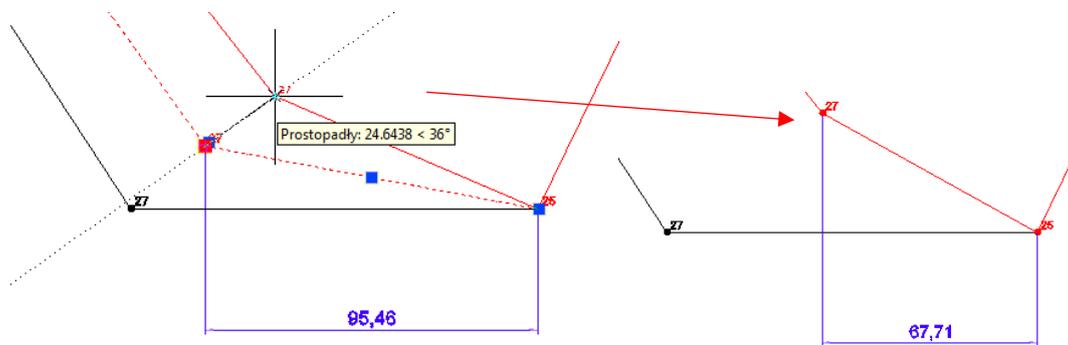
Linear dimensions can be horizontal, vertical or revolving and the dimension text content and display angle can be modified.



After inputting a dimension, if the user moves a point to which the dimension is assigned, the program will automatically determine the dimension by changing its value.



To do this we need to move the point, to which the reference line of the dimension will be assigned, by clicking on the snap element in the given point and by moving it.



The program will automatically change the dimension.

#### ✓ Dimaligned,

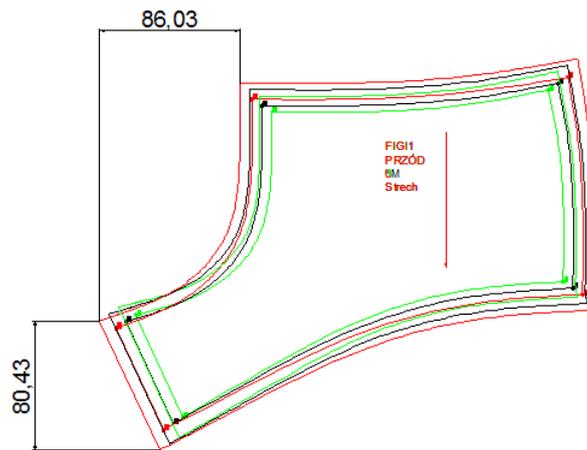
This function lets you create linear dimensions aligned with entity.



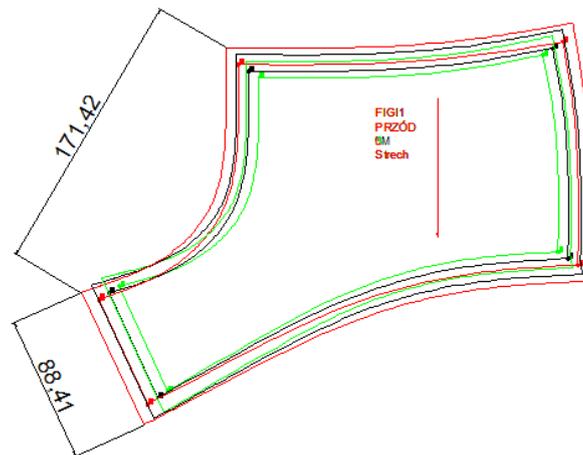
Dimaligned

Linear dimensions can be created horizontally, vertically, revolving as well as with the option to edit dimension text content and display angle. To access Dimaligned it is necessary to open the `Annotate` tab and the function can be found under the `Dimension` group.

The standard dimension creates the dimension lines either vertically or horizontally.



Aligned dimension allows you to precisely dimension the Real length of a chosen element.



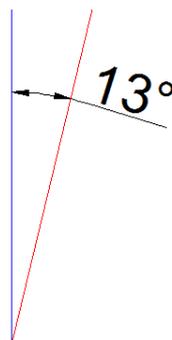
### ✓ Dimangular

Create an angular dimension for a circle, arc, a line or custom three points.



Dimangular

In order to create the dimension we need to select two lines that make up an angle.

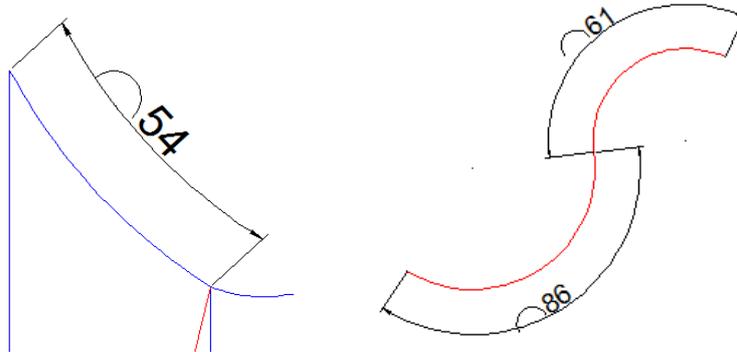


### ✓ DIMARC

Create length dimension for an arc or polyline arc segment.



Activate the command, specify an arc on the drawing which is to be dimensioned.

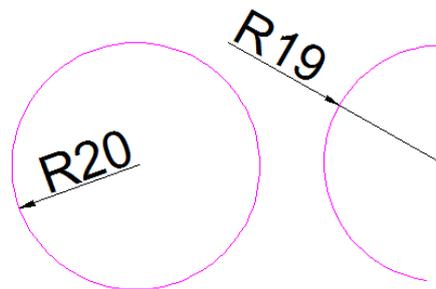


### ✓ DIMRADIUS

Create a radius dimension for a circle or an arc.



Activate the command and specify one point to confirm the location of the dimension line.



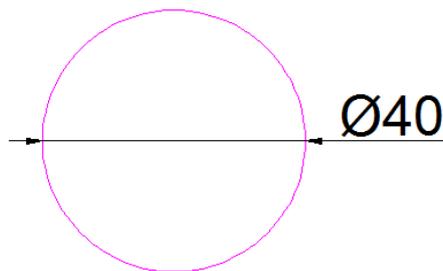
## ✓ DIMDIAMETER

Create diameter dimension for a circle or arc.



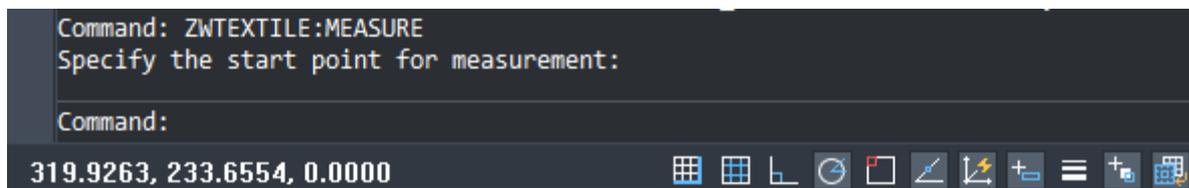
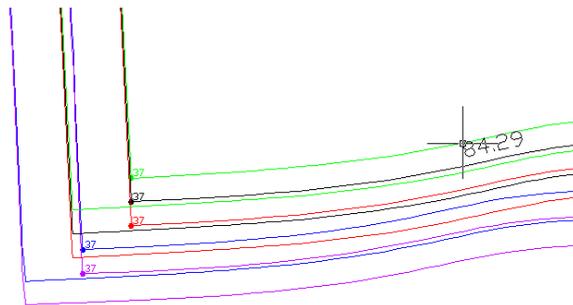
DIMDIAMETER

With DIMDIAMETER command, different types of diameter dimensions could be created based on the location and size of a circle or an arc and the settings of a dimension style. And the dimension styles could be set to draw a center dimension or a center line. When a dimension line is drawn within an arc or a circle, system will not create a center dimension or a center line.



## 4) Command ZWTEXTILE:MEASURE: 🏠

This function turns on the measurement, thanks to which the user will be able to precisely determine the length of a curve. The length is measured along the form in Real dimension, according to the values specified on the drawing.



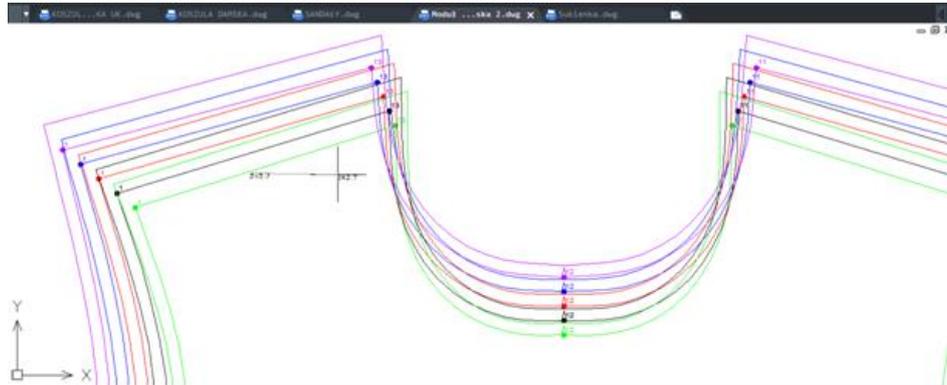
Underneath the cursor, the dimension value will be displayed and it will be updated automatically in real time according to the movement of the mouse. The height of the dimensioning text is automatically set according to the view of a certain element.

To end the function press **Escape** on your keyboard.

### 5) Command ZWTEXTILE:MEASUREENTITY

This command is used for counting the length of many elements. It sums the length of selected elements on the drawing.

Activate the function and then specify the elements that will have their length summed up.



```

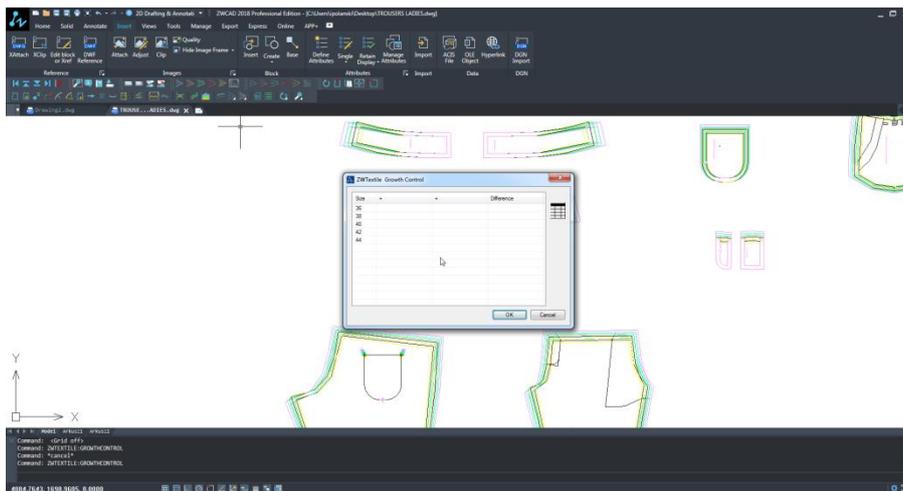
X Command: ZWTEXTILE:MEASUREENTITY
Select objects:
1 found
Select objects:
1 found, 2 total
Select objects:
Command:
  
```

Once confirmed with enter, the sum of lengths will be displayed beneath the function in order to choose the placement of the sum.

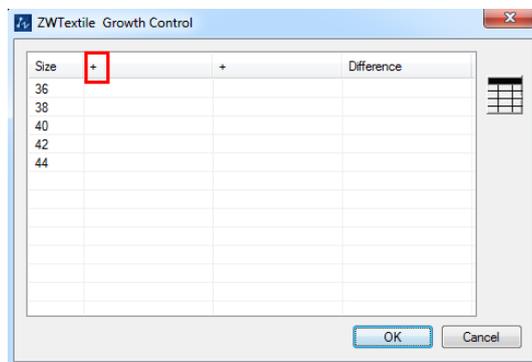
### 6) Command: ZWTEXTILE:GROWTHCONTROL

Growth control gives the option to check the length of two curves, based on their different length or their compatibility.

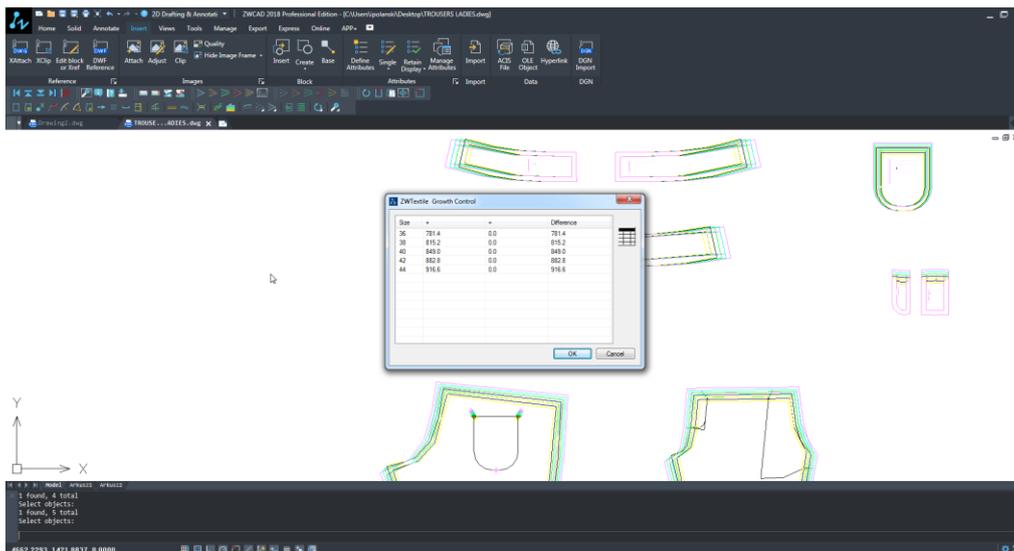
When the function is used, a dialogue window will appear with sizes of elements:



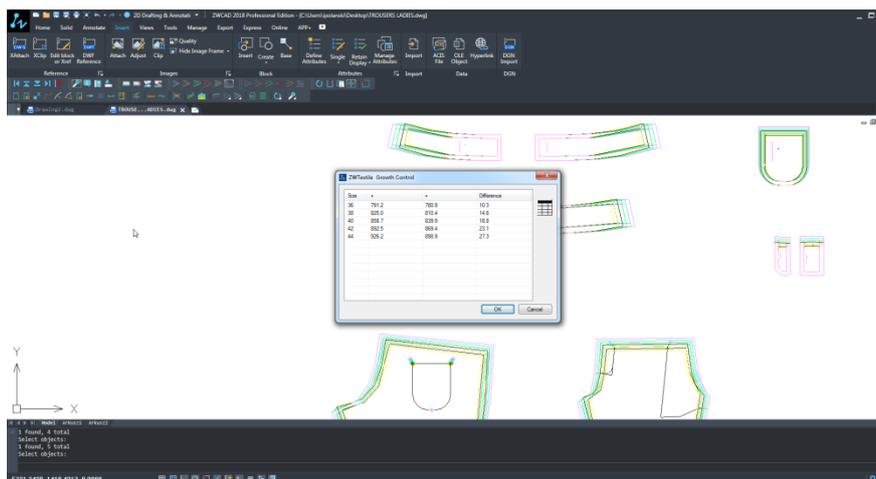
Afterwards it is necessary to click on the “+” sign and select the object that we would like to measure:



Once the objects are specified, the view will switch back to the dialogue window in which we will see the value of the measured length.



In order to compare the object please click on the “+” sign in the third column.

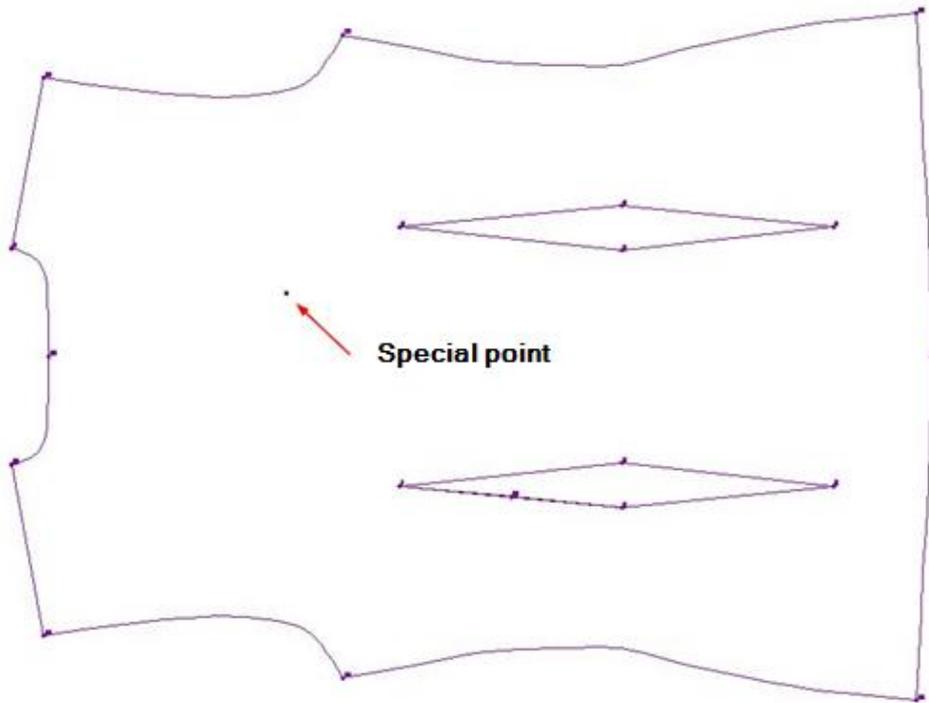


Once selected, the third column will include the lengths and the fourth one, differences. By clicking on the icon of a table in the dialogue window, you can add information in form of a table to a drawing.

Growth Control			
36	217.2	247.4	-30.2
38	227.0	257.3	-30.2
40	236.9	267.2	-30.2
42	246.8	277.1	-30.3
44	256.8	287.0	-30.3

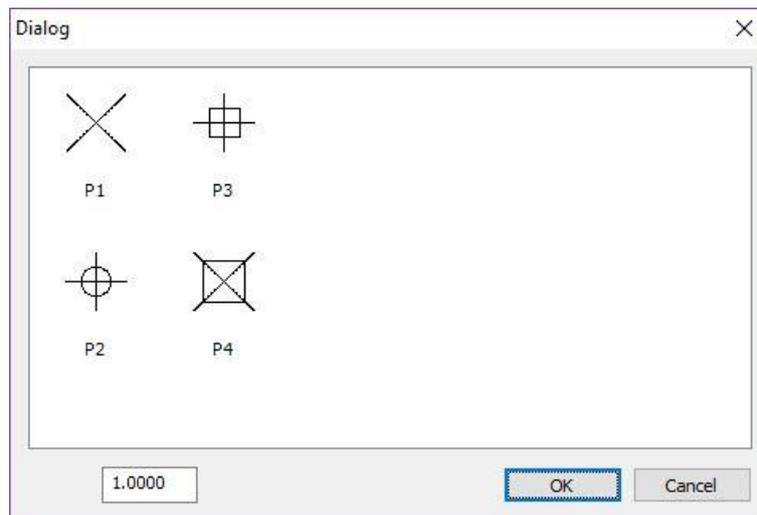
7) Command: ZWTEXTILE: SPECIALPOINT 

Special points are specific and user chosen elements that can be inserted into a drawing.



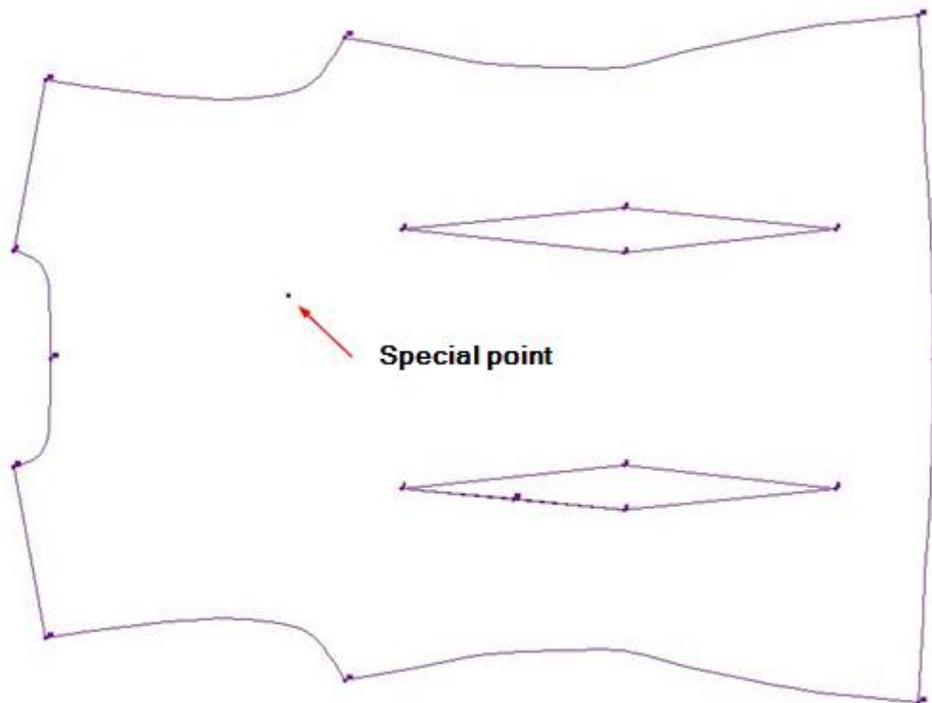
Once the function is activated, the program will let you choose a special point.

It is necessary to select the type of special points and click on OK.



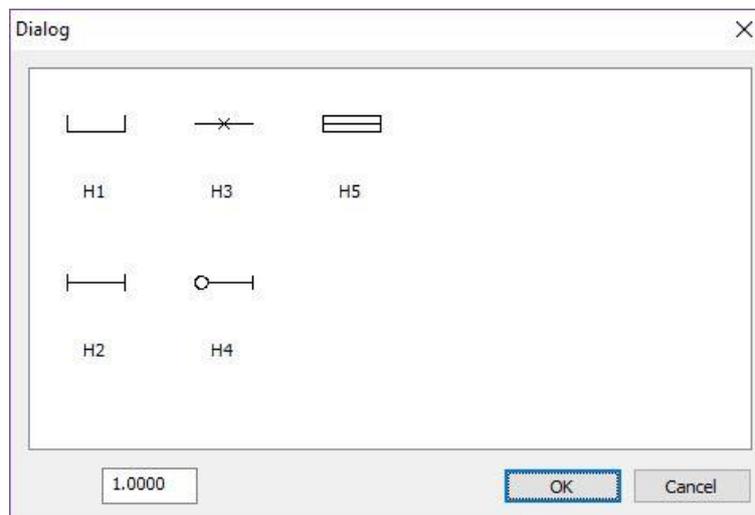
Once a special point has been chosen, it is necessary to choose the insertion point as well as the rotation angle.

The special point will be inserted in the specified place.



#### 8) Command ZWTEXTILE:HOLE

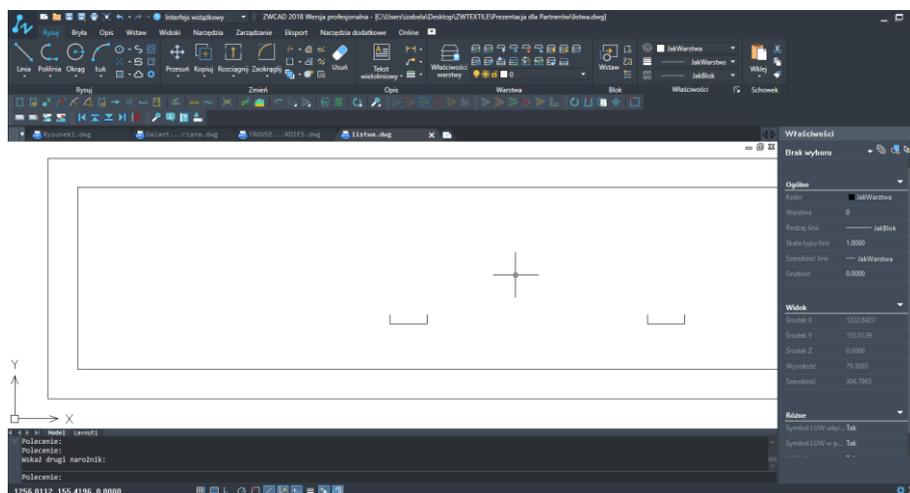
This command allows you to insert different types of holes on a form.



Once the type of hole is defined, the insertion point needs to be defined along with the rotation angle.

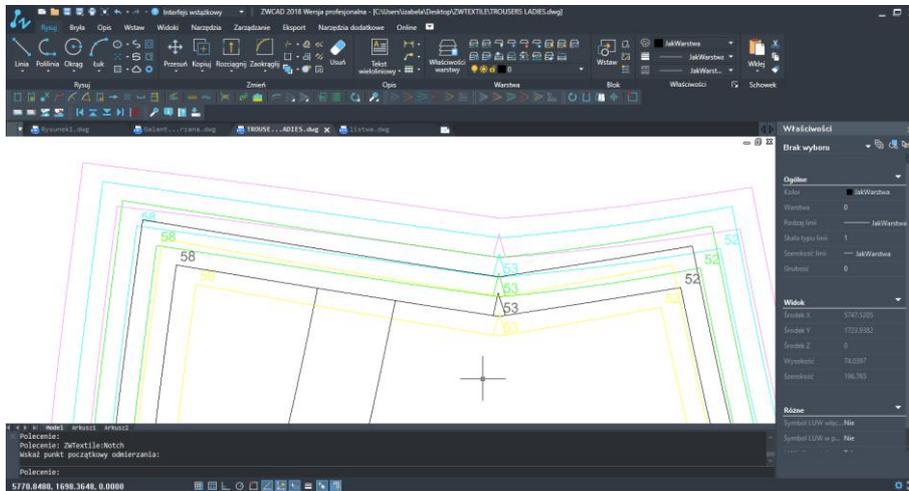
```
Command: ZWTEXTILE:HOLE
Specify hole insertion point:
```

Finally, after All the necessary steps are completed a hole marking will be displayed in the selected point on the drawing.



## 9) Command ZWTEXTILE:NOTCH

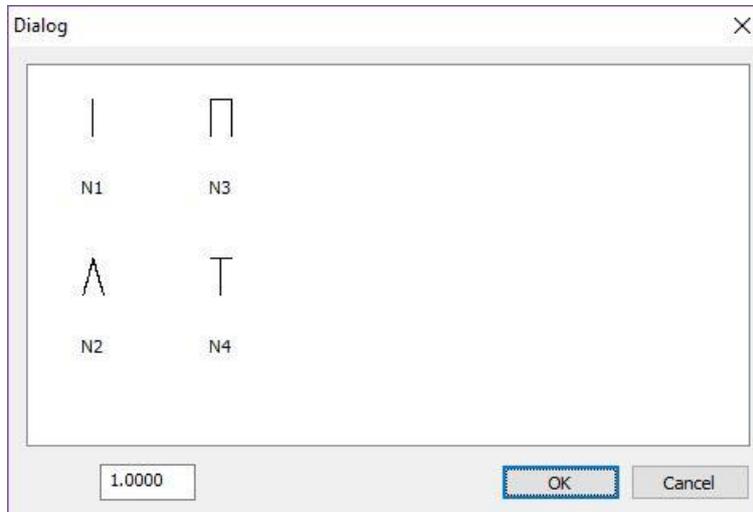
This command lets you choose the notch position on the drawing.



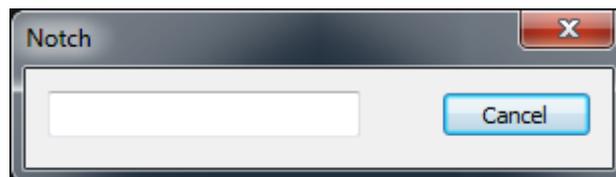
It is necessary to determine the starting point on the drawing in order to begin.

The marker will follow your cursor.

After using the function, a window will appear that will let you choose a symbol of the notch.

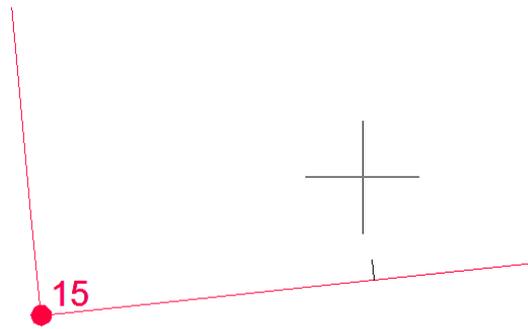


In the left top corner of the program, a window will appear that will display the length.



In the specified distance from a point, a Mark will be added in the form of a line. The distance

can also be entered by using a keyboard.

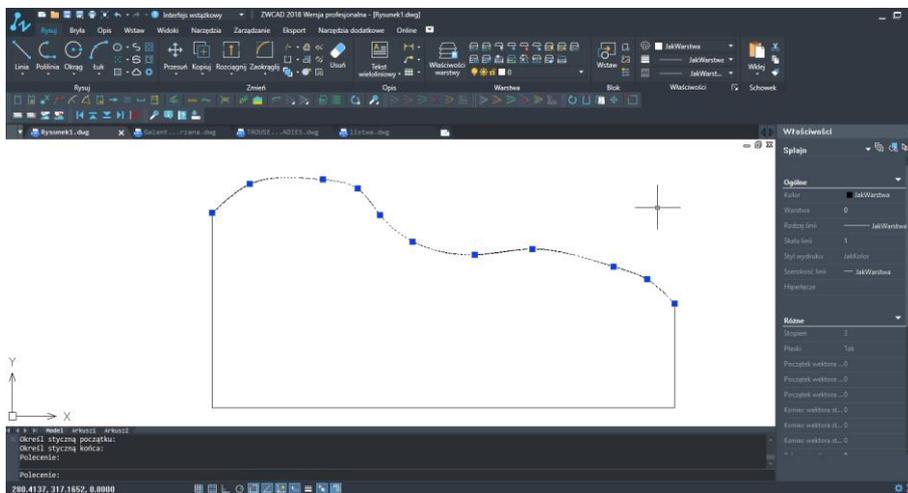


The notch will be created on every layer that corresponds to the measurement.

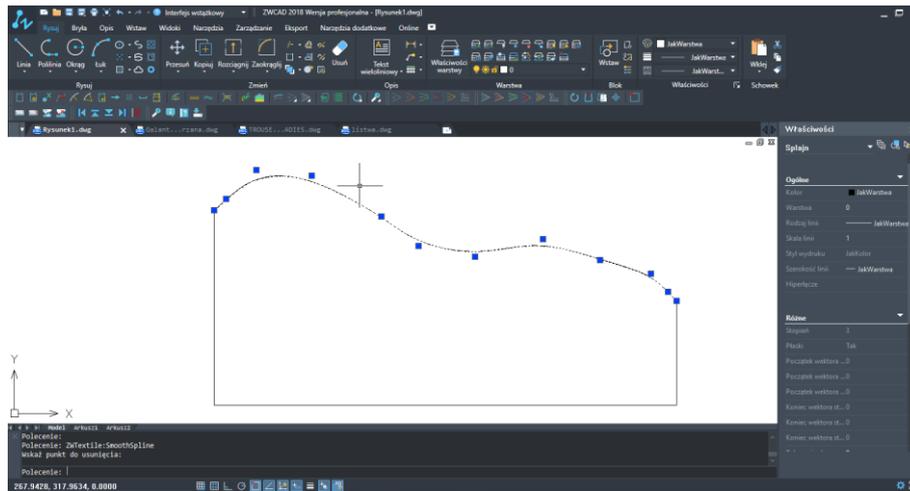
#### 10) Polecenie: ZWTEXTILE:SMOOTHSPLINE

Smooth Spline will let you modify existing spline in accordance to the deleted points of an object.

Once this command has been activated please specify the spline which we would like to modify.



Now specify a point which we would like to delete in order to smooth out the object.



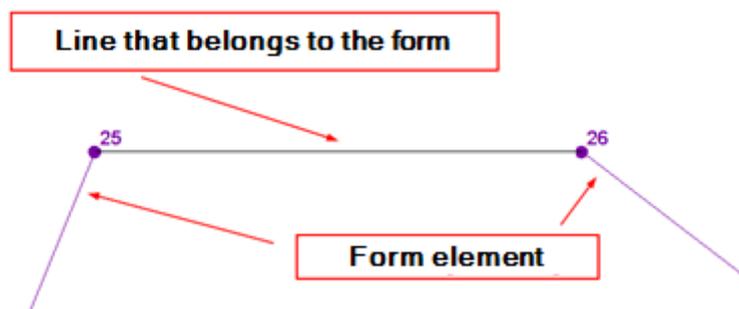
### 11) Polecenie: ZWTEXTILE:ADDDTOFORM 📏

This command allows for adding an additional element to a form.

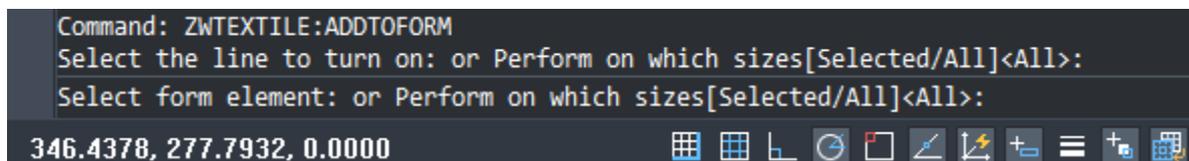
It lets you add new element to an existing form according to the measurements and grading set, if they are already established within the project.

When used, specify an element that will be added to the form and then define the form.

Example:



The command bar will display an additional option:

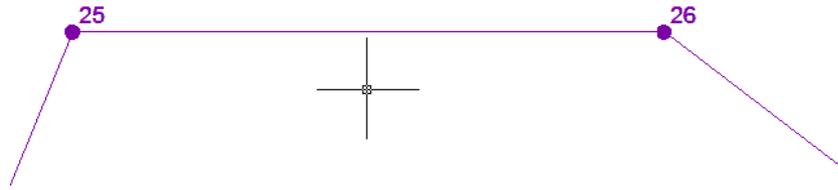


Thanks to which it will be possible to add an element to one form size or to all of them.

If the new element is to be inserted into every size, All that is necessary is to confirm the standard settings, this means All and select a new element. Now choose the form element to which it will be added.

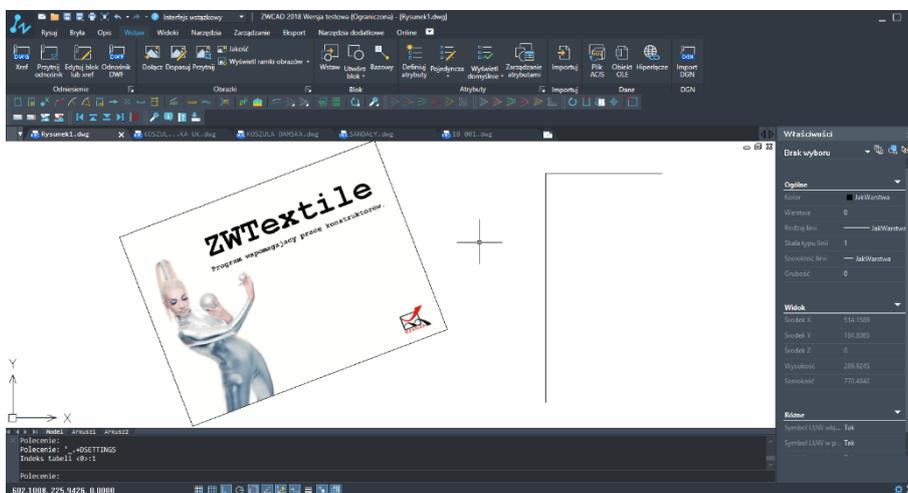
In a case of adding the element to one size, we need to choose Selected, specify a new

element and its exact size to which it will be added.

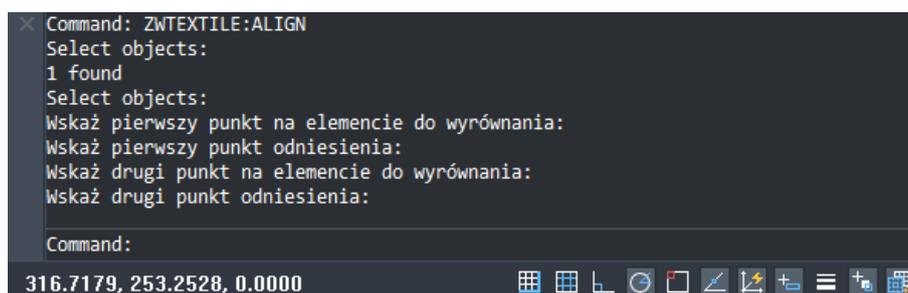


## 12) Command ZWTEXTILE:ALIGN

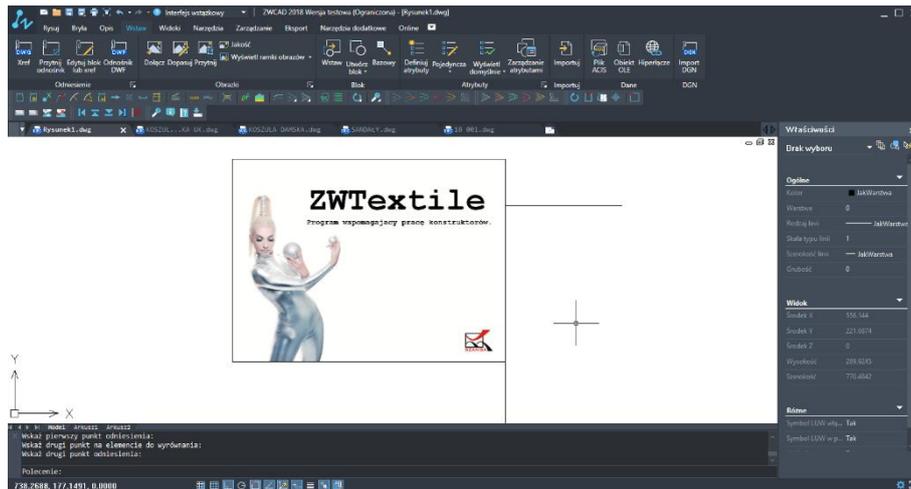
This command lets you align elements vertically, horizontally as well as a single element.



Once activated, it is necessary to select a point on an element that we would like to align. Afterwards determine the reference point on the drawing. We can repeat the same step in order to align another point of an element.

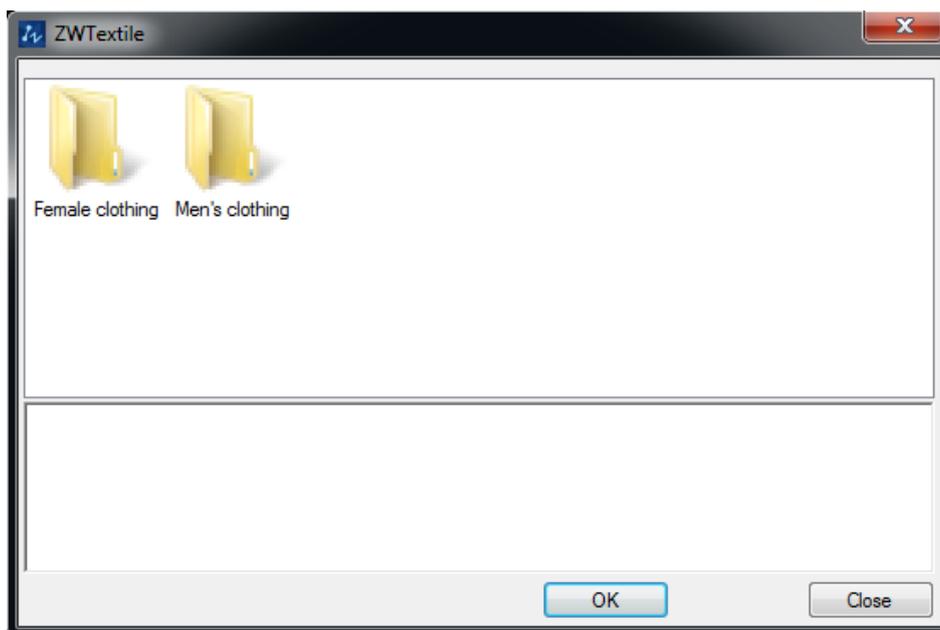


The result should be similar to the one below:



### 13) Command ZWTEXTILE:TEMPLATES

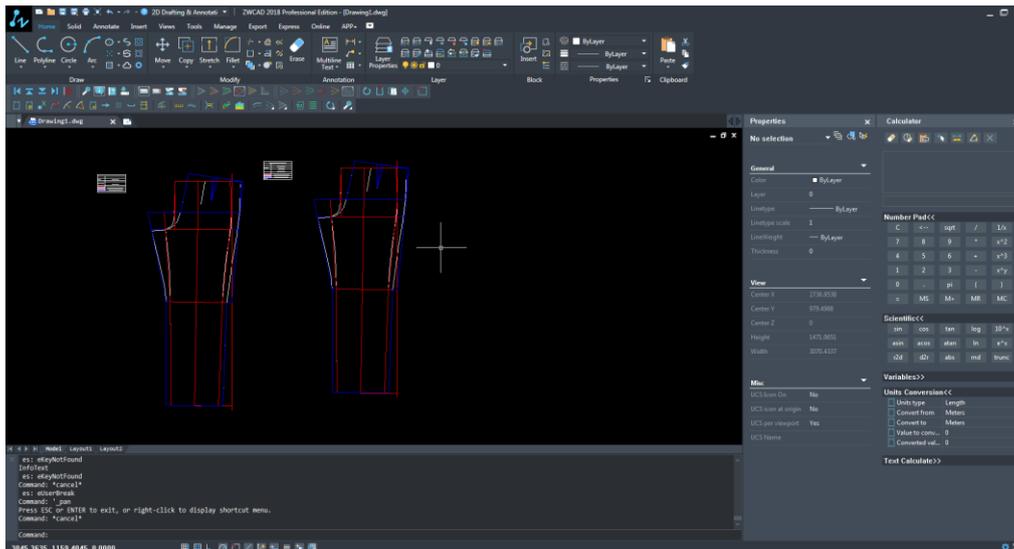
ZWTextile has its own library of templates for general use. To use the templates, launch the command which will have the following options



It is possible to choose male or female clothing templates. Once selected they will be added to the drawing.

**Please note:** The templates should only be used as an example and/or guide when carrying out work in ZWTextile. Any changes need to be made appropriately according to sizes and materials used.

In order to add the template to a drawing, select a location on the drawing.



The template will be added as a block with a table including all the necessary information. In order to use the elements of drawing templates separately, you need to use the function Explode.

## 2. Stage 2: Grading

### 1) ZWCAD: LAYERS

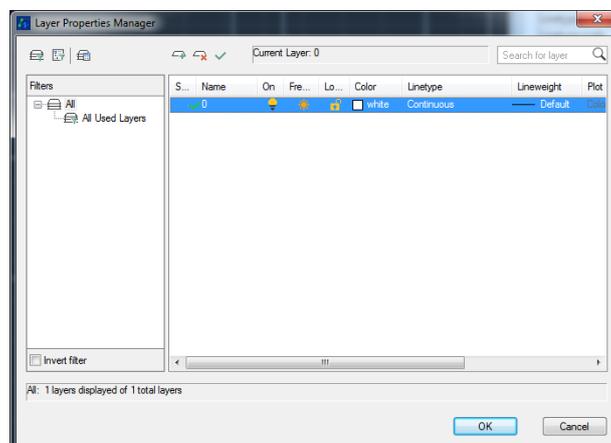
Layer settings can be found in the following ribbon Draw → Layers.

Layers control the properties and visibility of objects on the drawing. Layers also let you group your elements according to colour, width and type of line.



### Layers Properties Manager

Layer properties window lets you browse and edit the layers.



 **New Layer**

Adds a new layer.

 **Delete Layer**

Deletes currently selected layer.

 **Set Current**

Sets the selected layer as a current one. Following elements on the drawing will have the line properties that were defined in the layer properties.

In the dialogue window there are columns which are responsible for different properties of the layers.

Status	Name	On	Freeze	Lock	Color	Linetype	Lineweight	Plot Style	Plot	New Vi...	Description
	0				white	Continuous	— Default	Color_7			

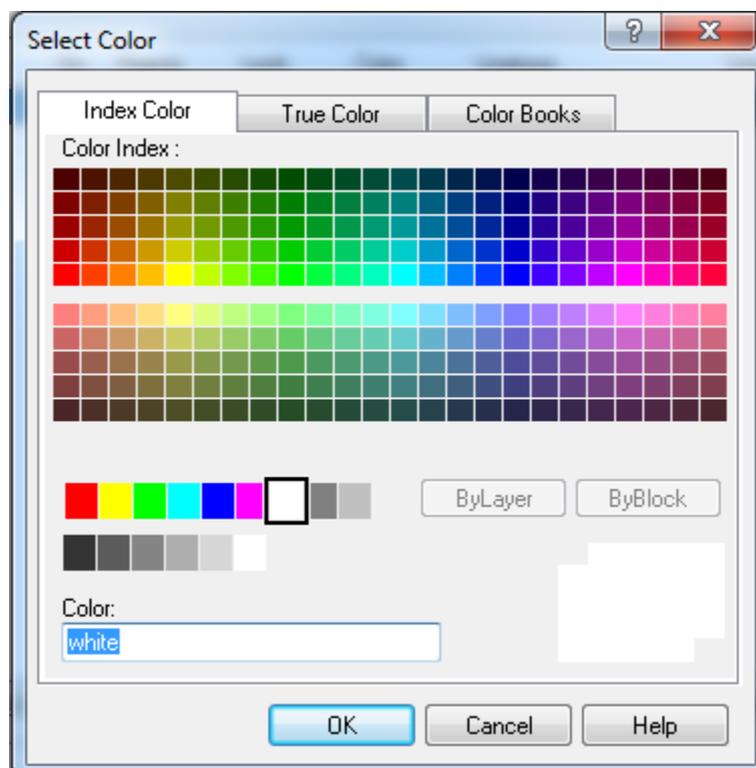
**Name** – Name of the layer, by default it is set to 0.

**On** – Determines whether the layer can be displayed or not

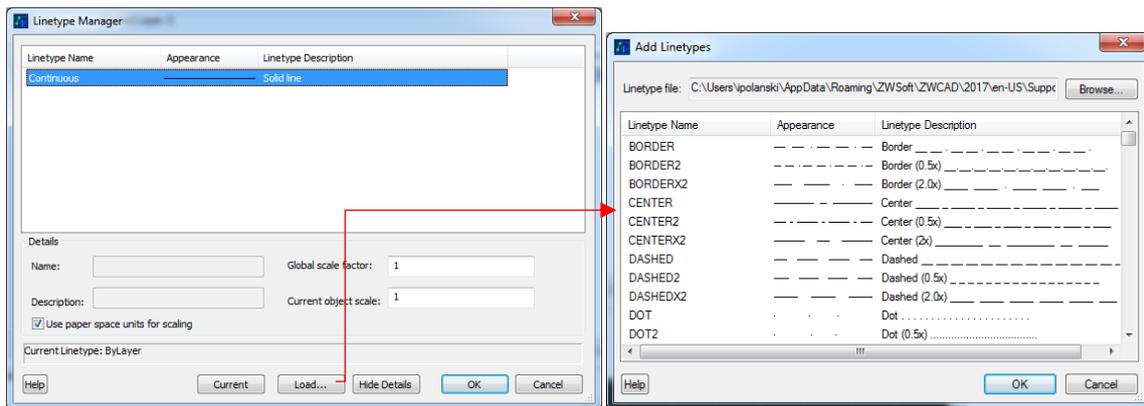
**Freeze** – Freezes selected layer

**Lock** – Blocks edition of selected layer

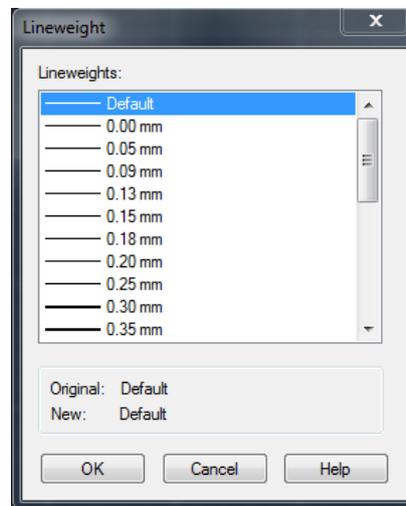
**Color** – Specifies the colour of a layer.



## Linetype – Choose a linetype from the library of linetypes



## Lineweight – Choose the weight of the line on the drawing



A bar can be found in the Ribbon that informs the user about the layer that is currently displayed. It is possible to edit the layers as well as to choose the current, displayed one. In order to do so, open the bar by pressing on the arrow displayed below.

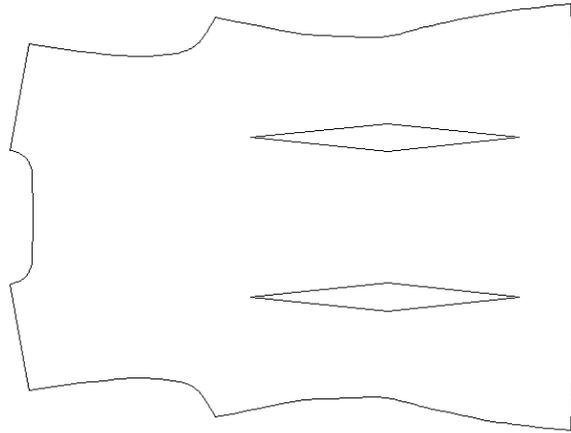


Many options regarding layers can be found above the layer bar.



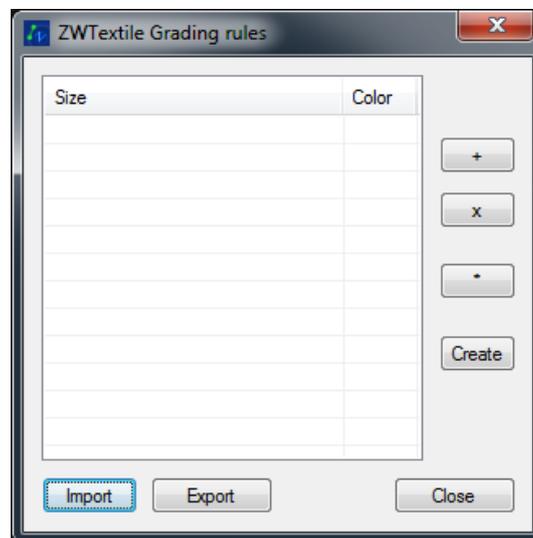
## 2) Command ZWTEXTILE:GRADING:RULE:

This function will allow for loading sizes from files such as \*.txt, \*.txs. Each form will be created on a separate layer that will be visible in the Layer Properties Manager.



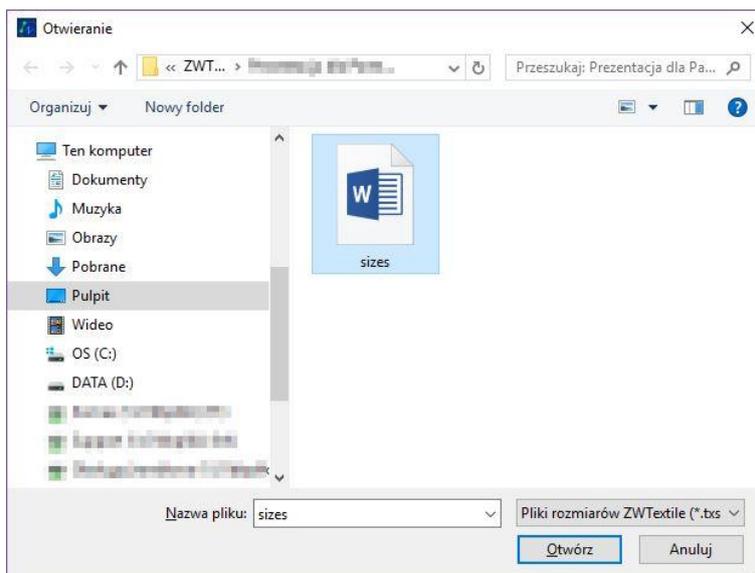
After Turing on the function, a window will appear which will ask for the file.

In order to select a file, click on **Import**.



In the list of formats it is possible to choose either \*.txt or \*.txs.

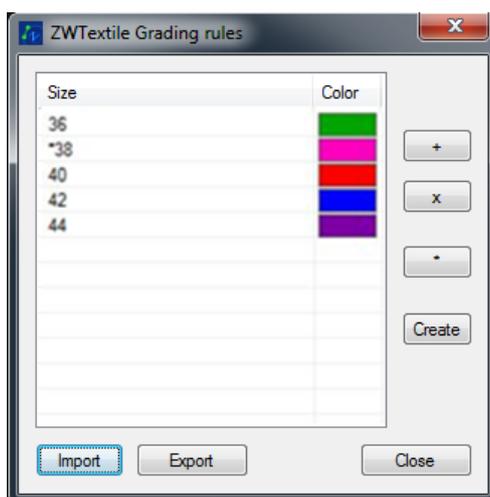
Afterwards select the file from a directory on your disk and click on **Open**.



The data from the file will be loaded in to the grading rules window.

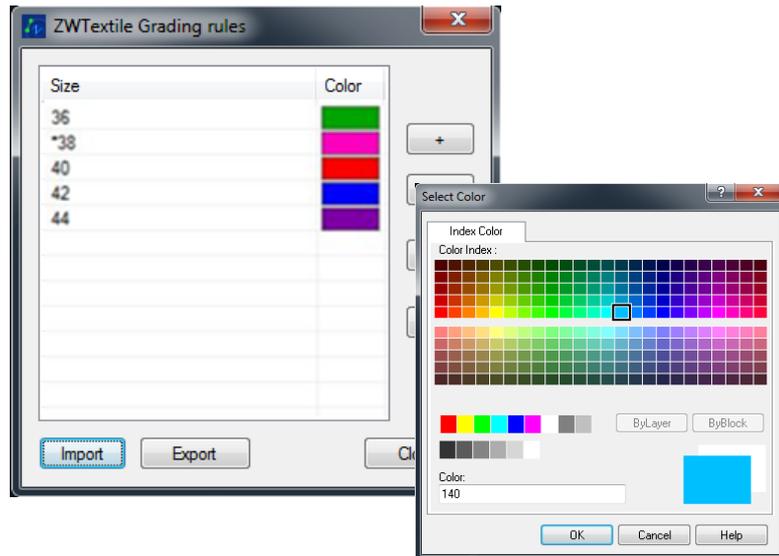
In order for the data to be saved within the drawing and created, click on **Apply**

6

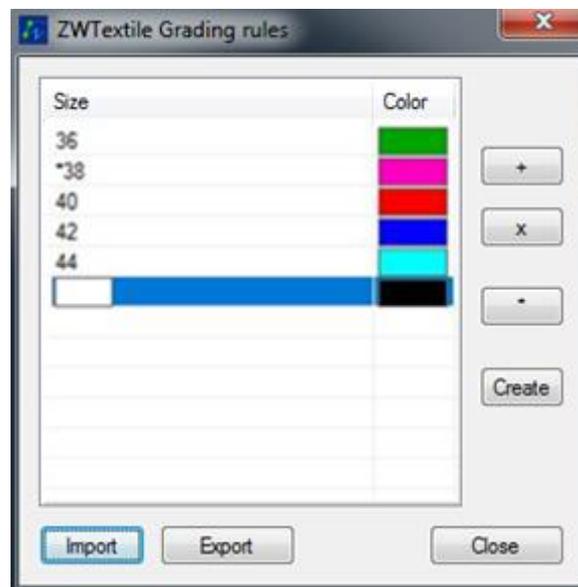


In the grading window, the user can set the colours of layers of a set size.

In order to define a colour, click on an empty rectangle in the column **Color**.



The user can add data by clicking on the +.



A new empty line will appear which will be the line for new data.

By using  $\times$  it is possible to remove entered data

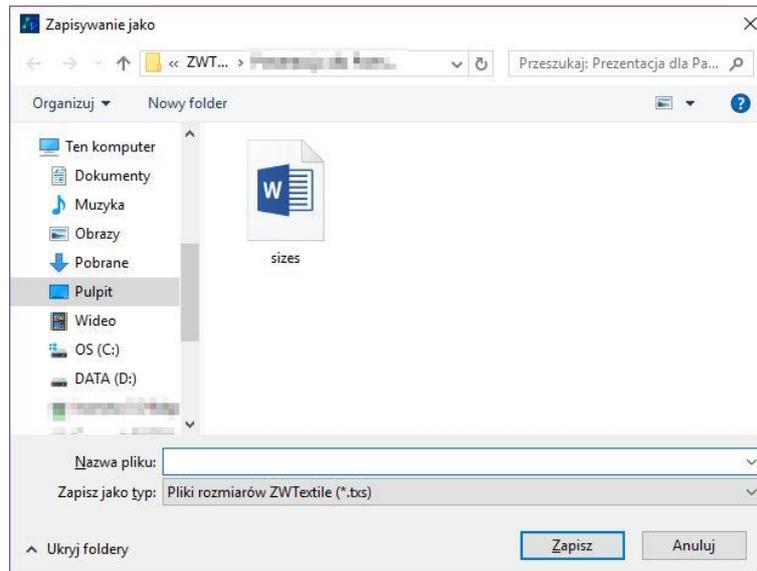
\* defines format as standard.

In order to add certain form to different layers click on **Create**

This will allow for grading save into the file.

Once data has been entered into the program, launch the command and click **Export** in the window that appears.

A window will appear that will let you type in the name of the file as well as give you the ability to locate it on the disk. Remember to define the wanted format, either \*.txt or \*.txs.

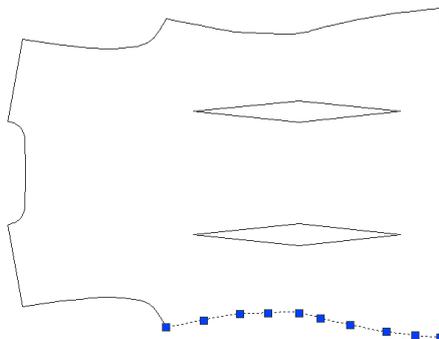


To confirm click on Save.

### 3) Command ZWTEXTILE:FORM

ZWTEXTILE:FORM allows for creating a form from previously created outline by changing lines, arcs and other elements to e.g. dotted line outline. The dotted line is defined as the seam line.

We can see on the example presented below that the defined shape consists of single elements.



Once the function is turned on it is necessary to select objects that will be the form.

```
Command: ZWTEXTILE:FORM
Specify elements of the form
```

After specifying all objects and confirming with enter, single elements of the shape will change to a group which will create a form consisting of selected elements.

There is a possibility to add a name for the form as well as determine the type of it in the

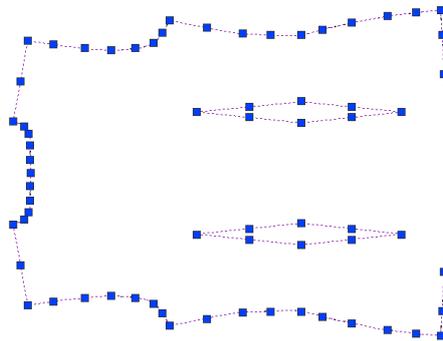
command bar.

```

Command: ZWTEXTILE:FORM
Specify elements of the form
Select objects:
1 found
Select objects:
Specify name of the part: Manual
Set the mode of the part[Single/Mirror]<Single>:S
Command: |

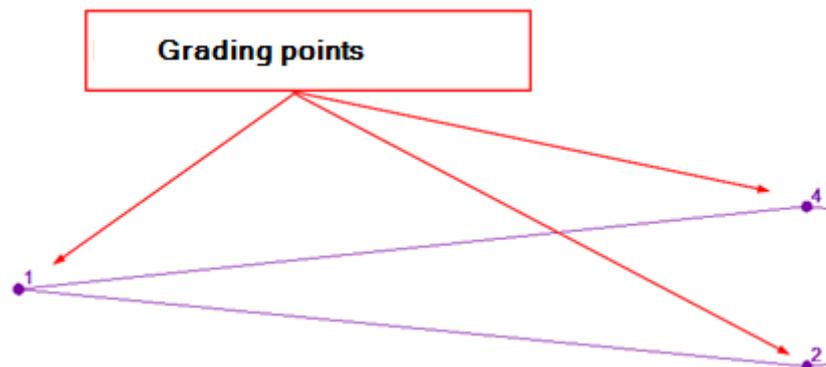
```

2658.6275, 846.0994, 0.0000



After selecting elements by points the whole of the object will be displayed as a form.

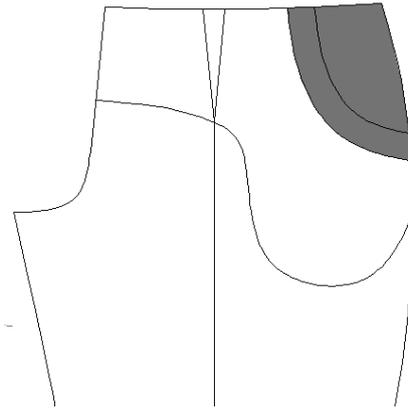
In the corners of the form grading will be added, you can move it to a desired position by using ZWTextile functions.



#### 4) Command ZWTEXTILE:FORMBOUNDARY

Quick form allows you to create a part from existing boundary by selecting its inner point.

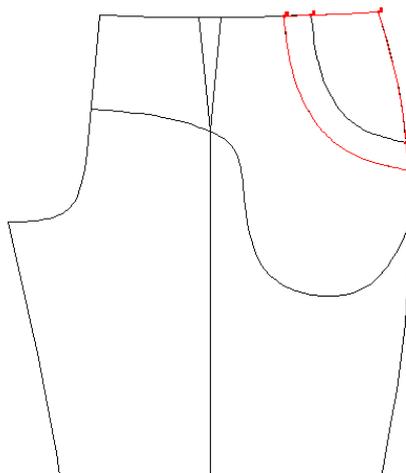
When the command is active, it will ask for the inner point of an object, which will become a part. The command changes lines, arcs and other objects into a polyline.



The area will be filled in with a hatch, so that the user can confirm whether the selected area is correct.

There is an option to name the part as well as define its type.

After confirming, the contour will change into a form with inserted grading points on each of the specified measurement.

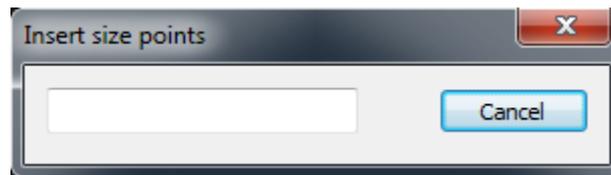


#### 5) Command ZWTEXTILE:ADDPOINT

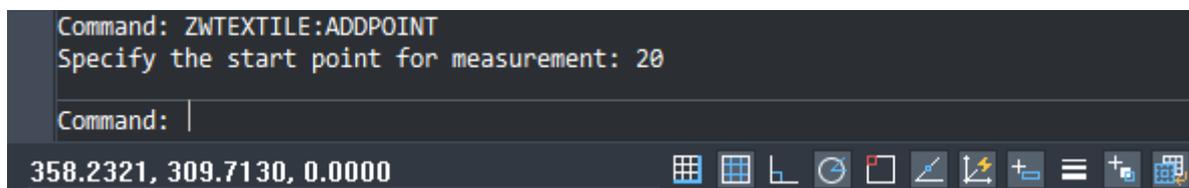
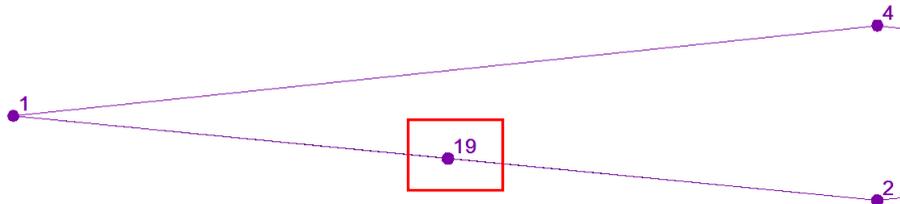
Adding a grading point functions in a way that it lets you place the grading directly in the wanted place. After inserting such point, the line will be divided into two.

A window in the top left corner of the screen will appear once the function is launched, it will let you type in the exact distance of the grading point.

Remember to specify a point on a drawing from which the length must be counted in order to receive the length.



Afterwards add the grading point to a defined curved line.



The curved line will be divided into two parts, which will be divided by the grading point.

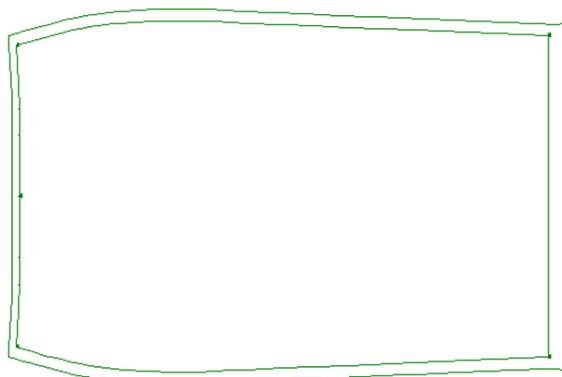
#### 6) Command ZWTEXTIL:DART

This function lets you add darts to a drawing.

Once the function is turned on, you need to define the start and end point of the dart.

**Note:** The dart needs to be inserted before grading of the form.

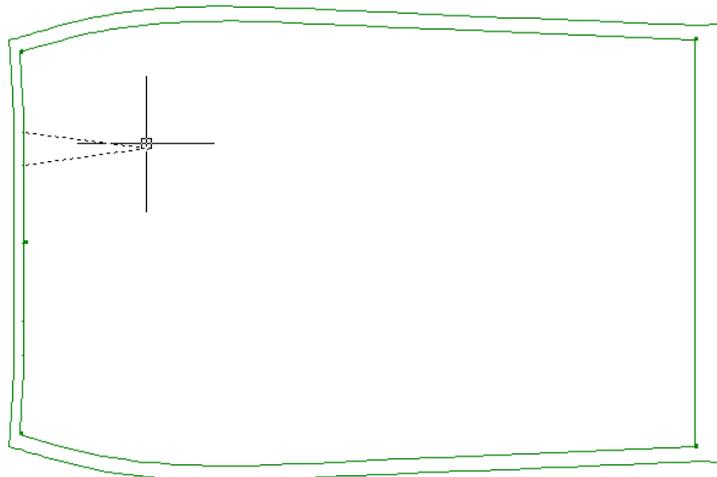
Below is an example of creating a dart:



Enter a dart with a set distance in order to determine a correct start and end point of the dart.

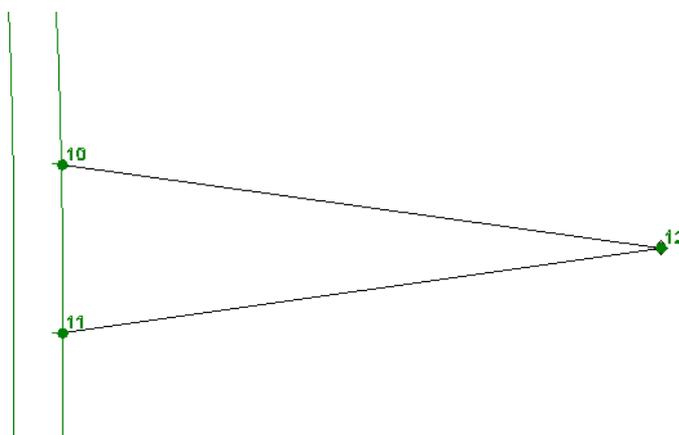


Afterwards activate the command `Dart`, specify the start and end point of the dart on the drawing:



```
Command: ZWTEXTILE:DART  
Specify beginning of the tuck:  
Specify ending of the tuck:
```

Another part of inserting the dart is specifying the depth of the dart on the drawing.



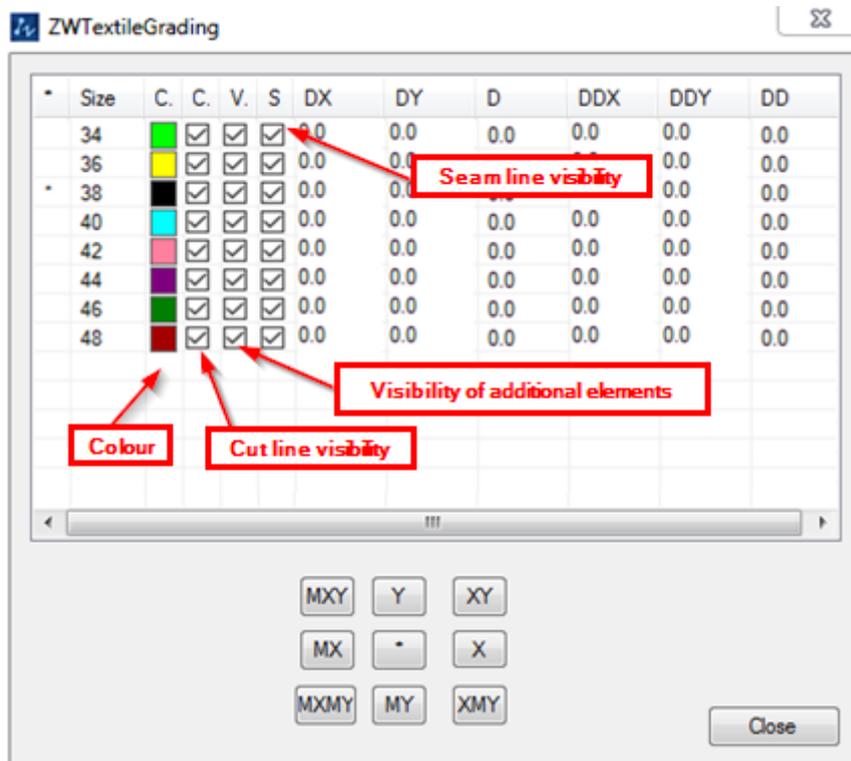
This function adds additional grading points.

The dart can be created after the form, as well as in later stages.

### 7) Command: ZWTEXTILE:GRADES:GRADING

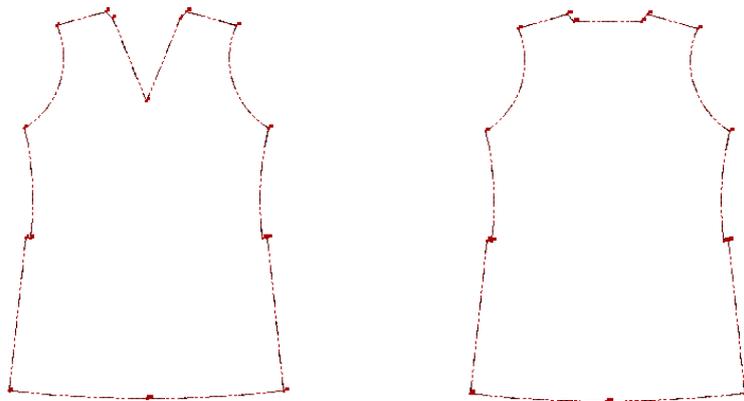
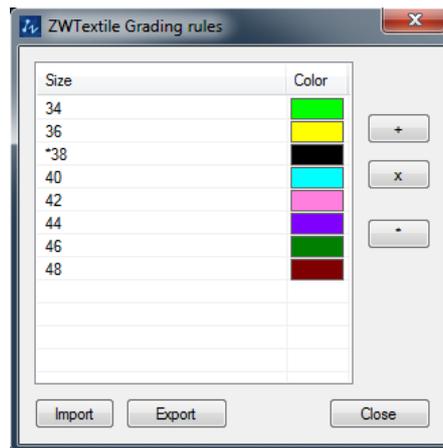
This command opens a dialogue window where the user can define or edit colors of layers of a certain size, visibility of cut lines, visibility of seam lines as well as the offset value according to the x and y axis.

#### ❖ Visibility of lines



The grading loaded by using the command ZWTEXTILE:GRADE:LIBRARY creates each grade on different layers, through which the user can manipulate with their visibility.

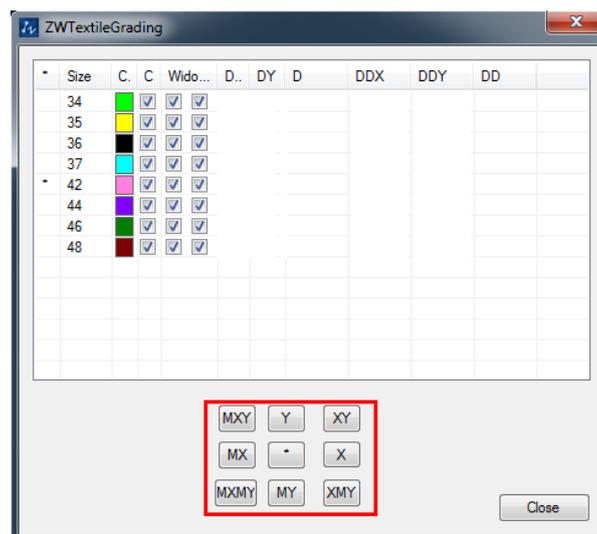
For example: Sizes 34-48 were loaded and their colors defined.



All sizes are visible.

- ❖ Point localization – Offset according to coordinates or point.

Following options can also be found in the dialogue window:



-> Specify a point.

-> Mirror grading according to the X axis

-> Mirror grading according to the x axis with the same parameters as the y axis.

-> Mirror grading according to the Y axis.

-> Grading with the parameters of X axis and mirrored according to the Y axis.

-> Mirror grading according to the X and Y axis.

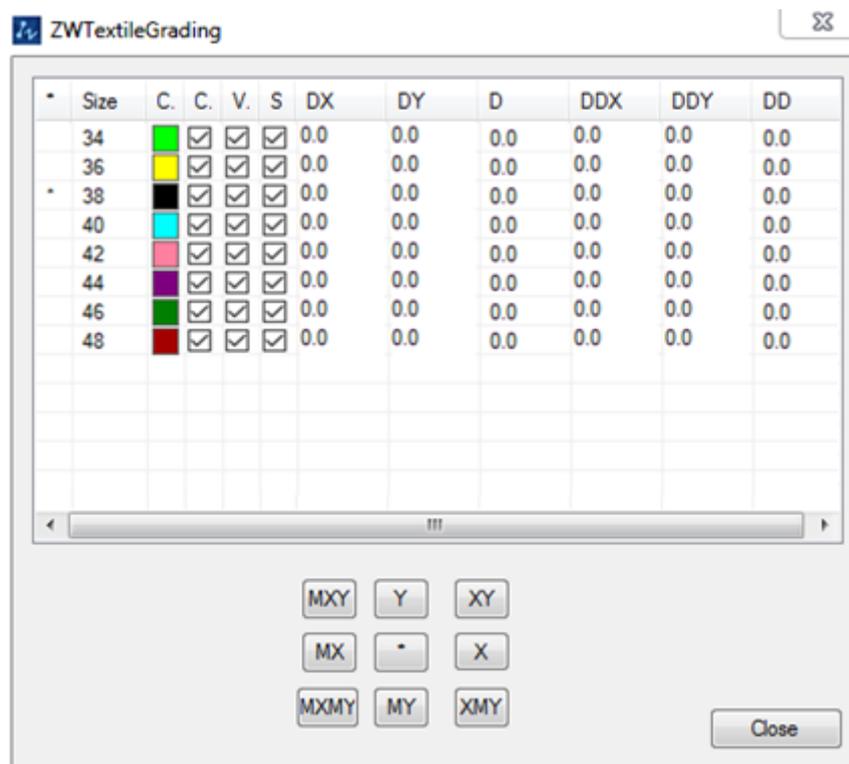
-> Grading according to the X and Y axis.

-> Grading according to the Y axis.

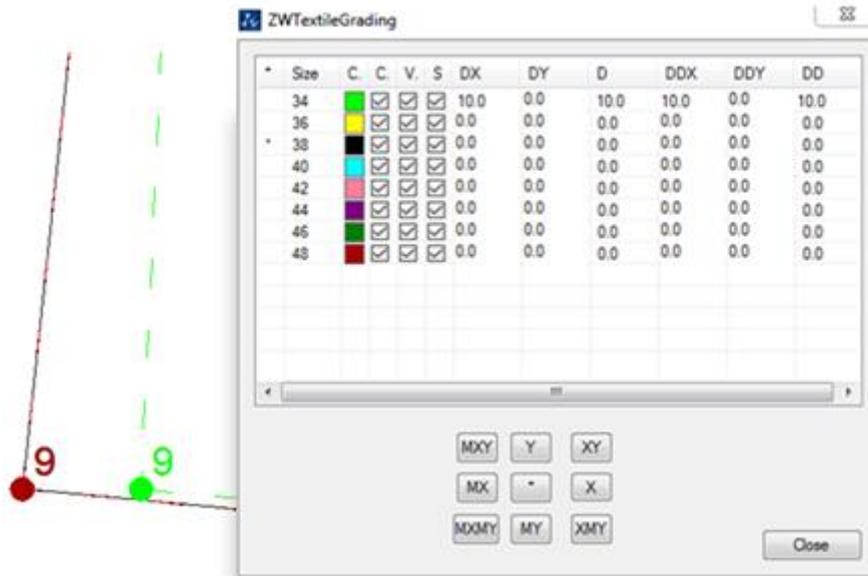
-> Grading according to the X axis.

For the defined values to be displayed, specify a point using this button .

The user has the ability to edit the values in the window by clicking on a defined cell.

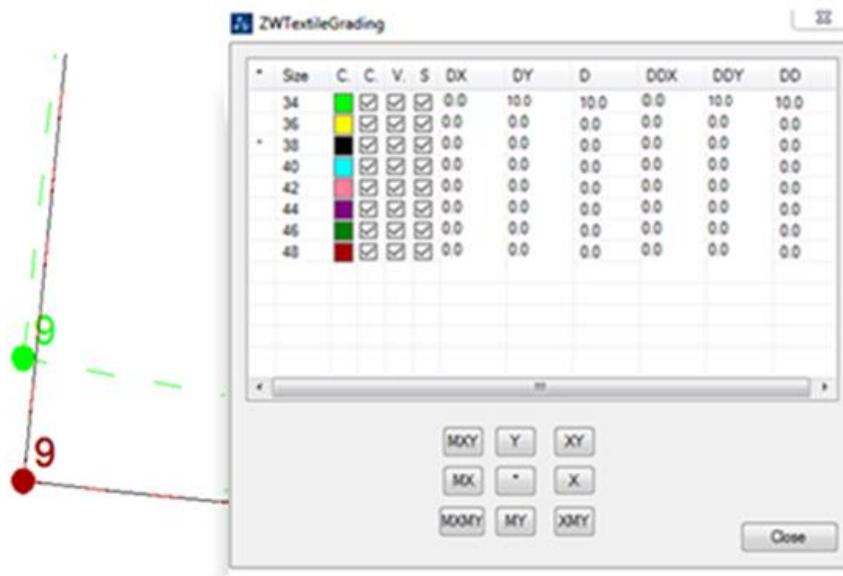


The grading point offset from its base according to the X axis by the value of 10.



Entering a value with a correct sign +/- point will be matched with offset according to the coordinates.

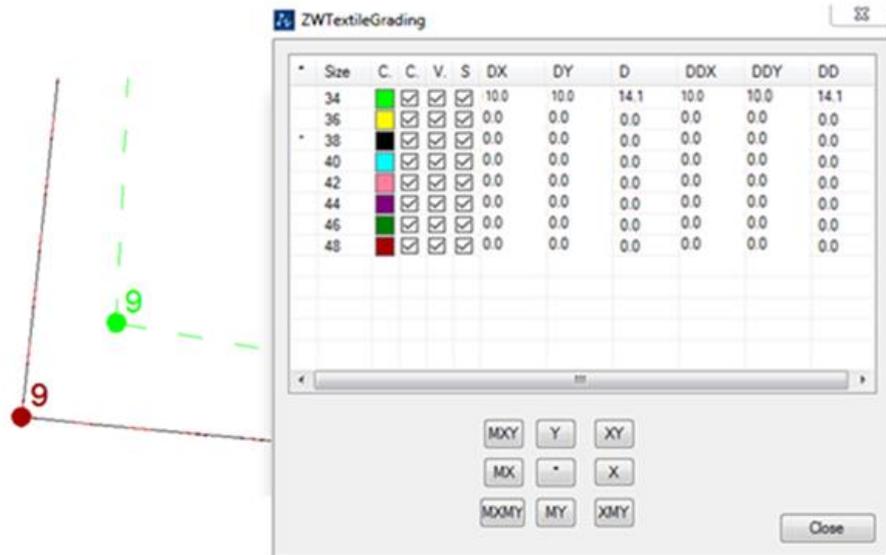
The grading point offset from its base point according to the Y axis by the value of 10.



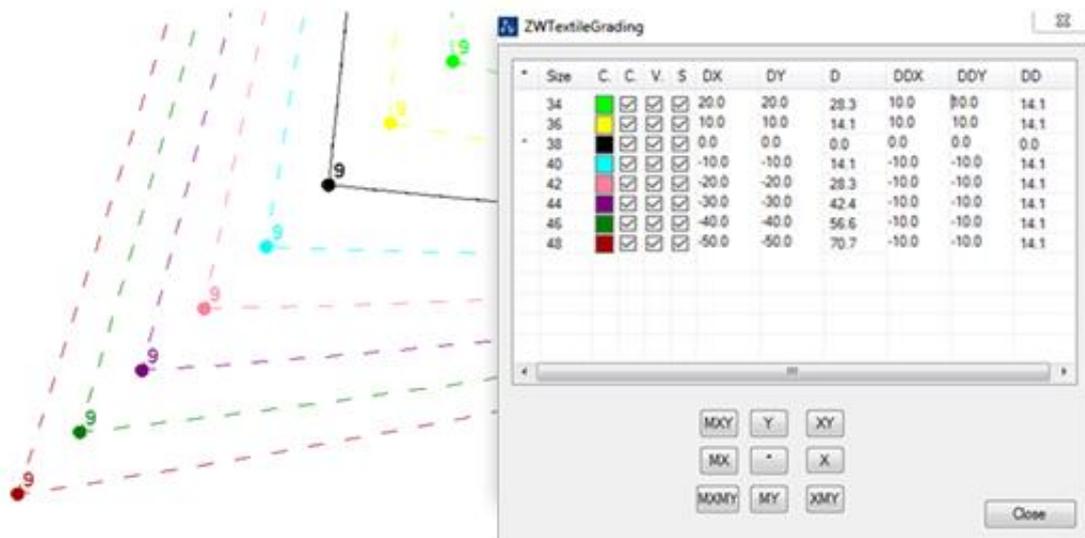
Once all changes are done, confirm by clicking on Close

For example:

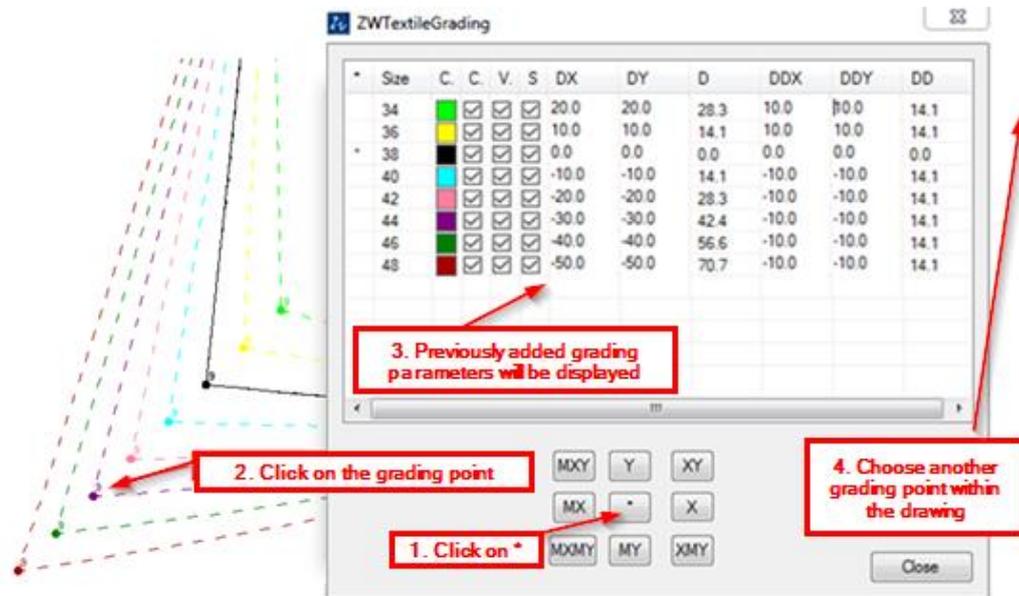
Grading according to the X and Y axis.



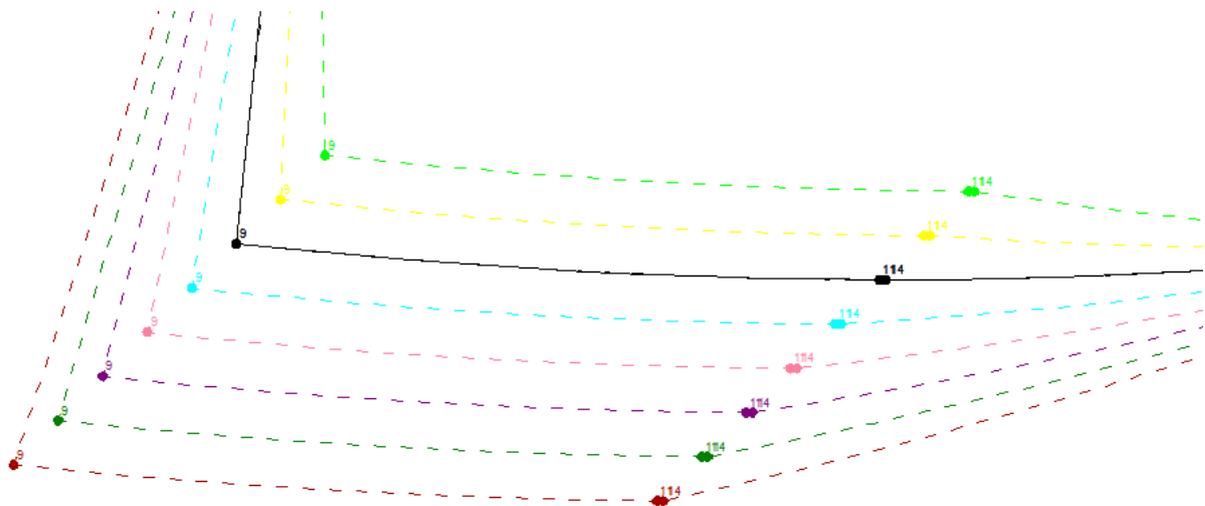
After entering all the grading parameters of points to the sizes, we will receive the graded elements on the drawing.



By using  we determine a point on a drawing, which will change its position according to the axis X and Y and by the offset value that was previously determined.

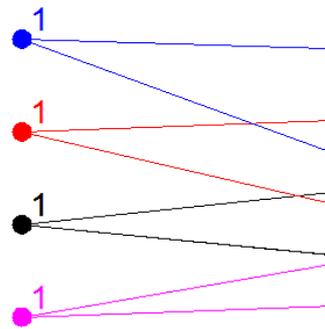


After specifying a point which will Get graded according to previously inputted parameters to previous point, the points will be moped according to the coordinates.

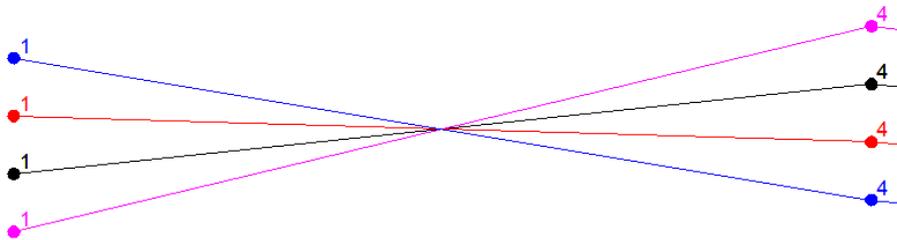


Functions  and  both work similarly because they use previously inputted data to move the points.

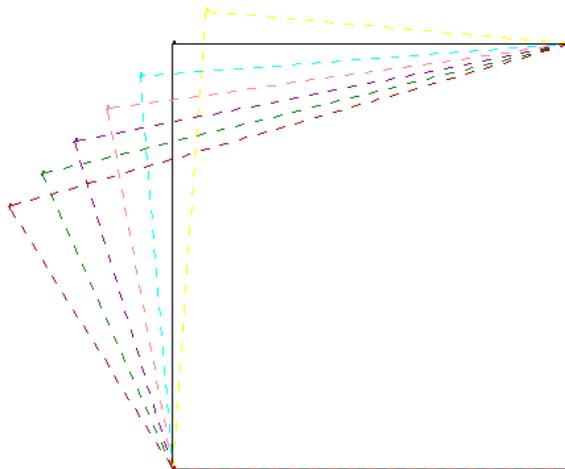
Entering a value in the column DDY and DDX allows the user to define a set distance of points from each other.



The user can also modify grading points by mirroring them.

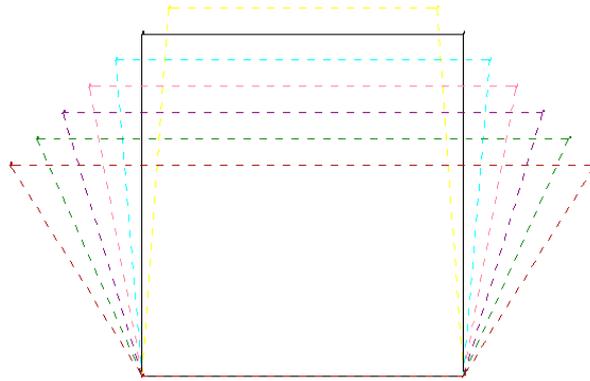


Activate the form modification command and enter the offset values according to the coordinates.



Use functions  or  and specify a point on the opposite side.

After specifying a point on the opposite side, the program will complete the grading in a way of mirror according to the axis X or Y.



To finish the edition click on Close.

Different options that can be found in the grading window can be completed similarly to the ones explained above.

### 3. Stage 3: Preparing templates

#### 1) Command ZWTEXTILE:ADDCUTLINE

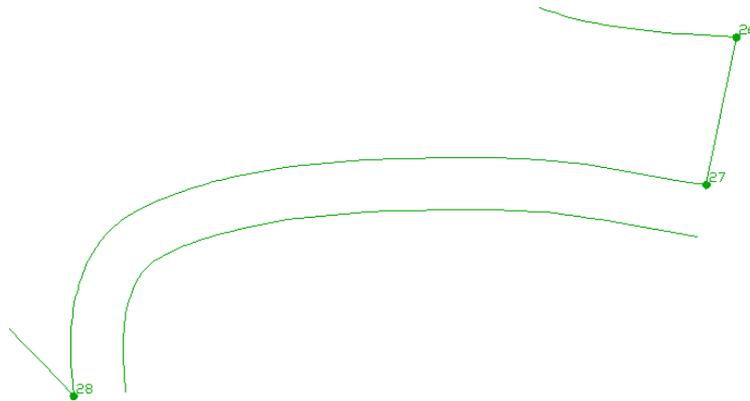
This command lets you add a cut line to an existing form.

Once activated type in the letter O in order to define the length of the additional cut line and enter its value. It is also possible to choose the direction of the extra cut line.

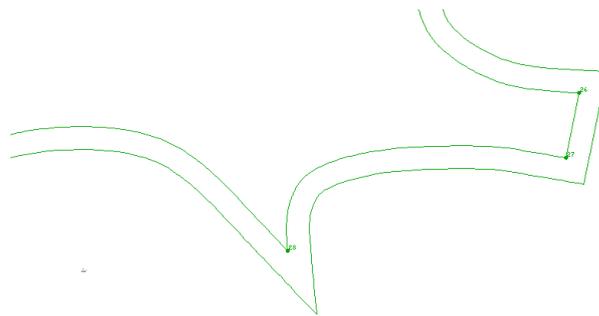


```
Command: ZWTEXTILE:ADDCUTLINE
Distance = 10.0000
Specify seam line[Distance/Direction]:D
Enter the size of the seam expansion::<10.000000>5
Distance = 5.0000
Specify seam line[Distance/Direction]:
319.6222, 276.0285, 0.0000
```

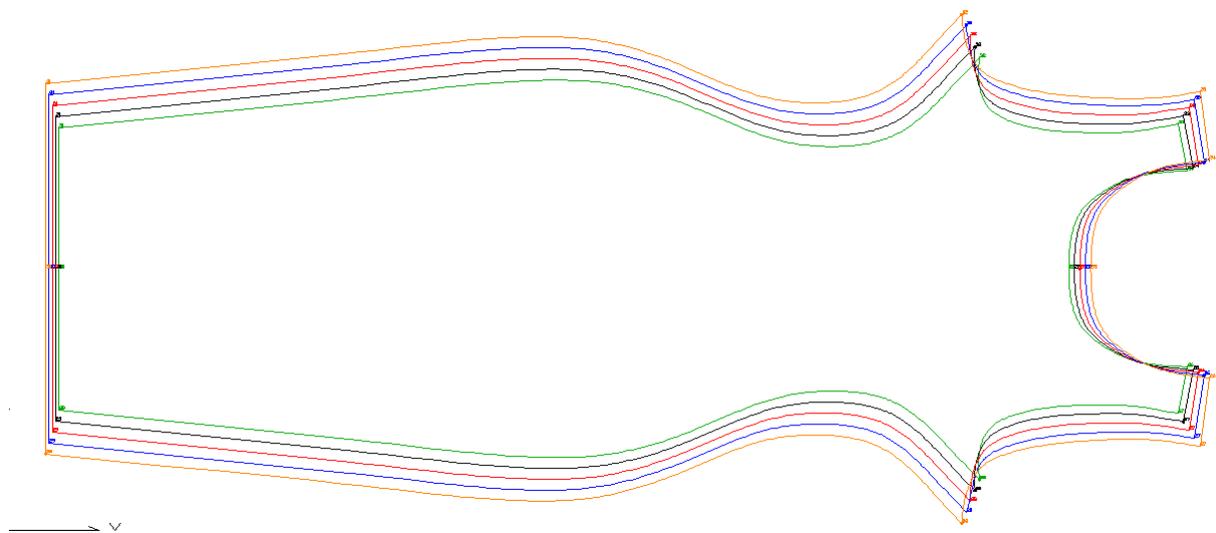
After specifying the saw line, the program will insert the cut line.



When using the function you can achieve results similar to the ones presented below. Remember that if the differences in distance appear, it is necessary to define them in the command bar.

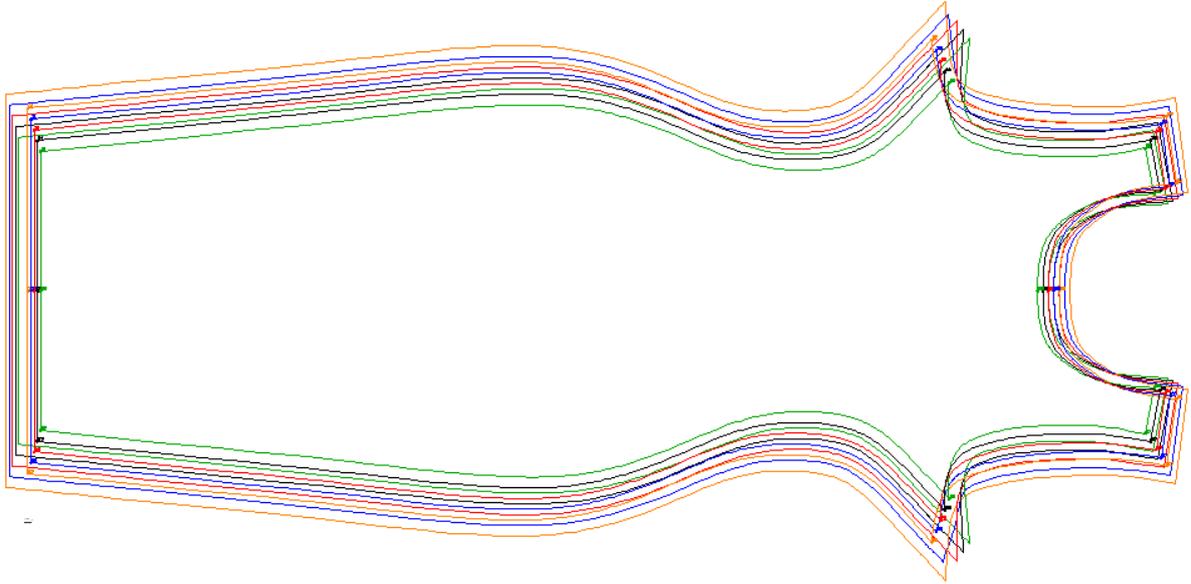


With visibility of all sizes we can see the following effect:



If the function is used when All sizes are loaded and visible, it will add the cut line to all of the present sizes, just like on the example below:





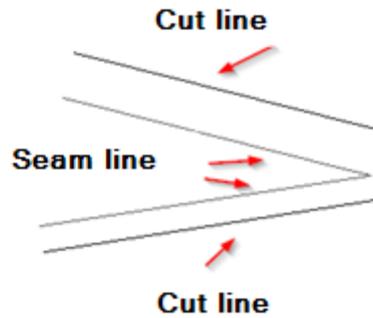
## 2) Command ZWTEXTILE:CORNER >

This function lets you modify corner connectors

Types of corner connectors:

- > Extending the cut line
- > Extending the cut line to seam line
- > Extending both cut lines to seam line
- > Cut line to perpendicularity
- > Cut line to 45°
- L Mirror to seam line

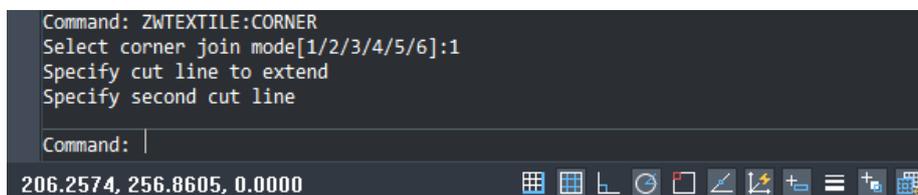
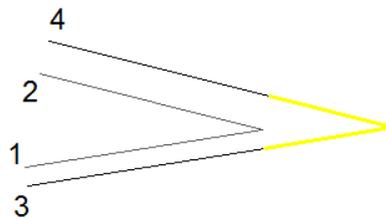
On the picture below you can see a base example of creating corners in two versions.



### ❖ Extending the cut line >

This command lets you connect the corners by extending the cut line.

Firstly specify the first cut line [3] and [4], and a line to which it will be extended.

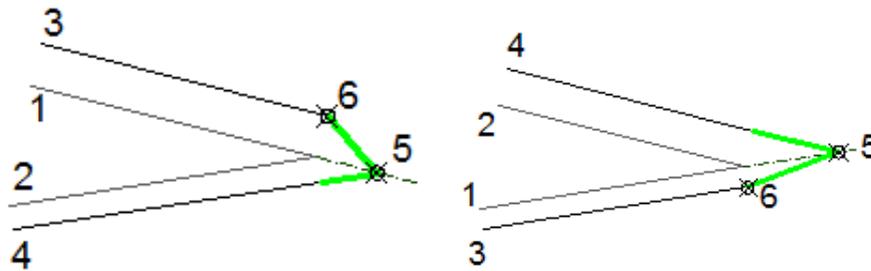


### ❖ Extending the cut line to seam line >

This function enables creating corners by extending the cut line into two directions.

The command extends the cut line to a seam line and connects the extended line to another cut line.

1. Specify the seam line [1].
2. Specify the cut line to extend [4].
3. Specify the cut line [3].
4. Points [5] and [6] will be connected.



```

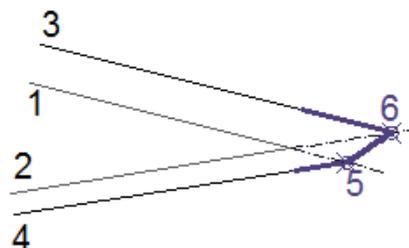
Command: ZWTEXTILE:CORNER
Select corner join mode[1/2/3/4/5/6]:2
Specify seam line
Specify cut line to extend
Specify second cut line
Command: |
529.3744, 191.6895, 0.0000

```

❖ Extending both cut lines to seam line 

The cut line is extended to the cut of the seam line, the end of the second cut line is extended to the cut of the second seam line. Two cut lines are connected.

1. Specify the seam line [1].
2. Specify the seam line [2].
3. Specify the seam line to be extended [3].
4. Specify the second cut line[4].
5. Point [5] and [6] will be connected.



```

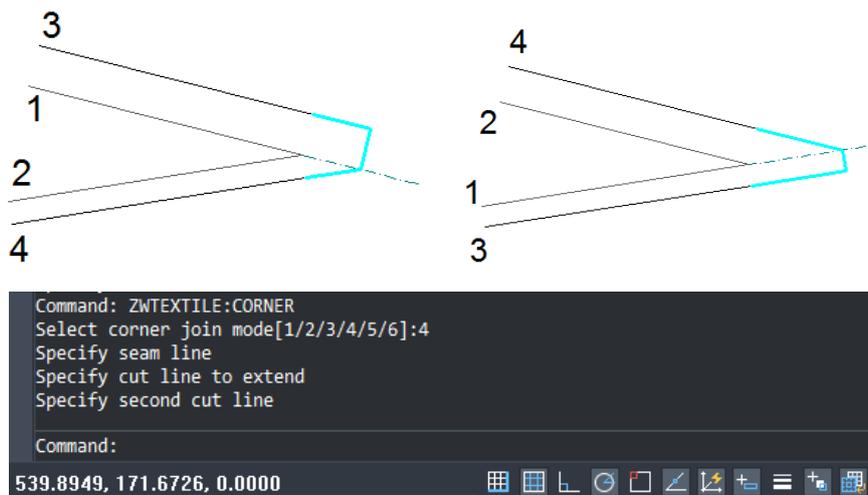
Command: ZWTEXTILE:CORNER
Select corner join mode[1/2/3/4/5/6]:3
Specify seam line
Specify seam line
Specify cut line to extend
Specify second cut line
Command: |
600.0549, 242.0136, 0.0000

```

### ❖ Cut line to perpendicularity

The cut line will be extended to cut point with seam line. They are both connected with a 90° segment. The second line will be extended to connect seam with cut line.

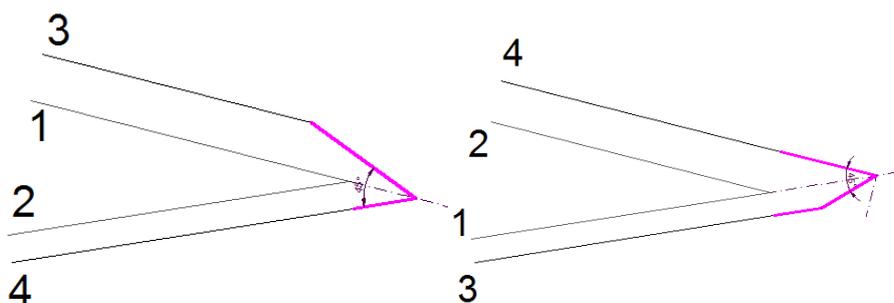
1. Specify the seam line [1].
2. Specify the cut line that is going to be extended [3].
3. Specify the second cut line [4].



### ❖ Cut line to 45°

Cut lines are extended according to the seam line with an angle of 45°.

1. Specify the seam line [1].
2. Specify the cut line to be extended [3].
3. Specify the second cut line [4].



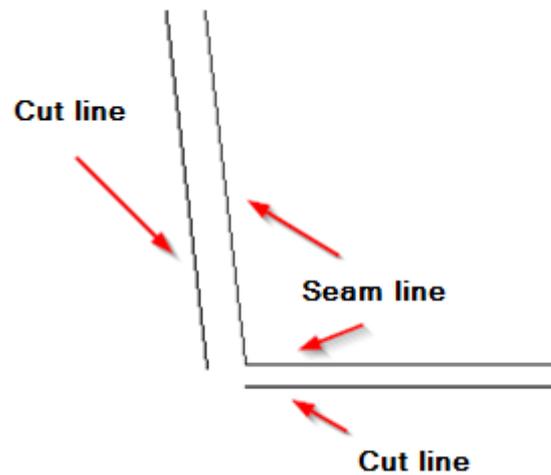
```

Command: ZWTEXTILE:CORNER
Select corner join mode[1/2/3/4/5/6]:5
Specify seam line
Specify cut line to extend
Specify second cut line
Command: |
571.3632, 365.1102, 0.0000

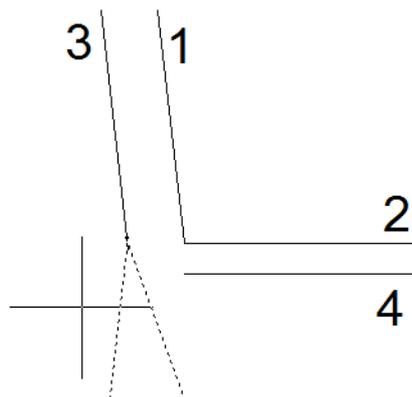
```

- ❖ Mirror according to the seam line 

Basis for the following example:

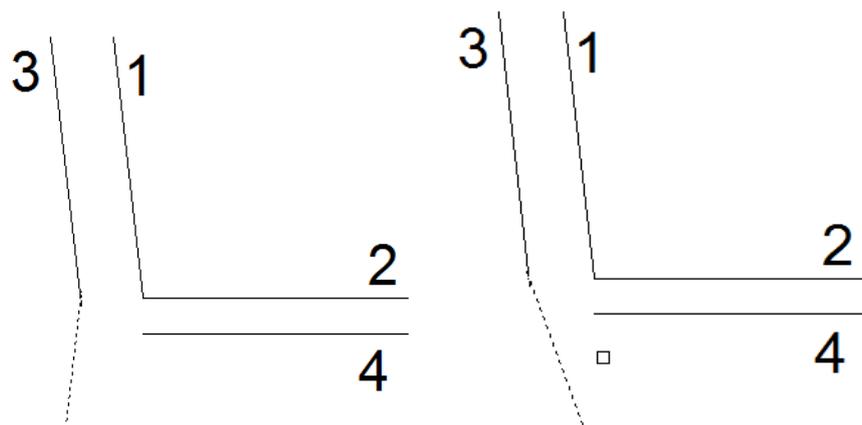


1. Specify the seam line [2].
2. Specify the cut line to mirror [3].

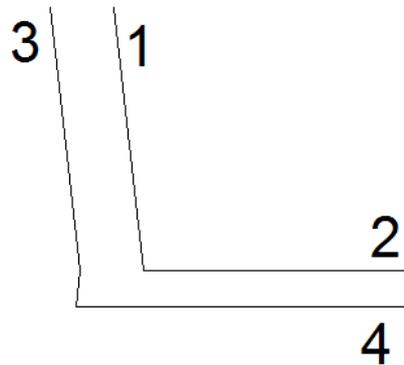


The corner connector will be added according to the selected direction.

3. Specify corner direction – click closer to the left or right side of the visible dotted lines.

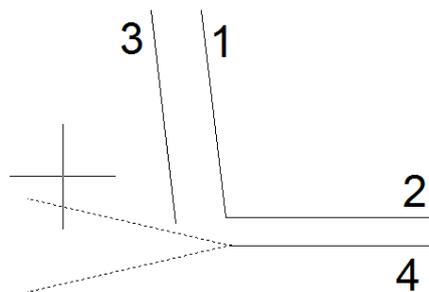


- Specify the cut line to be extended [4].



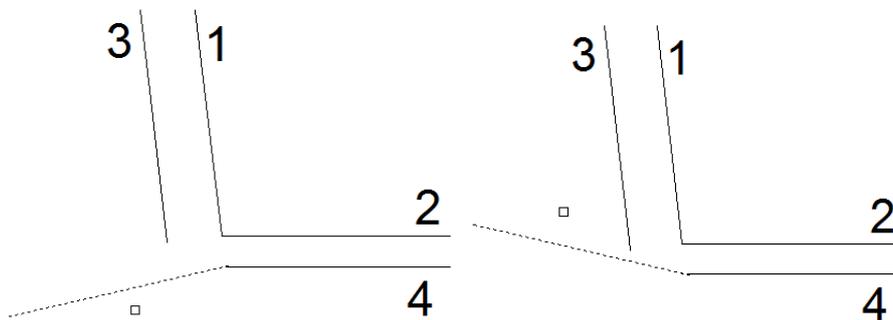
It is possible to insert a corner in different directions, similarly to the examples previously presented.

- Specify the seam line [1].
- Specify the cut line to mirror [4].

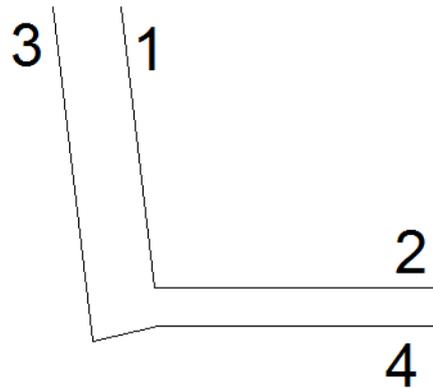


A corner connector will be inserted according to the set direction.

- Specify the corner direction – click closer to the left or right side of the dotted lines.



- Specify the cut line to be extended [3].



### 3) Command ZWTEXTILE:MULTICORNER

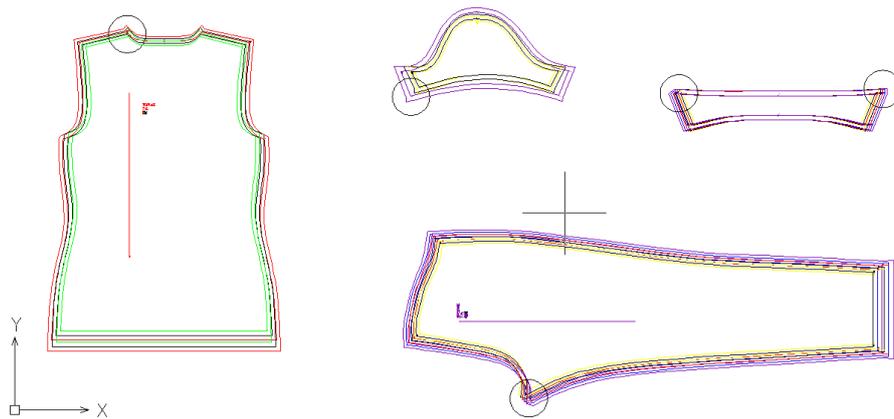
This set of functions allows the user to modify corner connectors in many sizes automatically. MULTICORNER functions are added in the same way as single connector.

Types of corner connectors:

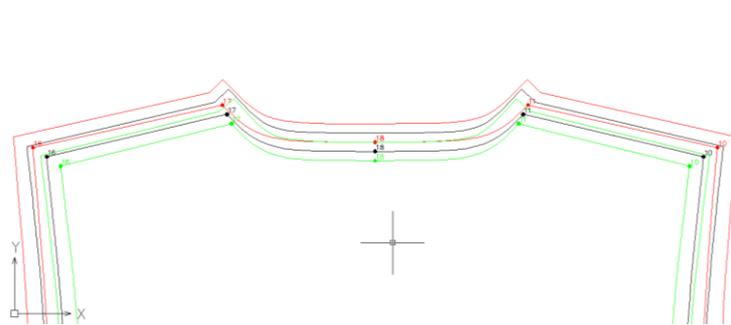
-  Extending the cut line
-  Extending the cut line to seam line
-  Extend both cut lines to seam line
-  Cut line to perpendicularity
-  Cut line to 45°
-  Mirror according to seam line

It is necessary that two lines on the whole length that are to be connected, are defined and turned on.

Here are few examples of how the functions can be used:



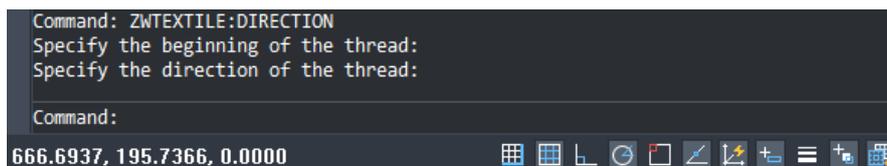
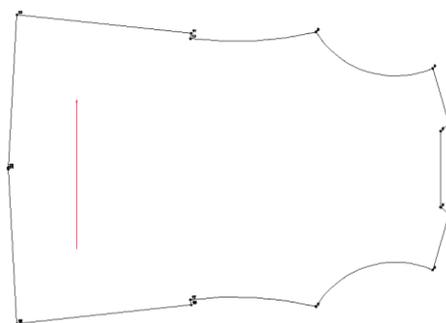
Specify the seam line, cut line to be extended and the second cut line.



#### 4) Command ZWTEXTILE:DIRECTION →

This command inserts a straight thread.

Once activated specify an insertion point and the ending point of the straight thread in the drawing and confirm by pressing Enter.



## 5) ZWCAD: TEXT

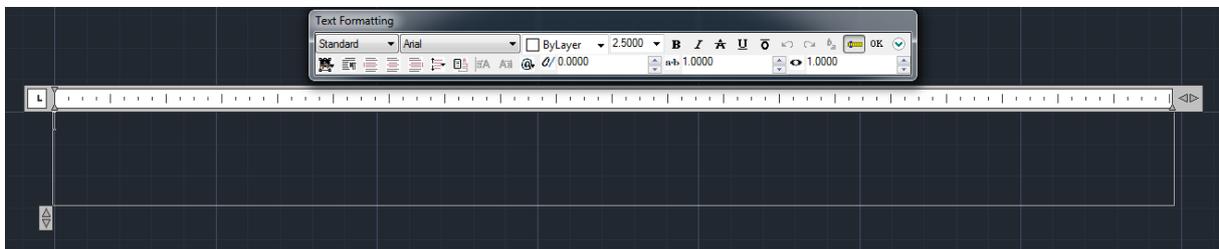
This function can be found in the Ribbon Draw-> Annotate.

- ✓ Inserting text

 Multiline Text

 Single Line Text

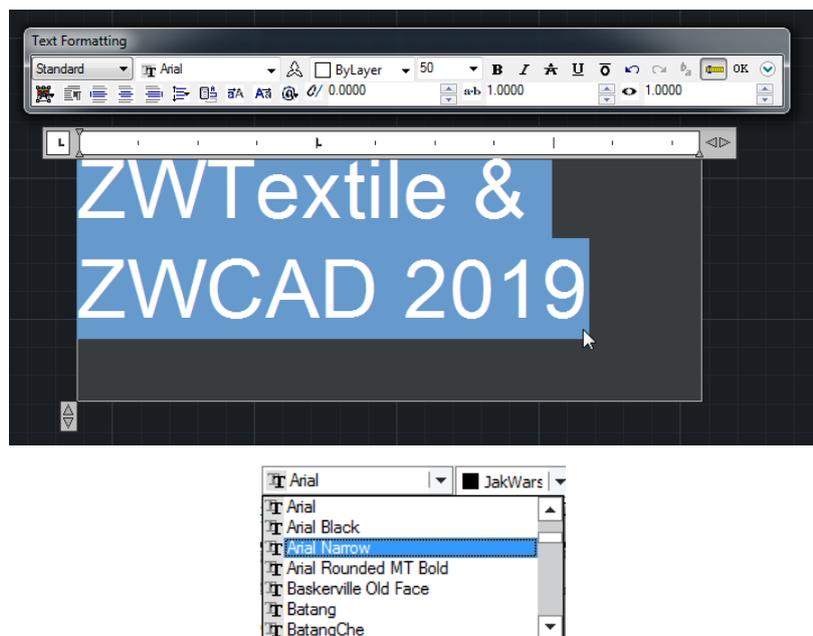
Once the command has been activated, specify a rectangle which will become the text field or specify an insertion point of a single line.



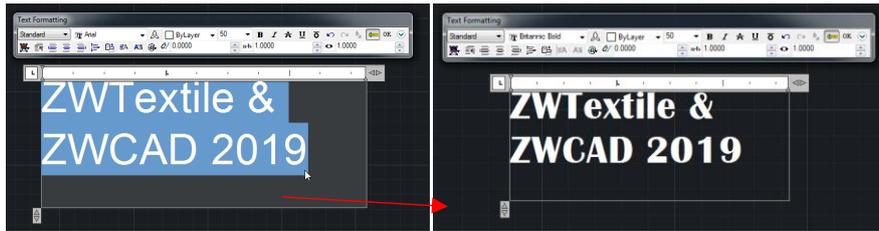
Once a text box has been added, you will be able to edit it in various ways.

- ✓ Changing the font

The font of inserted text can be edited by selecting a font from the list displayed below.



In order to change the font of existing text, firstly select text and then change its font. To select text hold the right mouse button and drag it over the text.



✓ Size

The height of the text can be defined by entering a value in the following window . Please remember that the size will change only if the text is highlighted beforehand.

✓ Text Edition

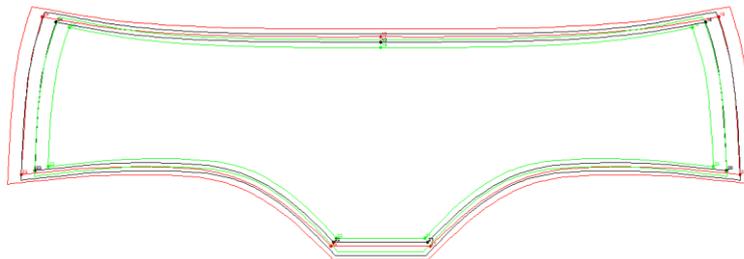
The existing text can be freely edited. After left clicking twice on a text element in the drawing, a formatting window will appear that will allow you to edit the element or text. The selected elements can be deleted by pressing Backspace or Delete on your keyboard.

#### 6) Command ZWTEXTILE: DESCRIPTION

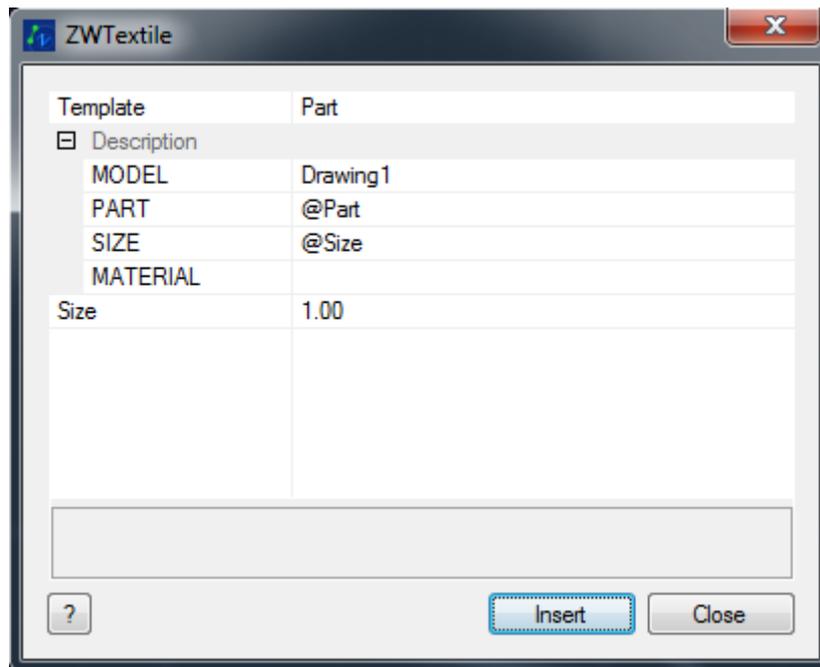
This command lets the user to enter a description for an element based on parameters defined by the user.

When creating a form, you have to define its name. Thanks to this command the name will be added to the description.

A form has been created as the front part in different sizes.



After activating the command, a dialogue window will appear, which will include all information contained in the description.



Model – Name of the file

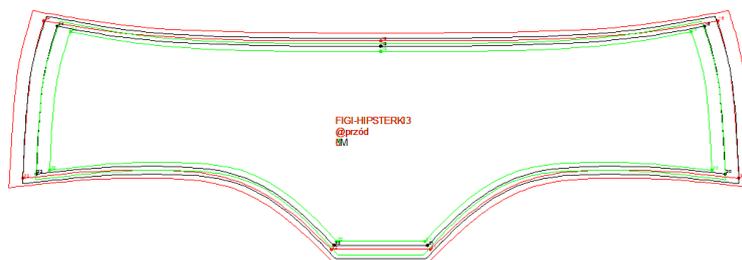
Part – Name of the selected part defined during its creation

Size – Selected size of a part or all sizes

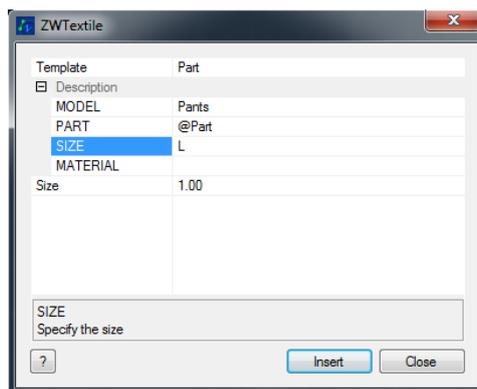
Material – The material from which the selected part is created

Height – The size of the inserted description

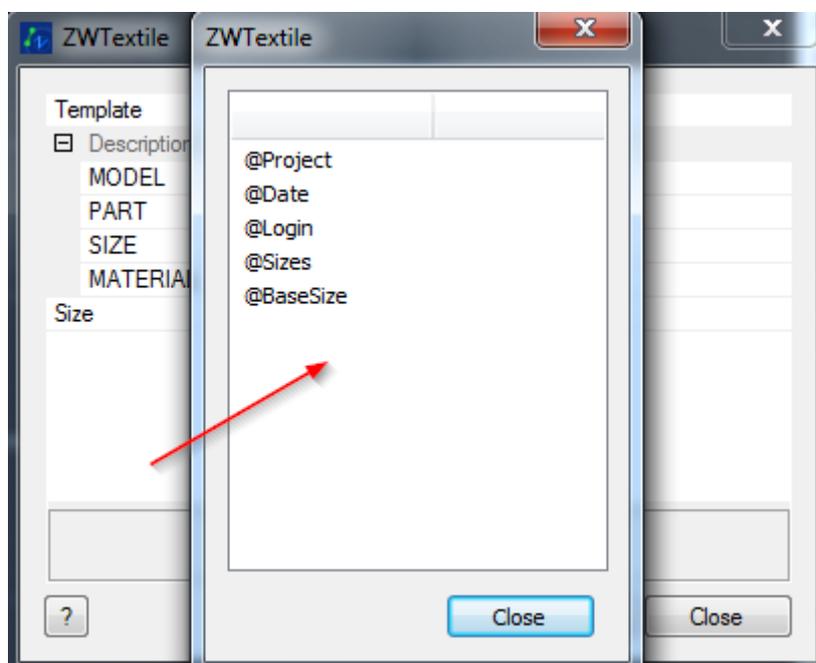
After defining insertion parameters it is necessary to click on Add and select a place for the object on the drawing.



It is possible to specify a single size in the description window.



If you click on ?, a window will appear that will let you choose the names for descriptors.



In the command Sizes you can enter:

@Project – Name of the file

@Date – Date of the description

@Login – Username used on the computer

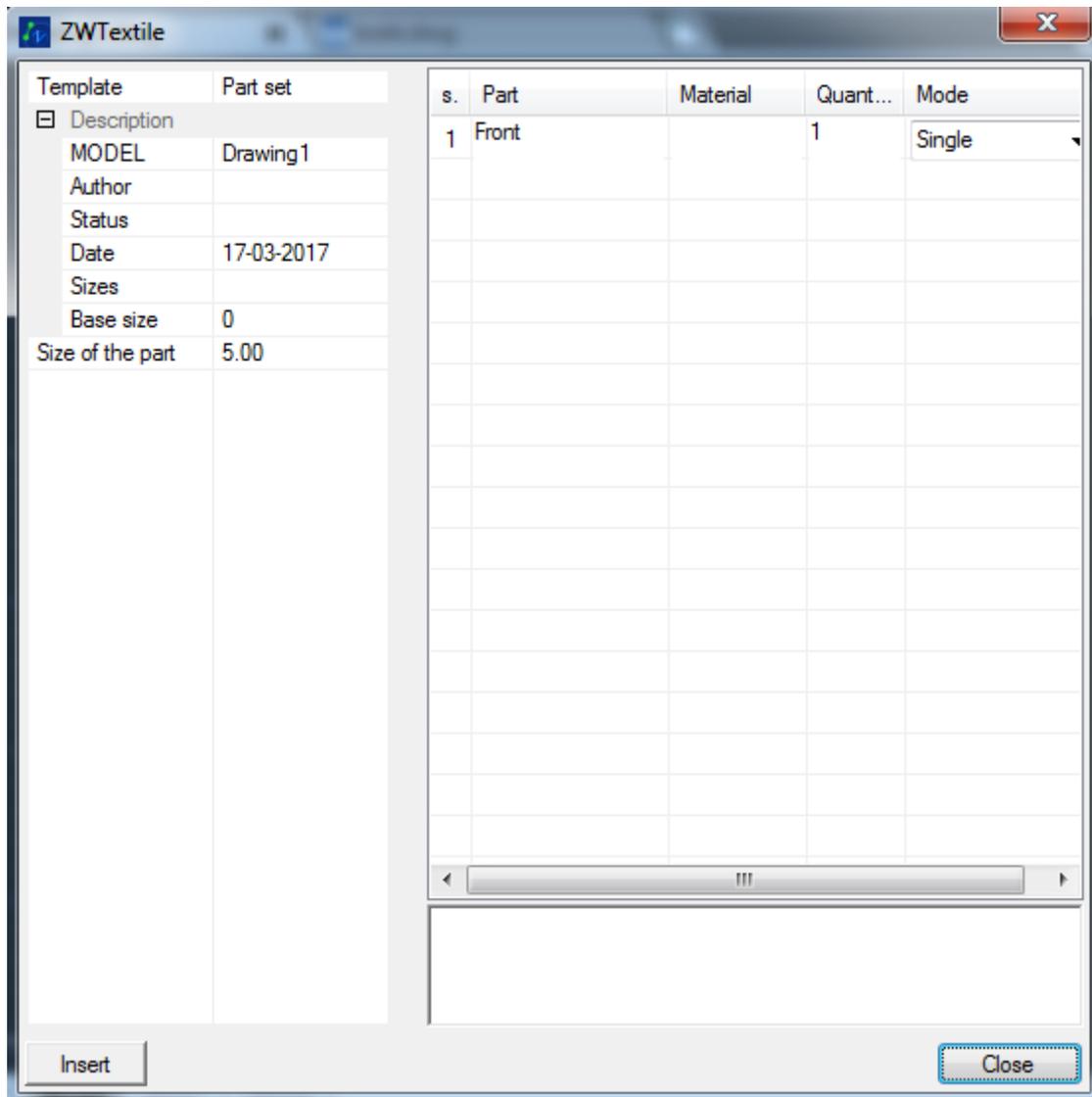
@Size – All the sizes in the document

@BaseSize – Includes base size

<div style="border: 1px solid red; padding: 2px; display: inline-block;">@Size</div> <b>PANTS-HIPSTERS3</b> <b>Front</b> <b>L&amp;M</b>	<div style="border: 1px solid red; padding: 2px; display: inline-block;">@Date</div> <b>PANTS-HIPSTERS3</b> <b>Front</b> <b>21-01-2016</b>	<div style="border: 1px solid red; padding: 2px; display: inline-block;">@BaseSize</div> <b>PANTS-HIPSTERS3</b> <b>Front</b> <b>M</b>
<div style="border: 1px solid red; padding: 2px; display: inline-block;">@Project</div> <b>PANTS-HIPSTERS3</b> <b>Front</b> <b>PANTS-HIPSTERS3</b>	<div style="border: 1px solid red; padding: 2px; display: inline-block;">@Login</div> <b>PANTS-HIPSTERS3</b> <b>Front</b> <b>Izabela</b>	

7) Command: ZWTEXTILE:FORMSET

It is a collection of all necessary information regarding a model.



The table includes:

- name of the model (can be edited anytime)
- referee (name and surname of the person responsible for the Project or its part)
- status (actual status of the work)
- date (current date)
- sizes (all sizes that are included in the model)
- base size ( base + layers 0)
- information about elements:
  - name (it is possible to change the name of the element; when creating a form enter the name without spaces but here it is possible to input the name with spaces)
  - material (the material can be inputted via type or number)
  - quantity (the number of single elements or element pairs)
  - mode (information whether the element is single or if it's a pair of elements)
  - comments (anything can be typed in here)

The screenshot shows the ZWTextile software interface. On the left, there is a 'Template' table with the following data:

Template	Part set
MODEL	kroki
Author	
Status	
Date	17-03-2017
Sizes	S,M,L,XL,XXL
Base size	M
Size of the part	5.00

On the right, there is a main table with the following data:

s.	Part	Material	Quant...	Mode
1	Back		1	Part mode horiz
2	Crotch		1	Part mode horiz
3	Front		1	Single

At the bottom of the window, there are 'Insert' and 'Close' buttons.

The table gets the information by itself from grading rules, form creation and elements

description.

Editing this information is possible in the table „SET”. The only information that cannot be edited are the ones from grading rules. The table can be added to the drawing as well as print it. There can be many tables within a drawing.

Pants

17-03-2017

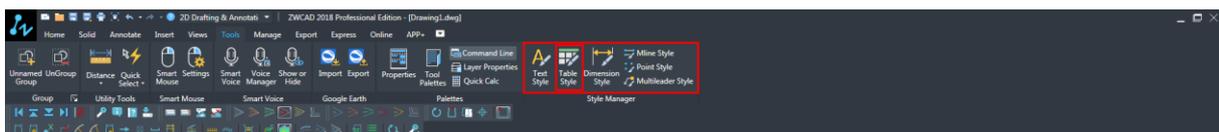
S,M,L,XL,XXL

M

Collection of parts				
sn.	Part	Material	Mode	Quantity
1	Back		Part mode horizontal	1
2	Crotch		Part mode horizontal	1
3	Front		Single	1
Sum:				5

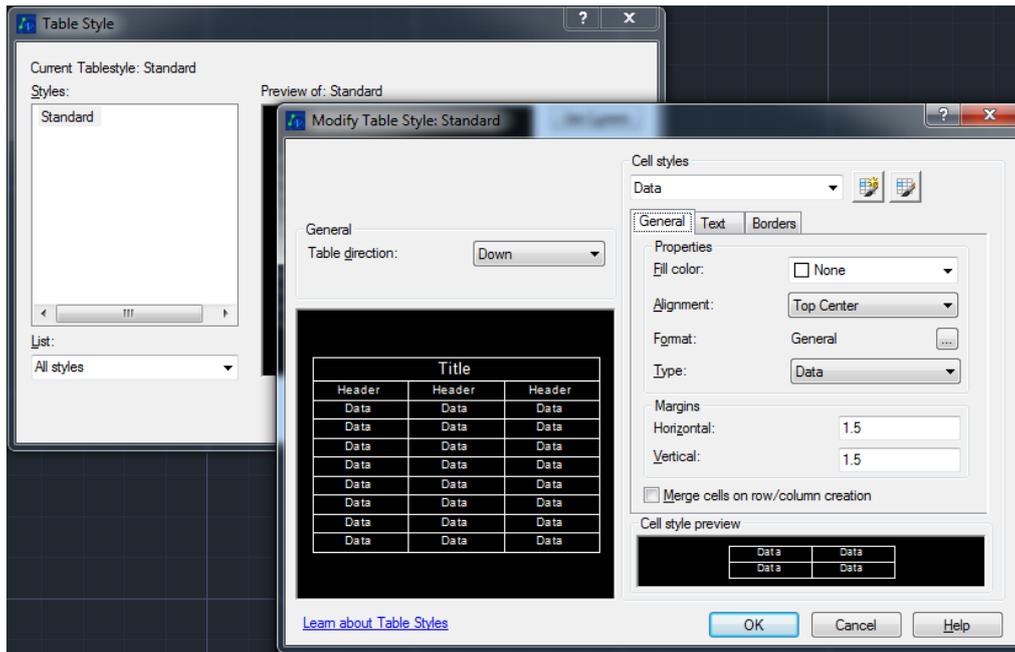
### Editing the information table

The table inserted into the drawing is an element, which can be edited by using ZWCAD. Ribbon Tools -> Style Manager -> Table Style



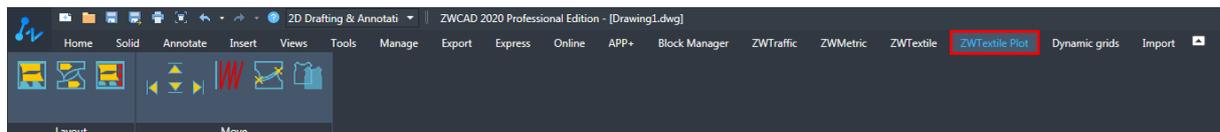
After activating the function mentioned above, it will display the name of a default table style, which can be easily changed or you can add a new one. In order to change the existing style click on **Modify...** and you will be able to see the title, header and data within the table.

If you define which element of the table you would like to change, select the tab that you want to edit – **General/Text/Border**.



## VI. ZWTextile – Layout & Print Module

The layout and print module can be found under the following tab:



By selecting ZWTextile Plot on the ribbon, you will be able to access all the functions corresponding to the given module.

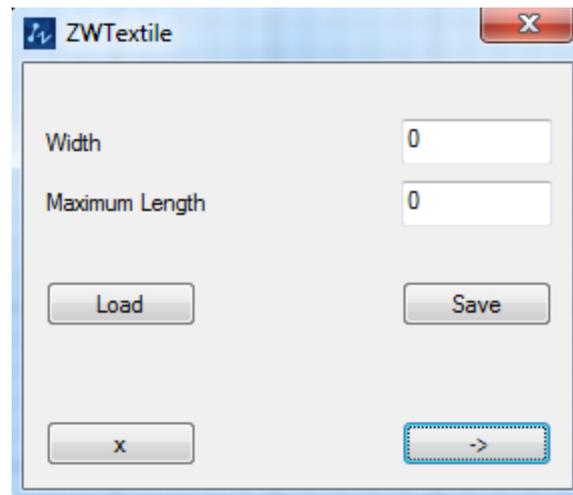
### 4. Stage 4: Repository

**Note:** When creating a repository please turn off Polar Tracking  and Object Snap .

#### 1) Command: ZWTEXTILE :REPOSITORY

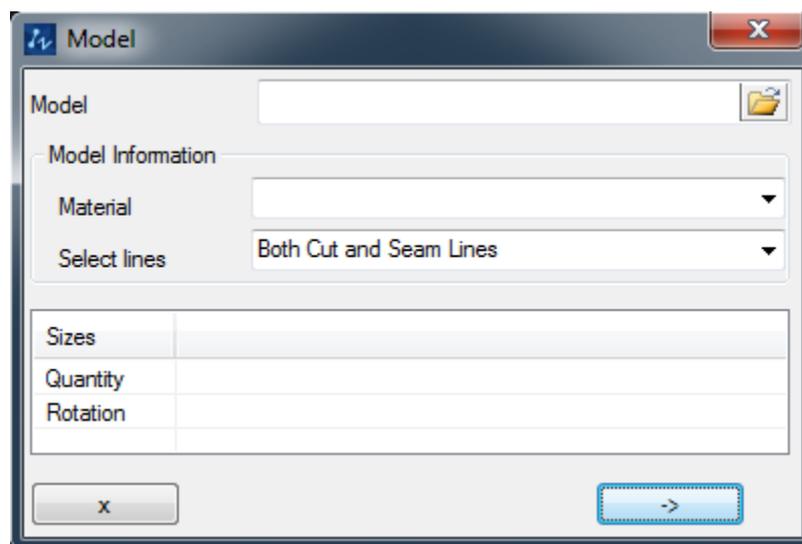
By using the function Repository, you can enter real measurements of materials area, on which the repositories will be printed to cut.

When the command ZWTEXTILE:REPOSITORY is activated, a window will appear that will allow you to define a repository.



The defined repository can be saved on your hard drive by clicking on “Save” or you can load a previously created repository by clicking on “Load”.

Enter the dimensions of the area of material and once that’s completed click on the “->” to continue.



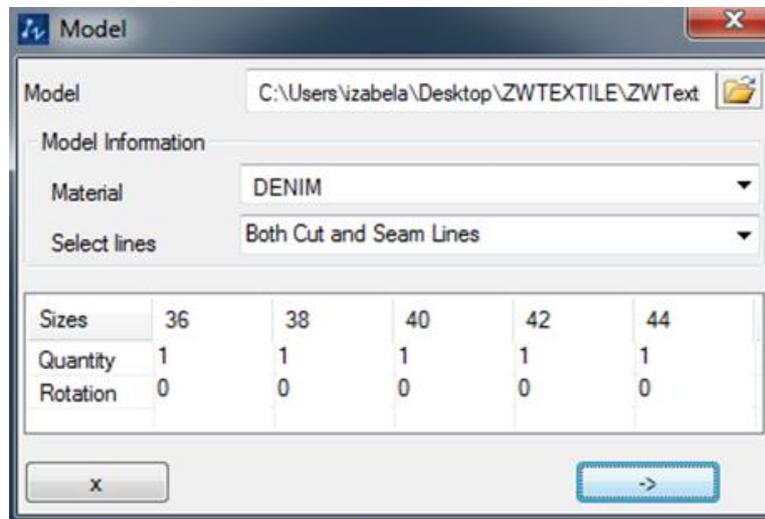
In the next window it is possible to include Model Information, which include:

- Model - \*.dwg file,
- Material,
- Select lines - lines that are visible in the repository

In order to load a model, click on  and then select the location of the file on your hard drive.

Once the model has been added, you can define the material for an element – the list is

completed according to the materials used when describing parts – as well as those drawn within the model.



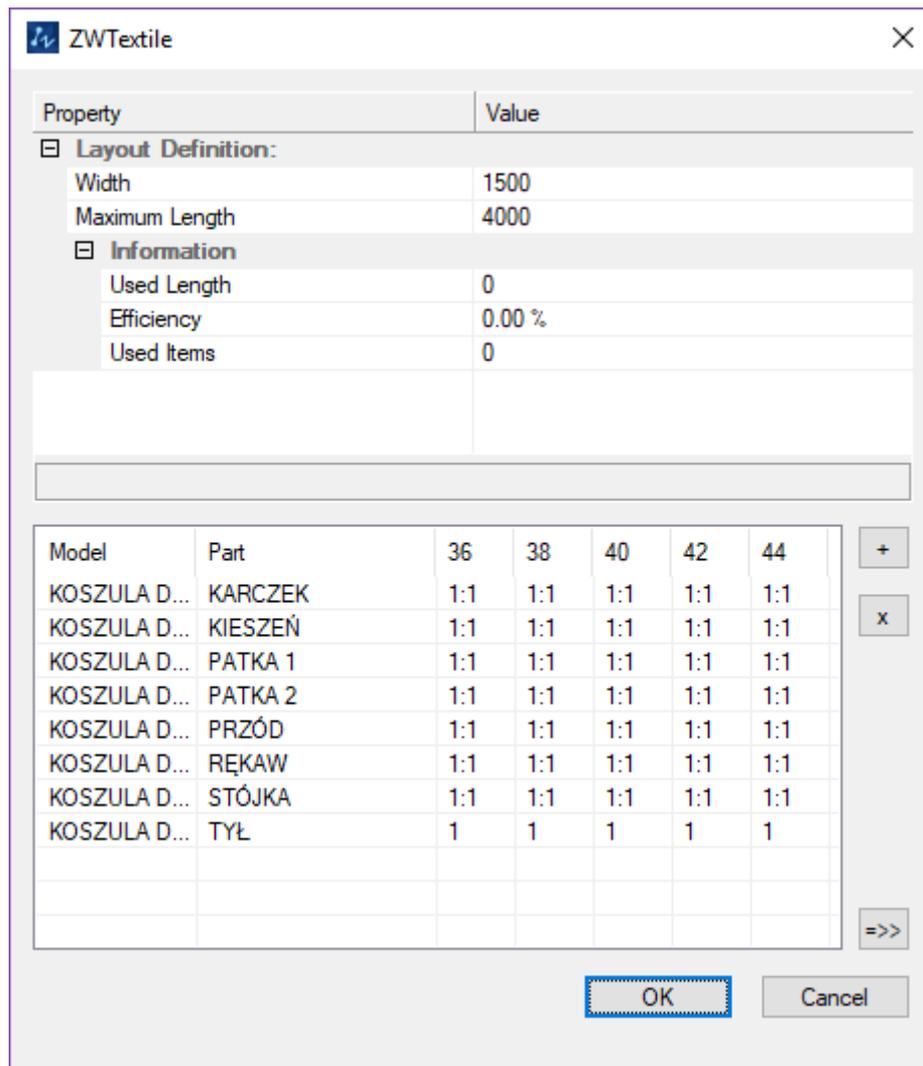
Material: DENIM  
FIZELINA

Select lines: Only Cut Lines  
Only Seam Lines  
Both Cut and Seam Lines

In order to display the options click on the arrow pointing downwards .

The sizes, quantity and rotation will be displayed in the bottom table. Quantity and rotation can be modified by clicking twice on the left mouse button. After changes have been made, confirm by pressing Enter. =

In order to add defined elements, click on “->” and the repository will be displayed on the drawing.

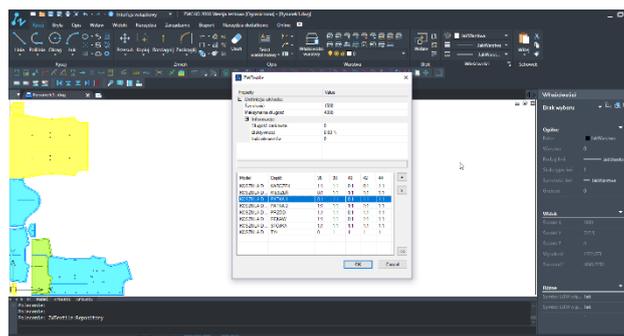


A dialogue window will appear with all the loaded elements and with the option to add them to the drawing.

In order for a certain size of an element to be added to a drawing, click twice on the model:

KOSZULA D... KARCZEK 1:1 1:1 1:1 1:1 1:1

The selected element will be added to the layout and the amount of it will decrease in the window Content of the layout

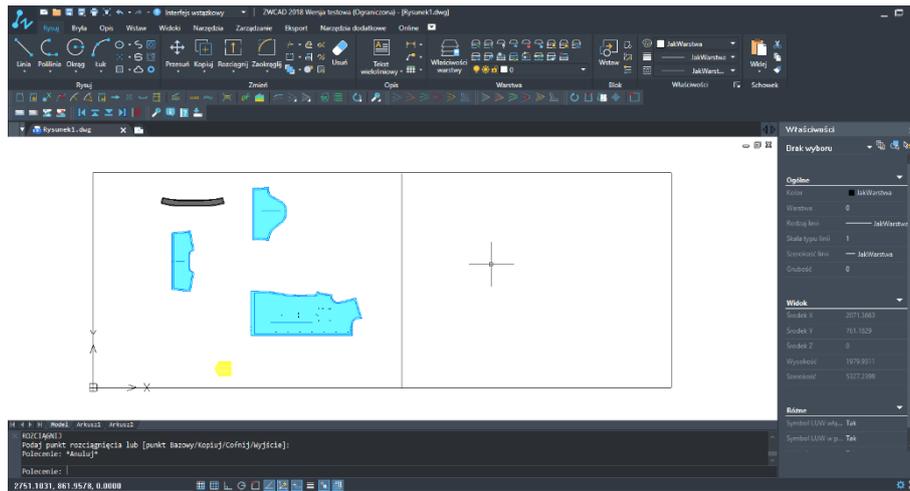


The number of elements in the defined layout will decrease if they are added to the drawing.

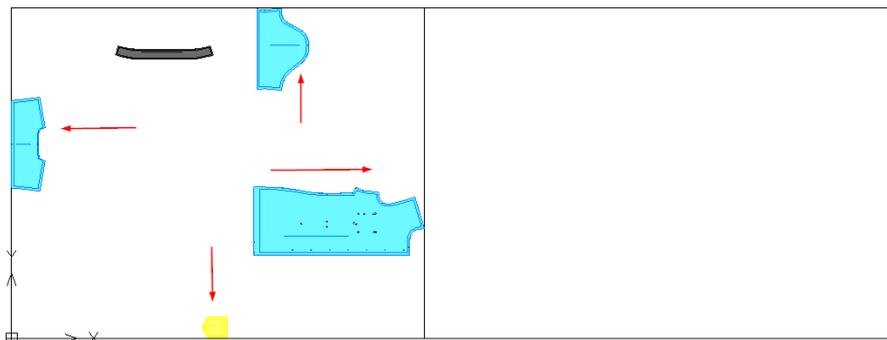
If a rotation angle is added to the part of a layout, the view of a selected part will be rotated. The rotation is defined accordingly to the straight strand.

## 2) Command ZWTEXTILE:LAYOUT:MOVE

The move function lets you relocate the elements on a layout in a selected direction. According to the users choice of direction, the element will be moved to the location of the closest element.



-  - Move left
-  - Move up
-  - Move right
-  - Move down



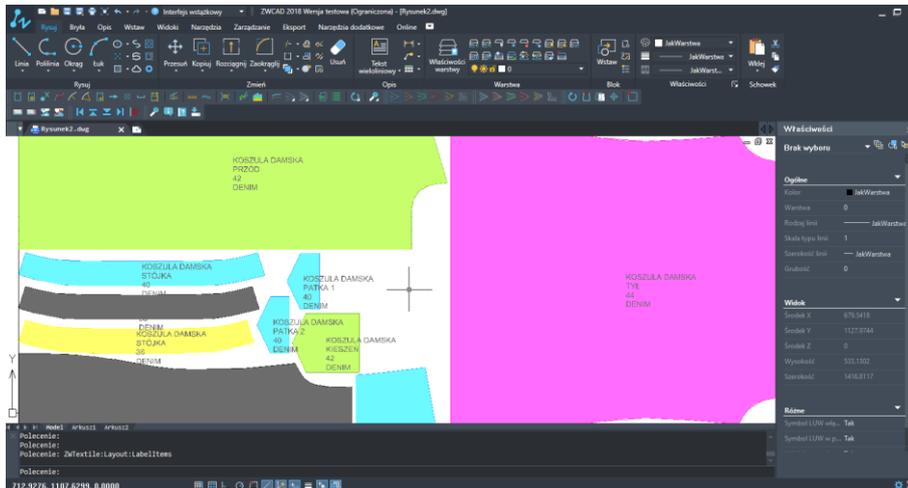
## 3) Command ZWTEXTILE:PRESSURE

When called for, select a group of elements that you would like to move by using pressure. This function automatically moves every selected element in every possible direction and it adapts to free space.

#### 4) Command: ZWTEXTILE:LAYOUT:LABELITEMS

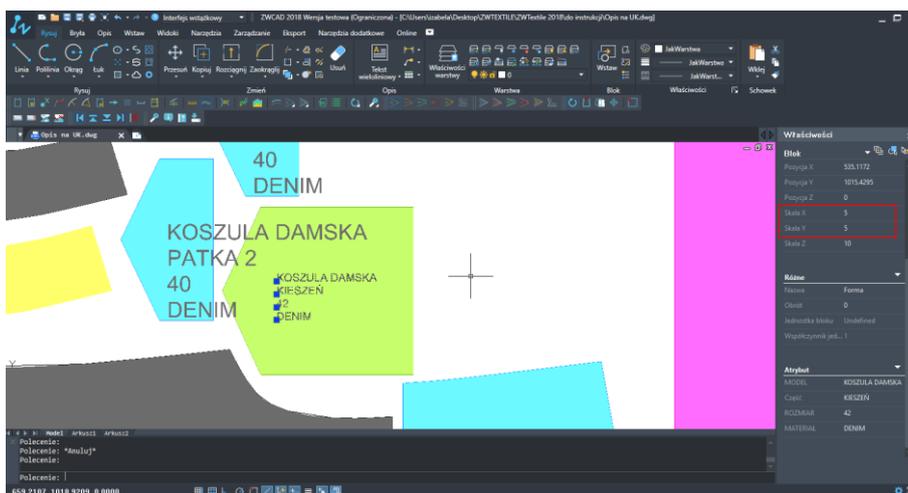
By using this function you can automatically add a description to all items found within the layout.

Once the function is activated, a result similar to the one below will be shown:



Inserted labels will not be applied according to scale of parts but you can customize the labels by using ZWCAD.

After selecting a description block, we can enter a new scale value X, Y, Z in the object properties or you can directly scale the whole description by using the function Scale.



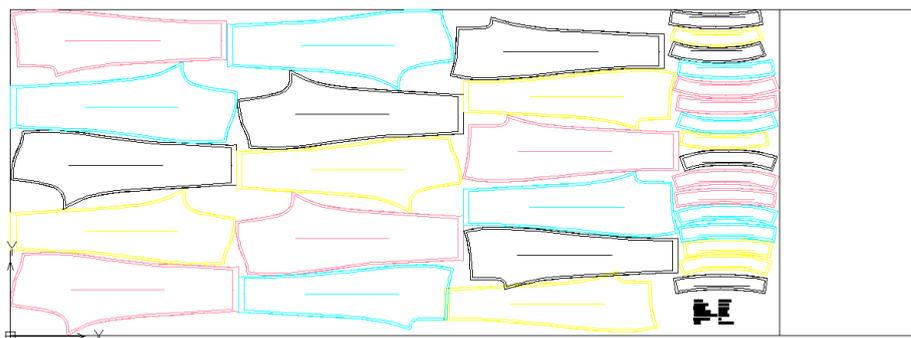
After editing values in the Properties of the object, its length along the defined axis will change. In order to correctly scale a description, you need to enter the same value in 3 axis.

### 5) Command: ZWTEXTILE:LAYOUT:CHECKINTERSECTIONS

Intersections on a layout might not be visible even though they were edited beforehand and placed close to each other in order to save the material.

This command will let you check where the intersections are located on the drawing.

For example you can see a layout with a number of intersections:



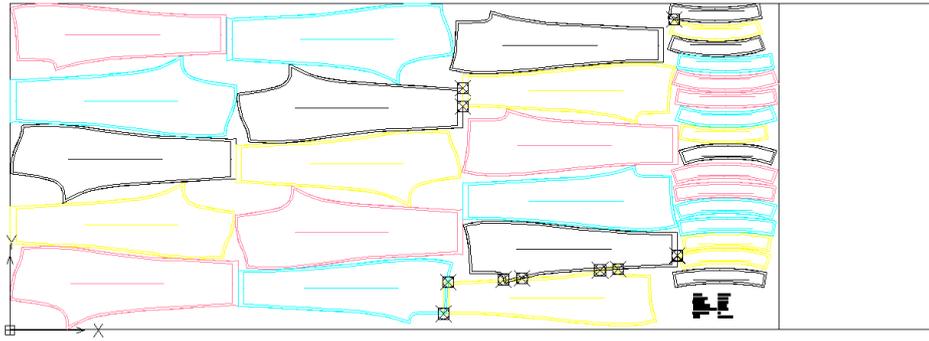
Once the command is activated, the program will automatically check for intersections on a current layout.

**Note:** In order to ensure that the program correctly highlights the intersections, it is necessary to have one layout within the drawing. If more elements are present, it will take longer for the program to find and highlight them.

After a short scan of a layout which happens when this function is called for, the result will be displayed on the drawing. In order to precisely check the result it is necessary to change the size of points used in the drawing.

CHECKINTERSECTIONS inserts a point at an intersection which is invisible or is a normal dot.

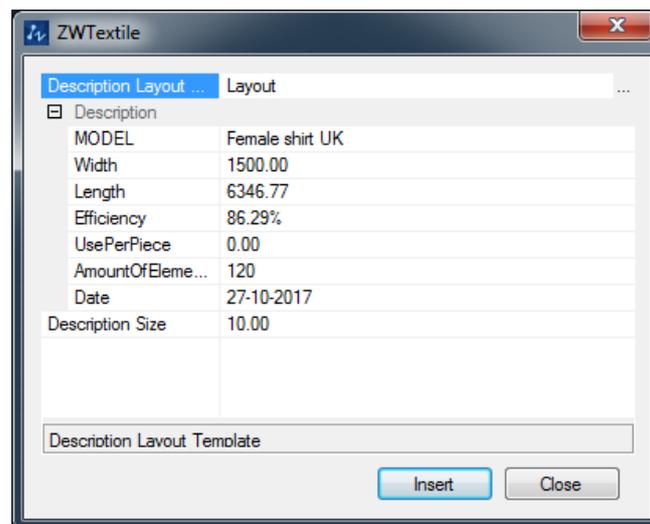
In order to change the points size or style, use the function Point Style.



#### 6) Command: ZWTEXTILE:LAYOUT:LABEL

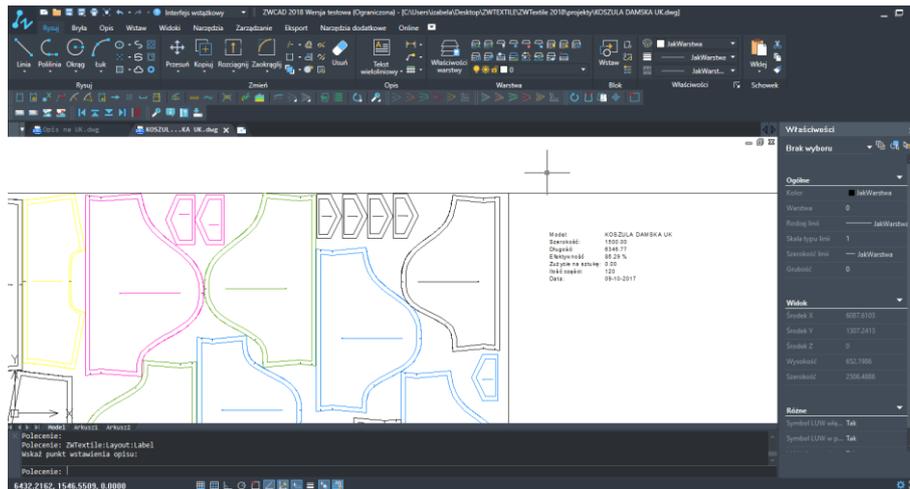
This function lets you enter a label to a layout with the information that has been entered in the Repository window.

Once the function that is responsible for warehouse description, a window will appear with data regarding current layout.



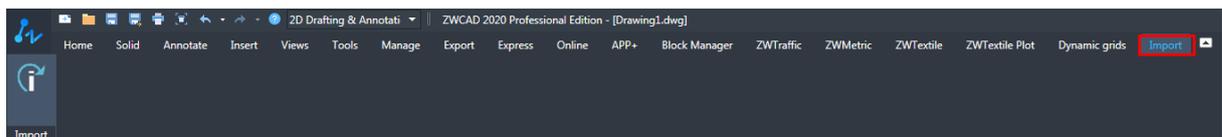
Certain values can be edited by the user or by directly clicking on the text which is going to be changed.

In order to add a description to a drawing with a layout, please click Add and specify the insertion point.

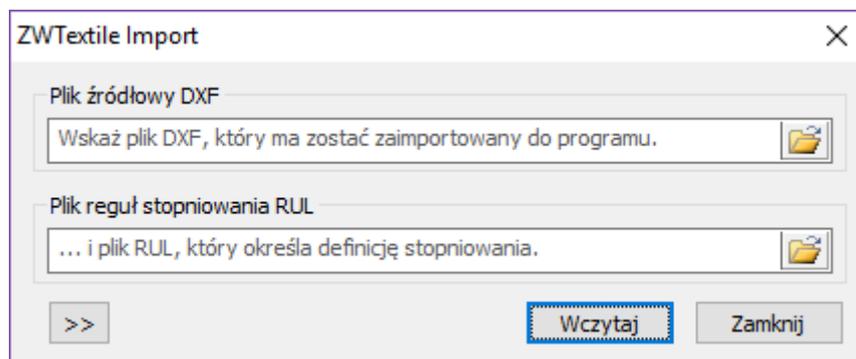


## VII. Import

The module is available by clicking on Import found on the ribbon interface:

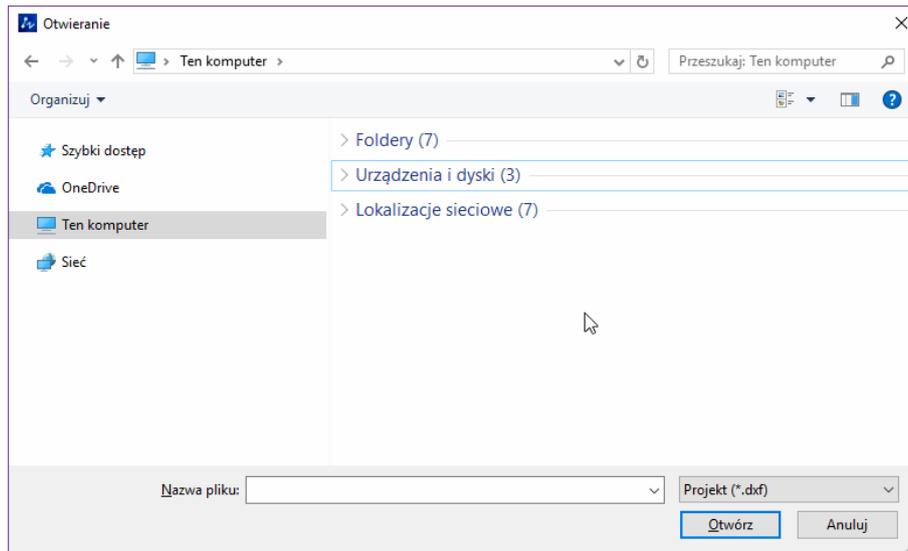


Main function of the application is „**Import**”. Once the function is activated, following screen will pop up:



1. We need to select a **DXF** source file, which can be found on your PC and that will be imported to ZWCAD with ZWTextile.

To select the file, click on this icon  and specify the DXF file.



2. Now click on the **RUL** file, which defines grading for a DXF file. The file should be selected the same as the previous DXF file.

By default, the program will import every available sizes that were saved in the DXF and RUL. In the dialogue window, where we specify files to import, we have different options that we can use.

To expand the options view, click on: 

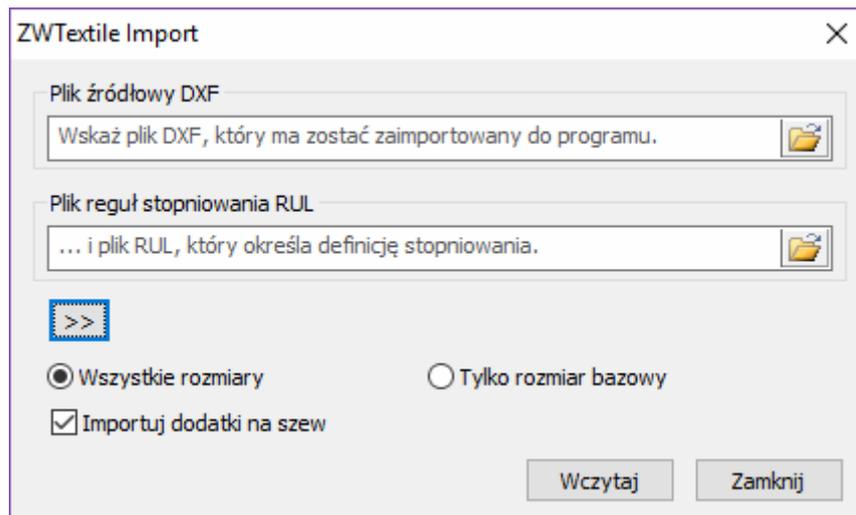
Following options will be available:

- All sizes
- Only base size

Another option selected by default:

- Import dart addition

If you change settings from „**All sizes**” to „**Just base size**” in ZWCAD and ZWTextile, only the base size will be visible from the DXF and RUL files.



Another option selected by default is „**Import dart additions**”.

If you do not want to load dart additions, please un-tick this option.

## VIII. Import / Export

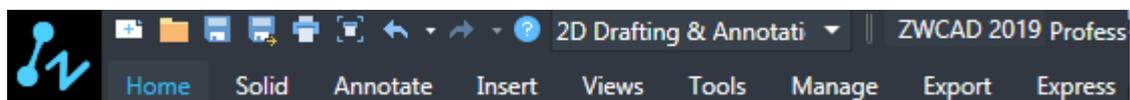
### 1) Import

#### DWG & DXF files

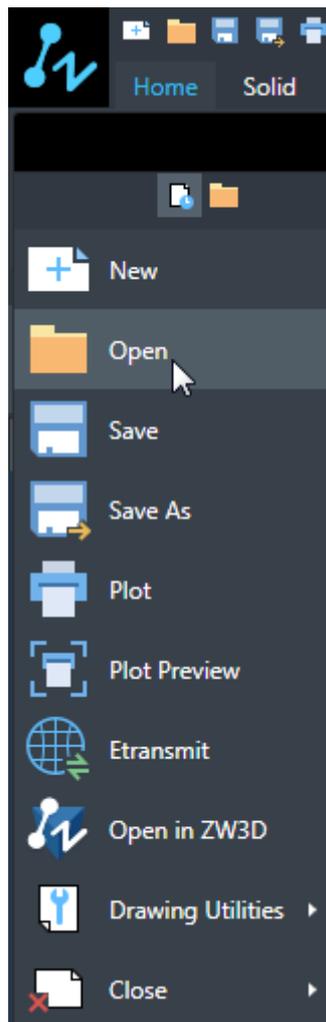
In ZWCAD you can directly open file formats DWG and DXF. The files in such format contain all elements of a drawing that allow you to work within the CAD environment. Worth noting are files which contains a lot of elements such as blocks.

In order to run DWG or DXF files you need to open ZWCAD and by using the function Open, select the desired file on your hard drive.

The function can also be run by clicking on the following icon at the top of ZWCAD user panel

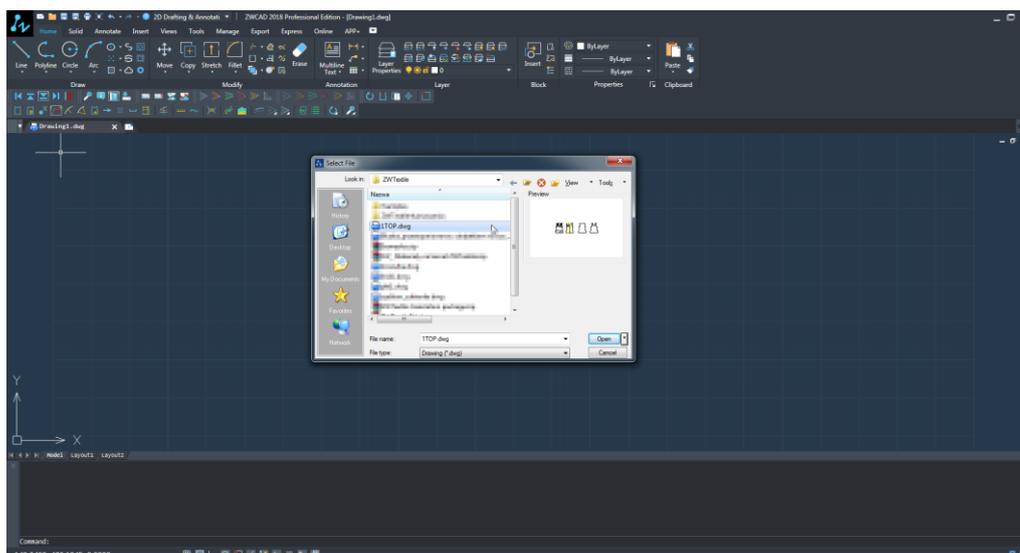


It is also possible to open a drop down menu and choose from the list:



After running the function, a window will appear that will let you specify the path of the file.

You need to define the type of a file that you are looking for:

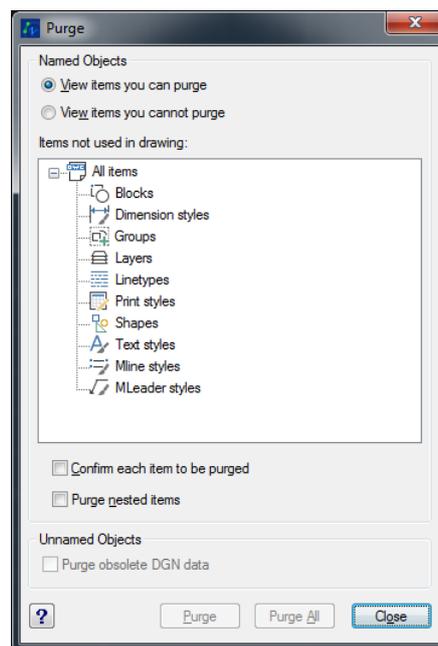


### Purging a drawing

It is possible that the layers or other elements will be overwritten when importing DWG or DXF files from a different program.

By using the function PURGE, you will be able to clear the drawing of any unused elements that might slow down or completely stop you from working.

Please enter the command PURGE and in the dialogue window that appears, specify elements that are going to be purged.

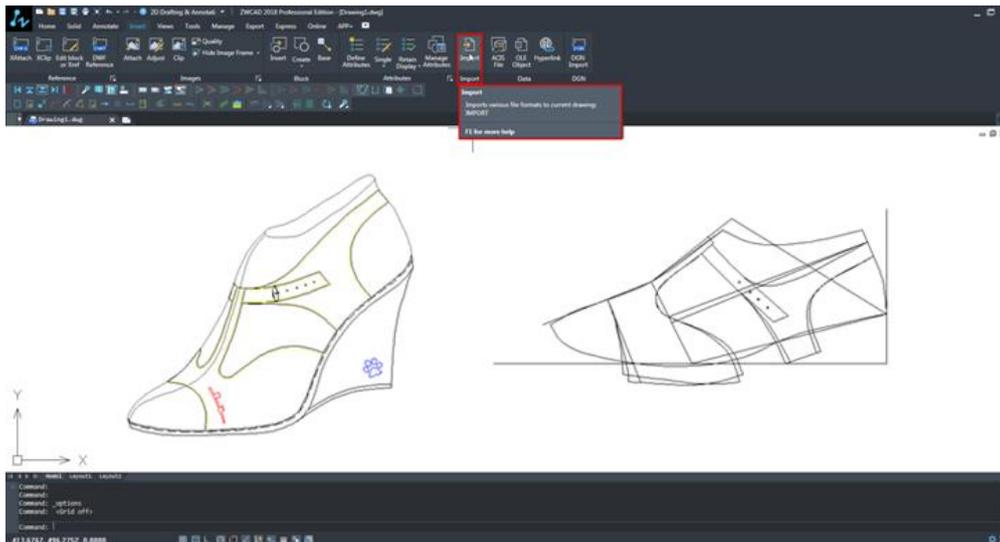


### Metafiles and ACIS

File formats listed below can be imported to ZWCAD:

- Metafile (\*.wmf) – Windows Media File
- ACIS (\*.sat) – solid files ACIS

Ribbon Insert -> Import



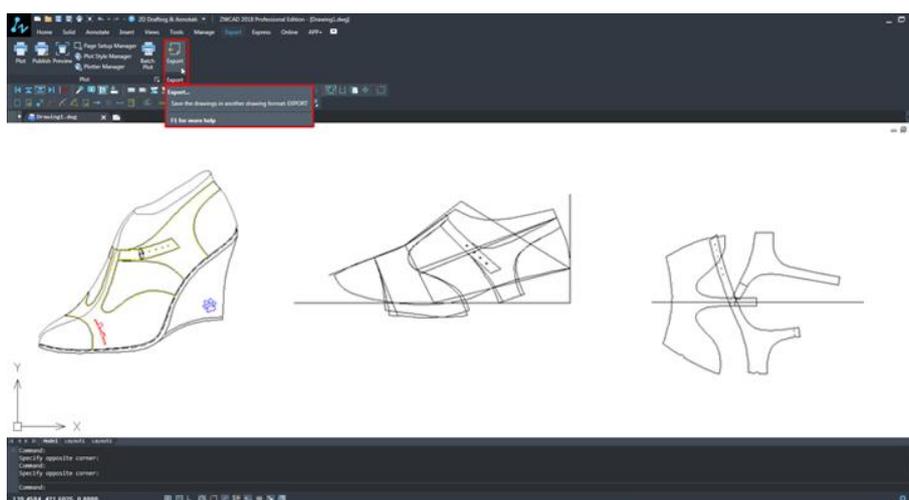
## 2) Export

ZWCAD allows files to be imported as well as exported.

Available export format:

- Metafile (\*.wmf) – Windows Media File
- ACIS (\*.sat) – Solid file ACIS
- Bit map (\*.bmp)
- Block (\*.dwg) – Drawing file

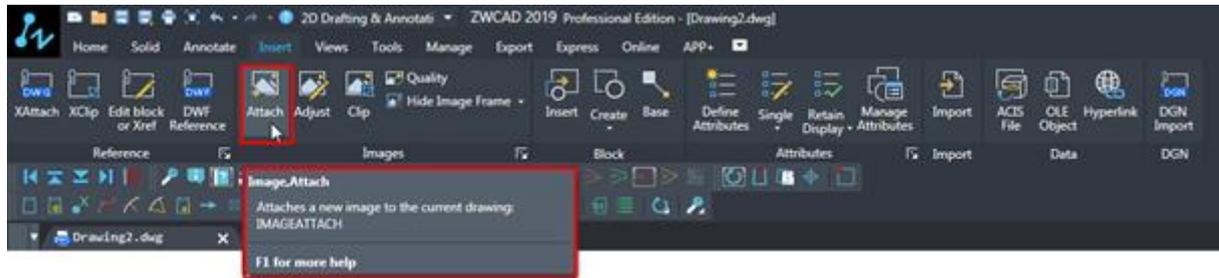
Ribbon Export -> Export



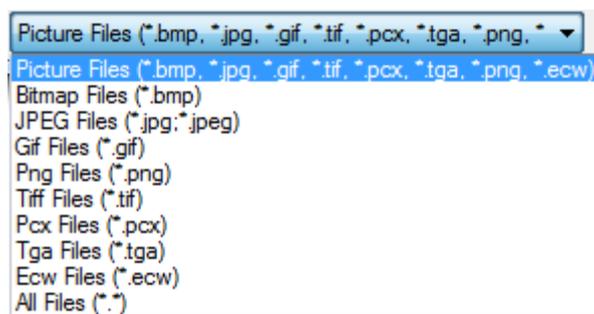
### 3) Inserting image files

Wider span of functions is available in under the function Attach.

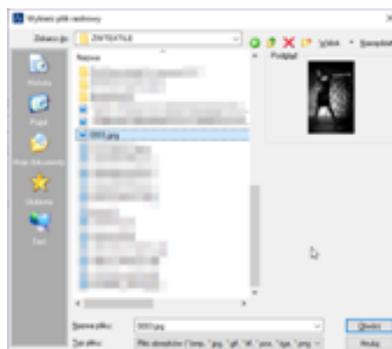
Ribbon Insert -> Images -> Attach



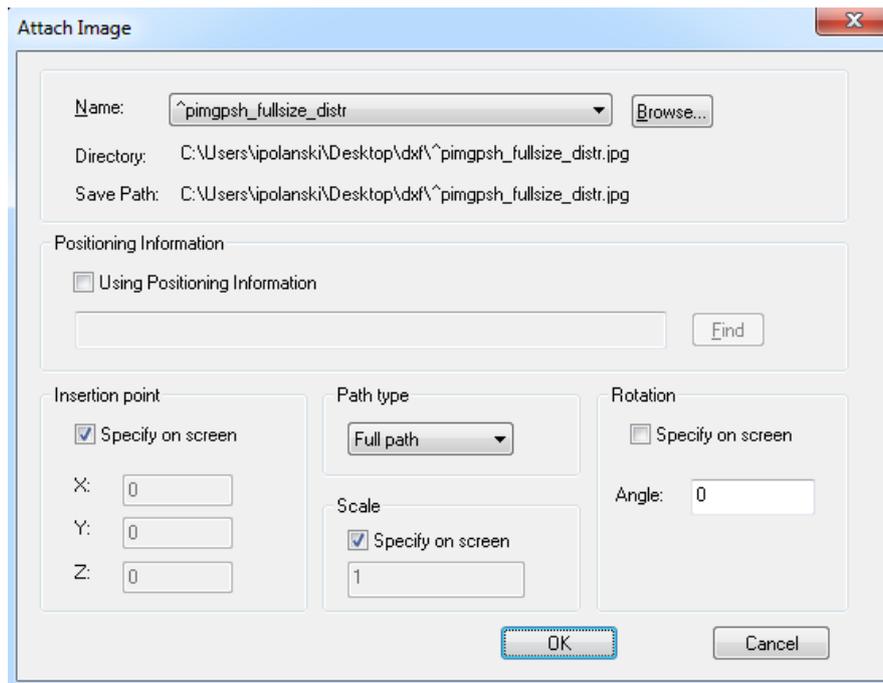
By using this function you can load the following formats to a drawing:



After activating the function, a window will appear in which you will have to define the format of a file that we want to add as well as its location on the hard drive.



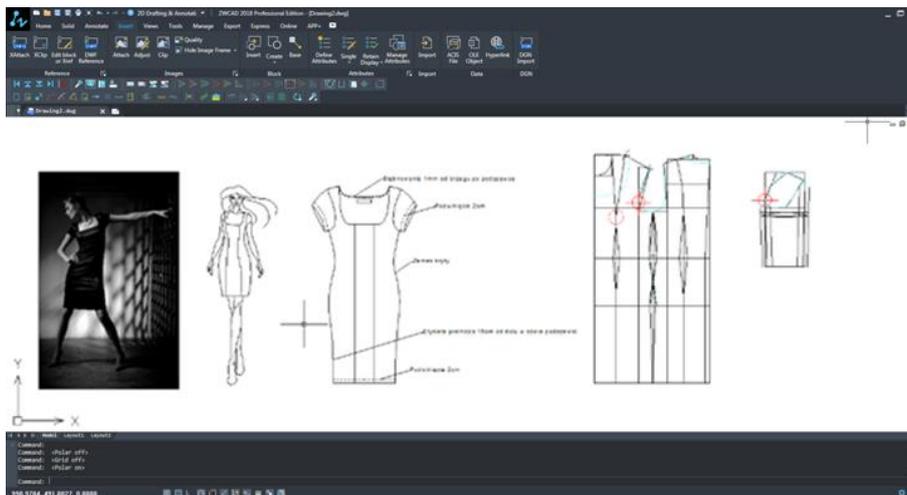
When the picture is selected, a window in ZWCAD will extend and it will show the parameters of the selected photo.



By default we enter the parameters on screen, but if we deselect this option:

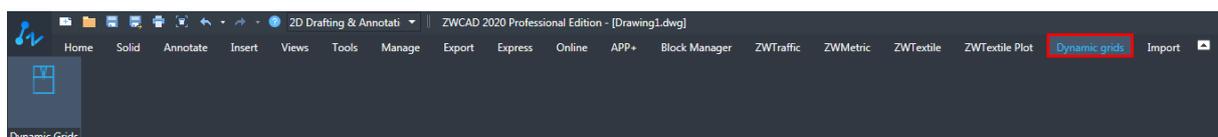
Specify on screen

, we can enter the parameters in the dialogue window.



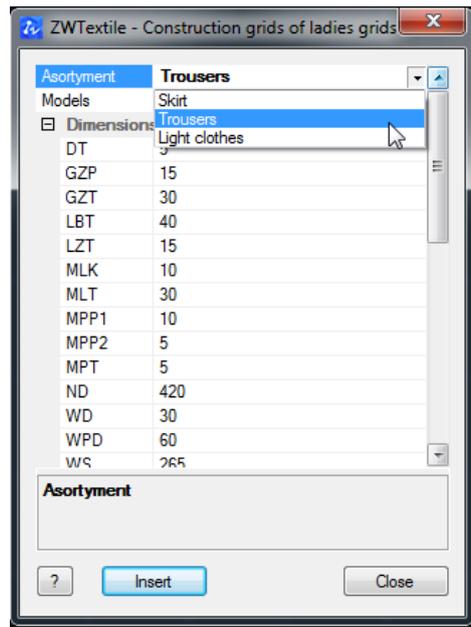
## IX. Dynamic Construction Grids

Dynamic Construction Grids module is visible as follows within the program:

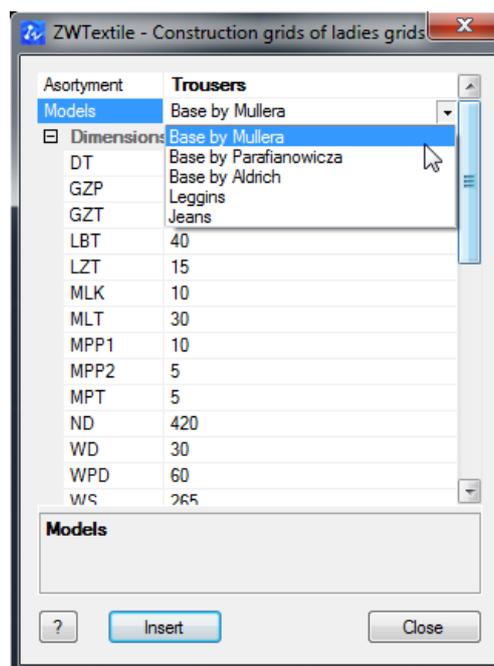


By clicking on the function within the module, we will access a window with possible selections.





We can select the type of clothing and a model. All of the details regarding models are presented in the user manual below:



The dynamic of a drawing depends on the changes made to its parameters, once numerical values of necessary measurements are added.

All drawings have been created based on designs that were mentioned in the literature acquired for this specific purpose. The authors, their ideas and their design have been included in the bibliography.

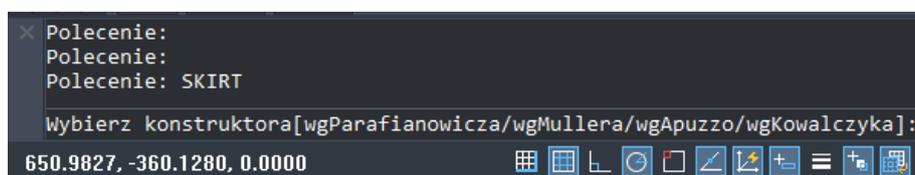
Mathematical formulas and calculations have been kept as in the original.

Parameters, technological and construction extras, that are defined by the author, can be modified according to the rules of clothing construction.

Small modifications of some formulas give the user options to change the dimension sizes, this is because of provided description and additional options foreseen by the author. Thanks to that, the user can adjust the dimension to the cut, purpose and trends of clothing at a given time.

### 1) Basic Skirt

Once the function has been called for, either by clicking on a corresponding icon or using the command SKIRT, following options will appear in the command bar:



It is necessary to choose the construction grid of a Basic skirt that you would like to add to your drawing.

It is necessary to use the appropriate shortcut of an author:

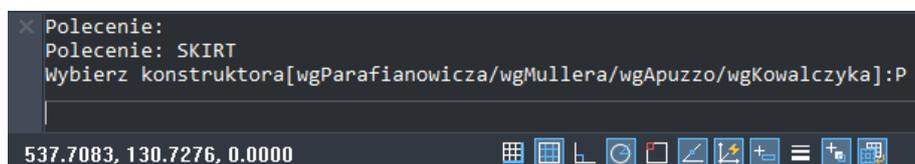
wgParafianowicz – shortcut „P”

wgMullera – shortcut „M”

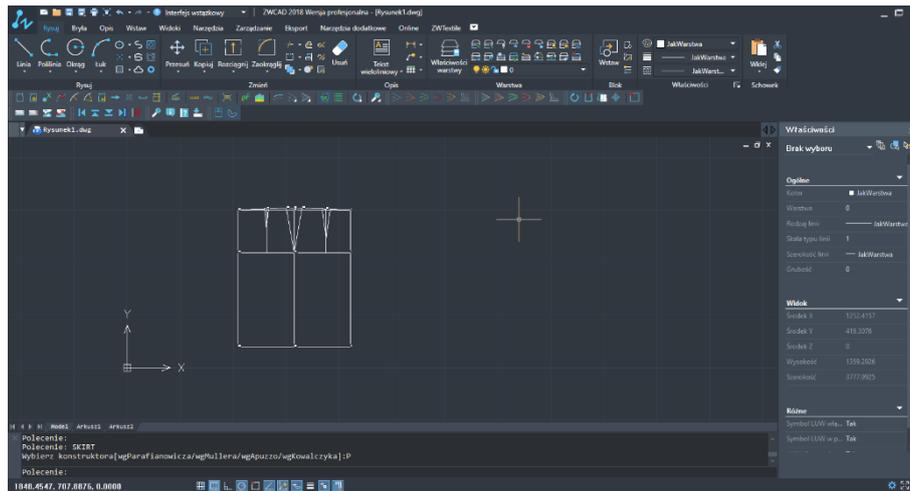
wgApuzzo – shortcut „A”

wgKowalczyka – shortcut „K”

After inputting a shortcut use Enter to confirm it.

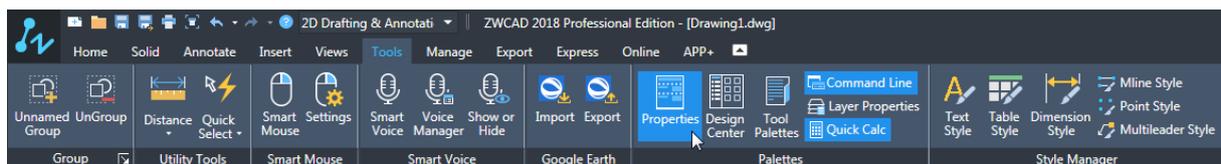


Once confirmed, a construction grid view will be visible near mouse cursors position. Choose insertion point by using the mouse.

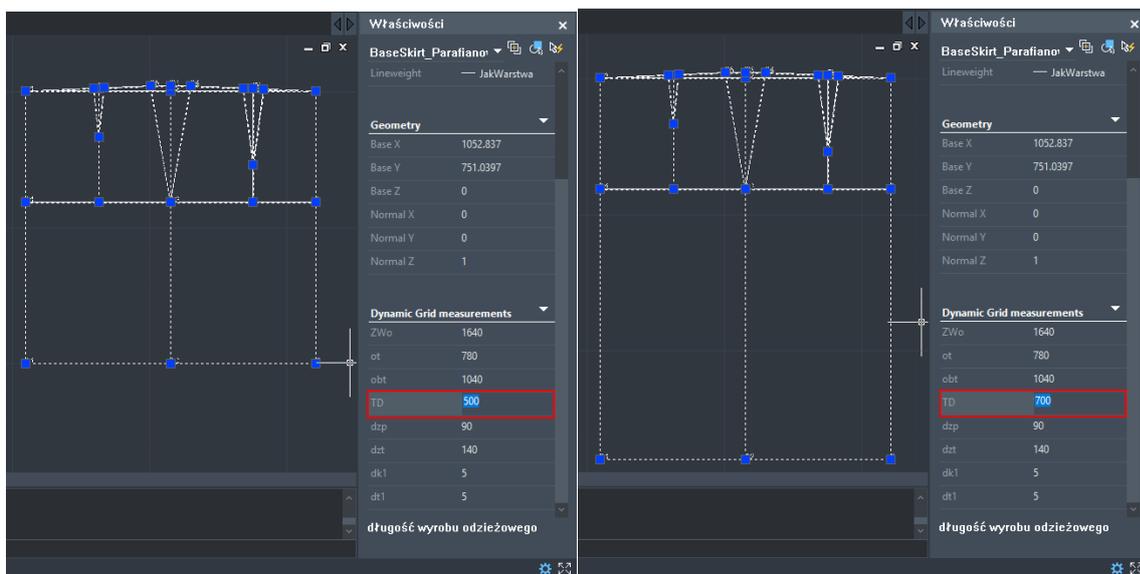


Properties of the dynamic grid will be visible once its selected. The dynamic properties will also be there and they can be edited in the properties window.

If the properties are not visible, please go to **Tools** and activate properties:



With the properties window opened and construction grid selected, dynamic parameters will also be displayed. They can be edited easily by inputting a value and confirming by pressing enter on the keyboard. The grid will adjust accordingly.



## ❖ Basic Skirt according to Zbigniew Parafianowicz

Dynamic parameters:

ZWo – Height

ot – Waist circumference

obt – Hips circumference with abdomen included

TD – Length of the skirt

dzp – Length of frontal dart, dimension specified by the author, it is set by default to 9cm, however for convenience of the user the ability to adjust measurements has been added.

dzt – Length of back dart, dimension specified by the author, it is set by default to 14cm, however for convenience of the user the ability to adjust measurements has been added.

dk1 – Construction allowance for waist circumference, used for clothing ease

dt1 – Technological allowance for waist circumference, used for adding material during sewing.

\* Construction and technological allowances are defined by the author as a fixed value of 1cm, but because of their usage, the user can adjust them accordingly.

Once measurements are added, the dynamically adjusted drawing of construction grid will be the basis of drawing forms and their modeling.

## ❖ Basic Skirt according to Muller

Dynamic parameters:

ZWo – Height

ot – Waist circumference

obt – Hips circumference with abdomen included

TB – Height of hip and waist lines, scope proposed by the author is 20-22cm, however



for convenience of the user the ability to adjust measurements has been added.

TD – Length of the skirt

dzp – Length of frontal dart, dimension specified by the author, it is set by default to 6-8cm, however for convenience of the user the ability to adjust measurements has been added.

dzt – Length of back dart, dimension specified by the author, it is set by default to 14-15cm, however for convenience of the user the ability to adjust measurements has been added.

uzp – placement of the frontal dart on the side of a skirt, it is set by default to 6-8cm, however for convenience of the user the ability to adjust measurements has been added.

swb – Width of side indentation,

szp – Width of frontal dart,

szt – Width of back dart,

- Calculations of the width of indentations (side, back and frontal dart) are made dynamically after inputting measurements of ot and obt, however the user can amend any of the measurements.

Attention should be given to the fact that when a different measurement has been added, two further measurements will be calculated dynamically according to the construction model and authors' rules regarding the division of calculated values for particular indentations.

dk1 – Construction allowance for width of skirt on hips line.

Once dimensions are added, the dynamically adjusted drawing will be the basis for drawing and modeling of forms.

## ❖ Basic Skirt according to Teresa Apuzzo.

Dynamic measurements:



AB – height of hip line from waist line

AC – height of skirt

ot – waist circumference

ob – hips circumference

DD1 – length of frontal dart

D'D1' – length of back dart

- Width of darts are given by the author as fixed (1,5+1,5cm for back dart and 1+1cm for frontal dart)

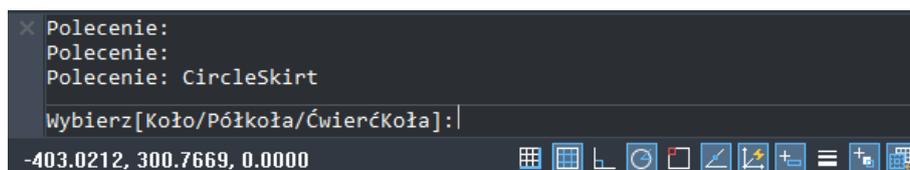
CF – Width of back tab

FF1 – Length of front tab

Once dimensions are added, dynamically adjusted drawing of construction grid becomes the basis to draw forms and model them.

### ❖ Circle Skirt

Once the function has been called for, a message similar to the one presented below should appear on your screen:



In the command bar type in the construction grid that you would like to add to the drawing.

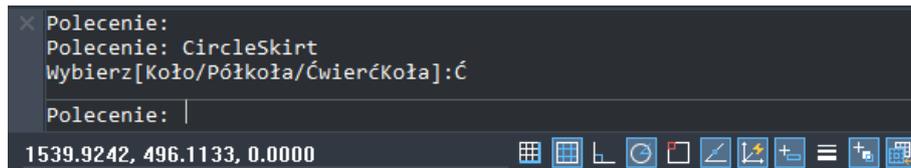
Type in a shortcut to get a desired result:

Circle – shortcut „K”

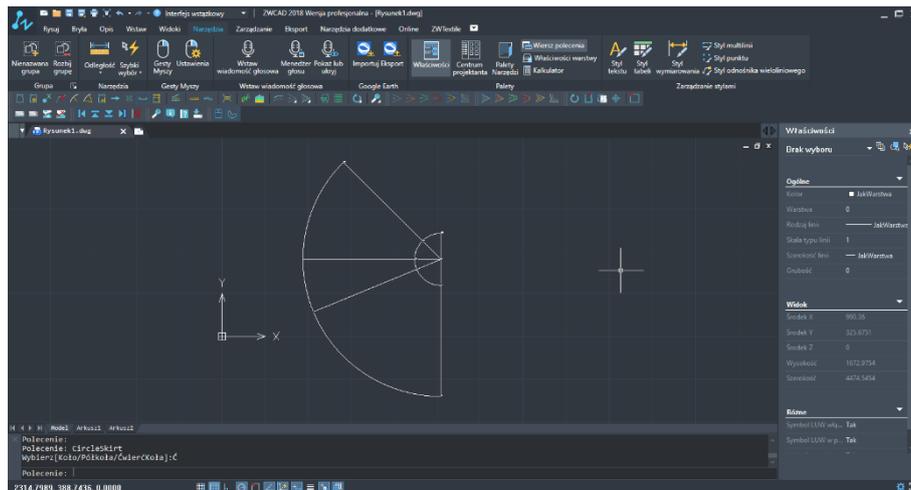
Half circle – shortcut „P”

Quarter circle – shortcut „Ć”

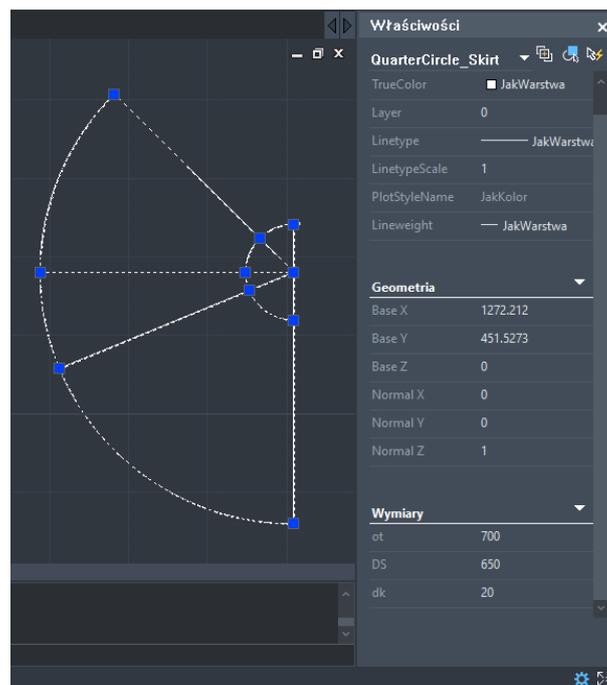
Once the shortcut is typed in, confirm it by pressing Enter



Underneath the cursor, construction grid will appear. Select where you would like to add it on the drawing by moving your cursor and clicking the right mouse button in a desired location.



In order to change dynamic parameters of the construction grid, click on the grid within the drawing and on the right hand side properties will be displayed that include all dynamic parameters.



### ❖ Circle Skirt according to Maria Bily – Czopowa and Karolina Mierowska

Dynamic measurements:

ot – waist circumference

DS – skirt length

dk – construction allowance for waist circumference

Po wprowadzeniu wymiarów, zmieniony dynamiczne rysunek siatki konstrukcyjnej jest podstawą do narysowania form i ich modelowania.

### ❖ Half Circle Skirt according to Maria Bily – Czopowa and Karolina Mierowska

Dynamic measurements:

ot – waist circumference

DS – skirt length

dk – construction allowance for waist circumference

Once measurements are added, the dynamically adjusted drawing of construction grid becomes the base of drawing forms and modeling them.

### ❖ Circle Skirt according to Krystyna Trzecińska

Dynamic measurements:

ot – waist circumference

DS – skirt length

dk – construction allowance for waist circumference

Once measurements are added, the dynamically adjusted drawing of construction grid becomes the base of drawing forms and modeling them.

## ❖ Basic Skirt according to Ryszard Kowalczyk.

Dynamic measurements:

ZWo – height

ot – waist circumference

ob – hips circumference

dk1 – Construction allowance that regulates the length of a skirt according to knee line. When adding the value of  $i$  „0”, length of the skirt will be as long as line of knees.

When adding positive values, the skirt will be longer than knees line.

When adding negative values, the skirt will be shorter than knees line.

### 2) Basic female trousers

## ❖ Basic women’s trousers according to Parafianowicz i Piskorski

Dynamic dimensions:

ZWo – Growth

ot - waist circumference

obt - circumference of the hips including abdomen protuberance

ZTv - external leg length - waist height

ZUo - inner leg length - perineum height

ZKo - knee height

SN - lower leg width - lower leg width

SP - belt width

a - the width of the leg on the knee line; this dimension depends on the SN dimension; entering '0' means that the width of the leg on the knee line is equal to the width of the bottom of the leg; positive values broaden the leg on the knee line and negative values narrow the leg on the knee line relative to the width on the bottom line.

ZP - length of the front pocket

ZT - length of the back pocket

DK1 - design allowance to calculate the darts meeting, consisting of: waistline alignment + waist circumference play + technological allowance for sewing in the belt

- The ZP and ZT dimensions are the lengths of darts, which according to the author have fixed dimensions (used in the basic drawing), but because of the very frequent use of this study by designers, these dimensions have been prepared as dynamic, giving the user the possibility to change these values.

After the introduction of dimensions, the modified dynamic grid drawing is the basis for drawing forms and their modelling.

#### ❖ Basic women's trousers according to Muller

Dynamic dimensions:

ot - waist circumference

ob - circumference of the hips

obp - hip width for the front leg

obt - width of the hips for the back leg

ZTv - external leg length

ZUo - internal leg length

ND - lower leg circumference

WT - height of the waistline, the range indicated by the author is 1.0 - 1.5cm, i.e. 10 - 15mm.

WS - seating height (dimension from waist line to seating base, or according to Muller's dimensions table)

WD - height of the bottom line, the range indicated by the author is 3.0 - 4.0cm, i.e. 30 - 40mm.

DK1 - construction addition to the width of the front underline, the range indicated

by the author is 0.5 - 1.0cm, i.e. 5 - 10mm.

WPD - height of perpendicularity of legs to the bottom line (right angle from the bottom line), the range indicated by the author is 4.0 - 8.0cm, i.e. 40 - 80mm.

MPP1 - modelling of the front underline at the height of the waistline (deviation of the center of the front of the trousers), the range indicated by the author is 0.5 - 1.0cm, i.e. 5 - 10mm.

MPP2 - modelling of the front trim at the waistline height (increase of the front center of the trousers), the range indicated by the author is 0.5 - 1.0cm, i.e. 5 - 10mm.

MLT - waistline modelling, the range indicated by the author is 3.0 - 5.0cm, i.e. 30 - 50mm.

GZP - depth of the front darkness, the range indicated by the author is 1.5 - 2.5cm, i.e. 15 - 25mm.

DT - technological addition for inserting the strap during sewing, the range indicated by the author is 0.0 - 0.5cm, i.e. 0 - 5mm.

DK3 - constructional addition to the increase of the hip arch on the waist line, the range indicated by the author is 1.0 - 1.5cm, i.e. 10 - 15mm.

MLK - modelling the leg on the knee line, the range indicated by the author is 0.0 - 1.0cm, i.e. 0 - 10mm.

ZP - length of the front darkness, the range indicated by the author is 9.0 - 10cm, i.e. 90 - 100mm.

LZT - deviation of the line of the rear centre - press line (edge), the range indicated by the author is 1.0 - 2.0cm, i.e. 10 - 20mm.

LBT - determination of the hip line position on the back leg, the range indicated by the author is 3.0 - 5.0cm, i.e. 30 - 50mm.

DK4 - construction addition to the height of the top of the back part of the leg (depending on the shape of the buttocks), the range indicated by the author is 0.0 - 1.0cm, i.e. 0 - 10mm.

MPT - modelling of the back trim at the level of the waistline, the range indicated by the author is 0.5 - 1.0cm, i.e. 5 - 10mm.

GZT - depth of the back darkness, the range indicated by the author is 3.0 - 5.0cm, i.e. 30 - 50mm.

ZT - length of the back darkness, the range indicated by the author is 13-15cm, i.e. 130-150mm.

DK6 - constructional addition of the length of the inner line of the back leg, the range indicated by the author is 0.0 - 0.5cm, i.e. 0 - 5mm.

- Dimensions of obp and obt are calculated dynamically, after entering ob value (hip circumference) and result from it.

After entering the dimensions, the changed dynamic drawing of the construction grid is the basis for drawing the forms and their modeling.

#### ❖ Basic women's trousers according to Winifred Aldrich

Dynamic dimensions:

ot - waist circumference

ob - circumference of the hips

WB - hip line height (measured from the waistline)

WS - seat height (measured from waist line to base, sitting, or from dimension table according to W. Aldrich)

ZTv - external leg length

SN - lower leg width

After the dimensions have been entered, the modified dynamic grid drawing is the basis for drawing and modelling the forms.

## ❖ Women's sports leggings according to Muller

Dynamic dimensions:

ot - waist circumference

ob - circumference of the hips

lead - calf circumference

oh - ankle circumference

ZTv - external leg length

ZUo - internal leg length

WS - seat height (dimension from waist line to seating base, or from Muller's list of dimensions)

WL - height of the calf line (measured from the knee line; place of the largest circumference)

WD - height of the bottom line of the leg (measured from the base), the range indicated by the author is 6.0 - 8.0cm, i.e. 60 - 80mm.

DK1 - constructional addition to the width of the front underline, the range indicated by the author is 1.0 - 2.0cm, i.e. 10 - 20mm.

DK2 - constructional addition to the top of the back trim on the waistline, the range indicated by the author is 4.0 - 5.0cm, i.e. 40 - 50mm.

DK3 - structural addition for hip arch elevation, the range indicated by the author is 1.5 - 2.0cm, i.e. 15 - 20mm.

DT - technological addition to the height of the rubber at the waist, the range indicated by the author is 2.0 - 3.0cm, i.e. 20 - 30mm.

Shrink - contraction for elasticity of the fabric, the range indicated by the author is 15 - 20%.

After entering the dimensions, the changed dynamic drawing of the construction grid is the basis for drawing the forms and their modeling.

## ❖ Women's jeans according to Zbigniewa Parafianowicz

Dynamic dimensions:

ot - waist circumference

obt - hip circumference

ZTv - external leg length

ZUo - internal leg length

ZKo - knee height

SN - Leg width

DK - size of the notch in the centre of the rear

a - width of the leg on the knee line; the value "0" is equal to the width at the bottom of the leg, positive values dynamically expand the legs on the knee line, and negative values narrow down, giving the effect of the "bell" type legs

SKT - width of the back pocket

PCT - position of the back pocket, relative to the side line

SKP - front pocket width

GKP - depth (height) of the front pocket

- The dimensions of the back and front pockets have been introduced for ease of use and are a result of the variety of lines of modern jeans.

After the introduction of the dimensions, the revised dynamic grid drawing is the basis for drawing and modelling the forms.

### 3) Light clothing

## ❖ Straight blouse according to Ryszard Kowalczyk

Dynamic dimensions:

ZWo- Growth



opx- chest circumference

ot- waist circumference

obt- hip circumference

RvRv- width of arms

DK1- structural accessory for lowering the shoulder seam behind, the range indicated by the Author is 1- 1,5cm, i.e. 10- 15mm

DK2- structural addition to the placement of the shoulder seam at the back, the range indicated by the Author is 3- 4cm, i.e. 30- 40mm

DK3- determining the bottom line of the blouse (measured from the waistline)

DK4- distance of the seam in the sleeve from the line of the middle, the range indicated by the Author is 2.4- 5.7cm, i.e. 24- 57mm

RX1- the radius regulating the shift of the chest darkness from the peak point of the darkness, the range given by the author is 2.5- 4.0cm, i.e. 25- 40mm

RvN- length of sleeve

SDR- width of the bottom of the sleeve

- The obturator dimension is a dimension that is not convertible in any of the formulas in this paper, therefore the change of values in properties does not dynamically change the construction grid. The adjustment of this dimension should be checked using the dimensioning function and taken into account when modelling the moulds.

After the dimensions have been entered, the modified dynamic drawing of the construction grid is the basis for drawing the forms and modelling them.

## ❖ Basic blouse according to Maria Piskorska and Zbigniew Parafianowicz

Dynamic dimensions:

ZWo- Growth

opx- chest circumference

DKopx- design allowance for chest circumference, for clothing looseness

ot- waist circumference

obt- circumference of the hips including abdomen protuberance

DKobt- structural addition to the hip circumference for clothing looseness

SyTy- Back to waist length curve

SySvXp- curve of the length of the front to the breast

SySvXpTp- curve of the front length through the breasts

os- neck circumference

DK1- design allowance for the chest-to-beam width

DKpp- structural allowance for underarm deepening

DB- blouse length

szp- width of the front darkness on the waistline

pcs- width of the back darkness on the waistline

swb- width of side notch on waistline

ZPD- adjusts the length of the front darkness downwards

ZTG- Adjusting the length of the darkness at the back upwards

ZTD- adjusts the length of the darkness at the back downwards

RvNv- hand length

DK3- construction addition to the length of the sleeve

DK4- design accessory for the width of the sleeve

DK5- constructional allowance for reducing the width of the sleeve at the bottom line in relation to the width at the elbow line

- Dimensions of ZPD, ZTG and ZTD are darkness lengths that have been prepared as dynamic, giving the user the possibility to change these values.

After the dimensions have been entered, the modified dynamic grid drawing is the basis for drawing and modelling the forms.

### ❖ Basic dress according to Muller

Dynamic dimensions:

ZWo- Growth

opx- chest circumference

ot- waist circumference

obt- circumference of the hips including abdomen protuberance

RvNv- hand length

SR- width of the sleeve at the bottom line

SD- length of dress

DD- any distance in the structure between the rear and the front

DK1- structural allowance for the shoulder seam of the rear

DT1- technological additive to the shoulder seam at the back of the shoulder on the widow

DK2- construction addition to the armpit trim of the back, the range indicated by the author is 1.3- 1.5cm, i.e. 13- 15mm.

DKopx- structural addition to the chest circumference

DKot- structural addition to the waist circumference, the range indicated by the Author is 1- 3cm, i.e. 10- 30mm.

DKobt- structural addition to the hip circumference, the range indicated by the Author is 1- 2cm, i.e. 10- 20mm.

ZG1- adjustment of the length of 1 darkness at the back upwards

ZD1- length adjustment of 1 darkness at the back downwards

ZG2- length adjustment 2 darts upwards

ZD2- length adjustment 2 darts back down

DK3- construction accessory regulating the width of the sleeve on the line of the elbow- front, the range indicated by the Author is 1- 1,5cm, i.e. 10- 15mm.

DK4- construction accessory regulating the width of the sleeve on the line of the

elbow- back, the range indicated by the Author is 1- 1,5cm, i.e. 10- 15mm.

- Dimensions ZG1, ZD1, ZG2 and ZD2 are the lengths of darts, which have been prepared as dynamic, giving the user the possibility to change these values.

After entering the dimensions, the changed dynamic drawing of the construction grid is the basis for drawing the forms and their modeling.

### ❖ Women's classic shirt according to Muller

Dynamic dimensions:

ZWo- Growth

opx- chest circumference

ot- waist circumference

obt- circumference of the hips including abdomen protuberance

DB- length of clothing article

DR- length of sleeve

SLZ- width of the fastening strip

SR- width of the bottom of the sleeve

DKopx- design allowance for chest circumference

DKot- design allowance for waist circumference

DKobt- structural addition to the hip circumference

DK5- structural addition to the length of the shoulder seam, the range indicated by the Author is 1- 1,5cm, i.e. 10- 15mm.

DK6- structural addition to the neck curve in the front, the range indicated by the Author is 0- 0.3cm, i.e. 0- 3mm.

ZG1- adjustment of length of 1 darkness at the back upwards

ZD1- length adjustment of 1 darkness at the back downwards

ZG2- length adjustment 2 darts upwards

ZD2- length adjustment 2 darts back down

Kws- Collar stand-up height

Kwk- Flange flange flange height flange

Kmk- Flange- angle shape

Mw- Cuff height

Mor- Cuff circumference

Mz- Cuff clasp

- Dimensions ZG1, ZD1, ZG2 and ZD2 are the lengths of darts that have been prepared as dynamic, giving the user the possibility to change these values.

After entering the dimensions, the modified dynamic drawing of the construction grid is the basis for drawing the forms and their modeling.

### ❖ Kimono type blouse according to Maria Bily- Czopowa and Karolina Mierowska

Dynamic dimensions:

ZWo- Growth

opx- chest circumference

os- neck circumference

SyTy- Back to waist length curve

RvRv- width of arms

RvNv- hand length

LB- lowering the shoulder line

SR- width of the sleeve at the bottom line

KNR- Tilt angle of the sleeve

PP- deepening the kimona subcategory

SL- widening of the neck section of a "boat" type neck

GL- depth of neck undercut of "boat" type

After the dimensions have been entered, the modified dynamic grid drawing is the basis for drawing and modelling the forms.



## ❖ Blouse without darts according to Muller

Dynamic dimensions:

ZWo- Growth

opx- chest circumference

ot- waist circumference

obt- circumference of the hips including abdomen protuberance

DKopx- design allowance for chest circumference

Rv1- lowering the shoulder's back line, the range indicated by the author is 1- 1,5cm, i.e. 10- 15mm.

RV2- lengthening the shoulder line in the back, the range indicated by the Author is 3- 4cm, i.e. 30-40mm.

SP- deepening of the neck trimming in the front, the range indicated by the Author is 1.5- 2cm, i.e. 15- 20mm.

RVh- adjustment of the sleeve head height, the range indicated by the Author is 1- 1,5cm, i.e. 10- 15mm.

DKr- construction addition adjusting the height of the sleeve ball, the range indicated by the Author is 0.5- 1.5cm, i.e. 5- 15mm.

After entering the dimensions, the changed dynamic drawing of the construction grid is the basis for drawing the forms and their modeling.

## ❖ „Princesse” type blouse according to Ignatowski/Dobrzański

Dynamic dimensions:

ZWo- Growth

opx2- chest circumference measured over the chest

opx- chest circumference measured by breasts

ot- waist circumference

obt- hip circumference

After the dimensions have been entered, the modified dynamic grid drawing is the basis for drawing and modelling the forms.

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Эдипресс-конлига 2011

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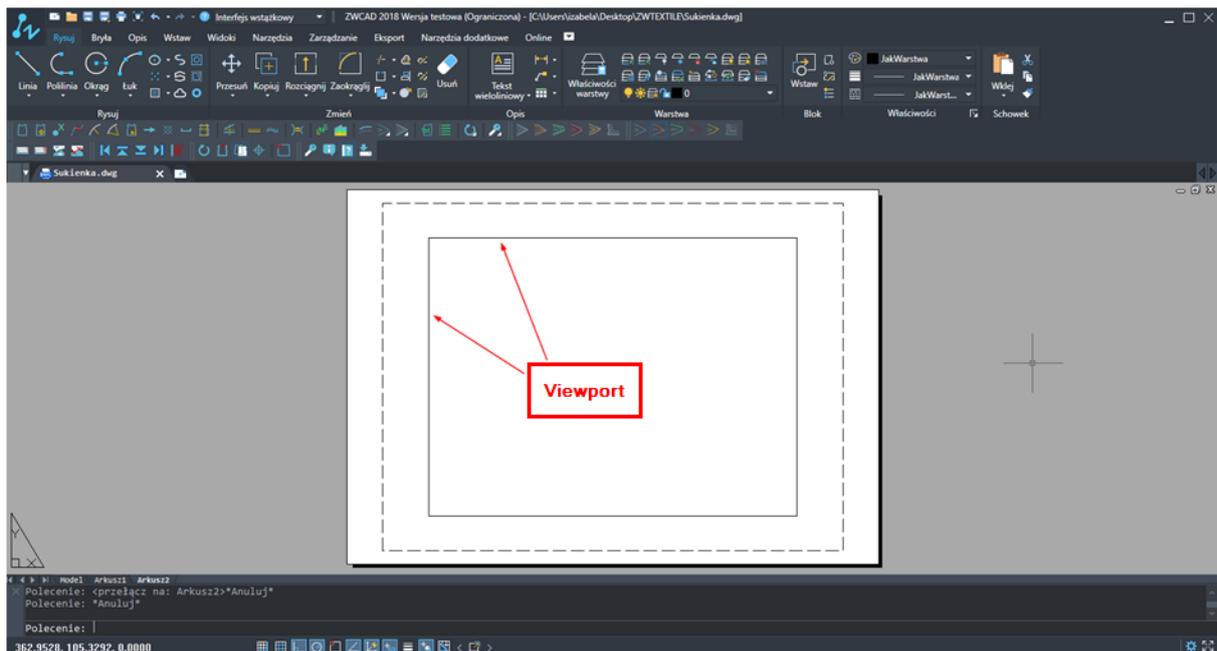
Schielle & Schon; Berlin 1994

## X. Print

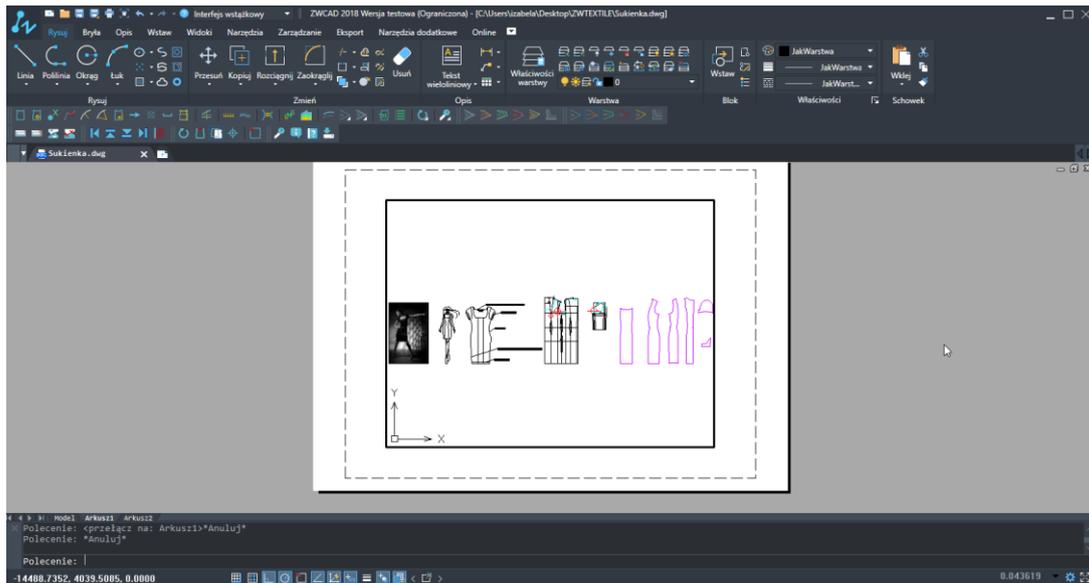
### 1) Viewports

#### What is a viewport?

Viewports are elements of paper space in which we can define graduated scale of an element (As a reminder, in the model space we are ALWAYS drawing in scale 1:1), they are also used to define what and which layers (sizes) are to be visible. The amount of viewports that can be included is endless, same applies to graduation scales. By default, viewports that are created by the program are rectangular but it is possible to define e.g. a circular viewport.



In the viewport we can see elements that are included within space of the model.



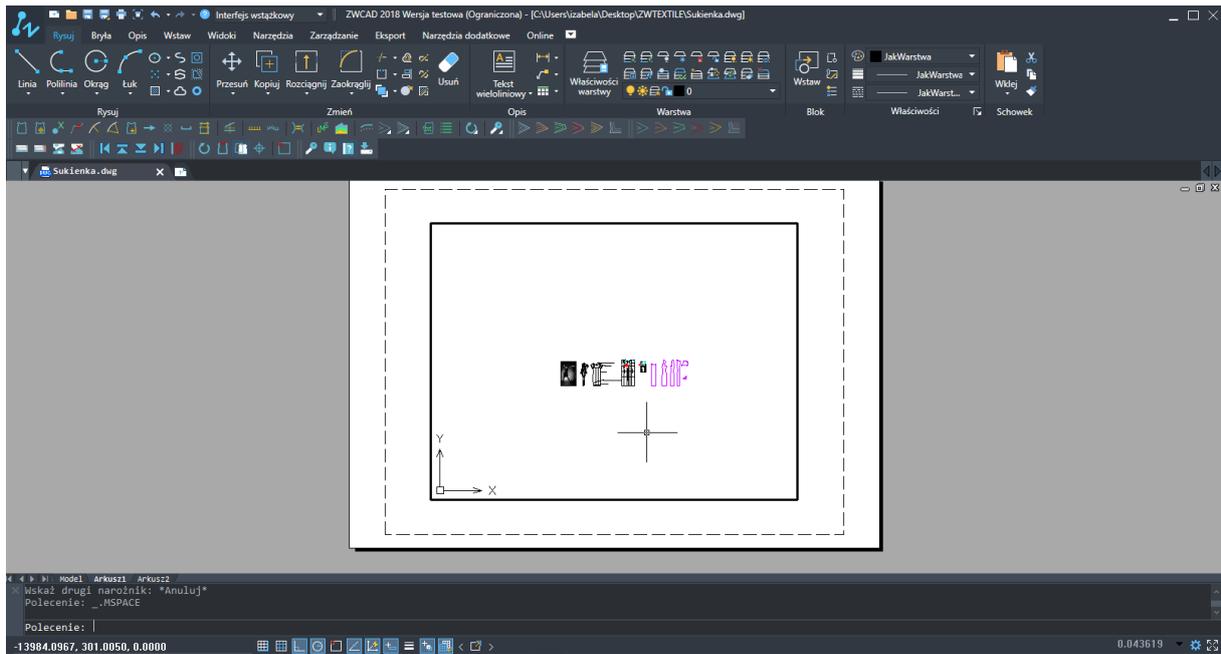
Once the view is switched to a layer, the paper space will be visible which is not displayed by default.

Paper space can be zoomed in and out by using the mouse in the model.

Right now the viewport is not active. We cannot apply any changes or set a defined view that we would like to get.

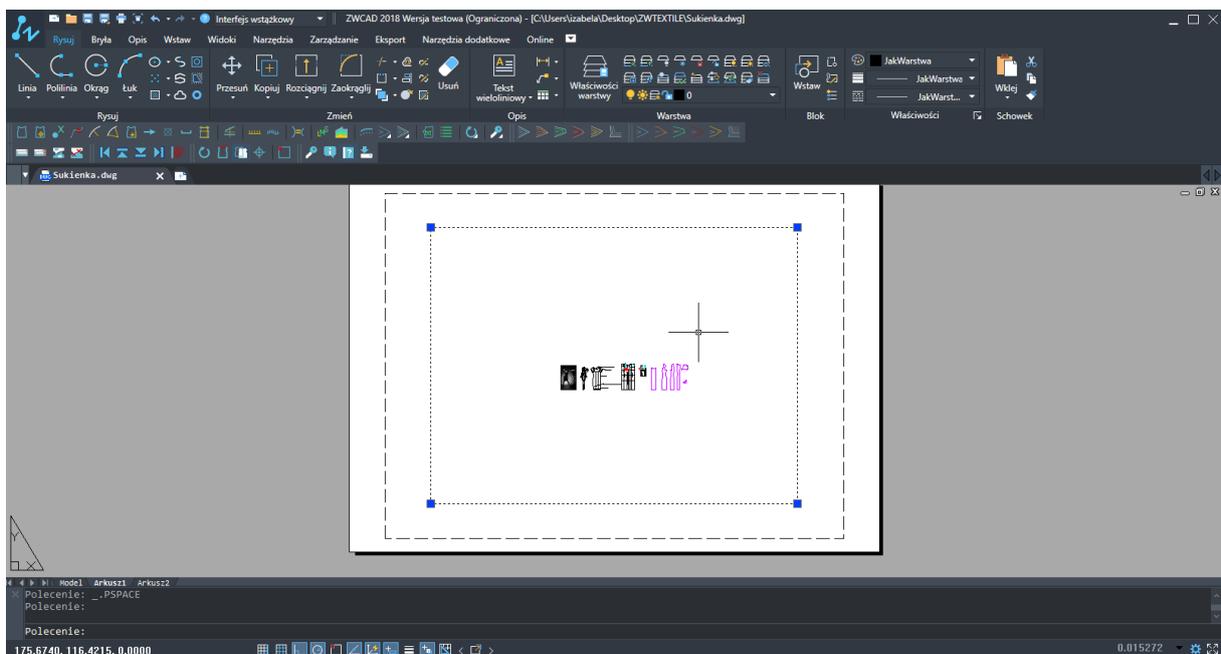
The viewport is active if it's highlighted in bold just like on the picture above.

In order to access the viewport, left mouse click twice in the viewport space. The outline of the viewport will be in bold and zooming in/out of elements will only affect elements from a model not from the whole paper space.



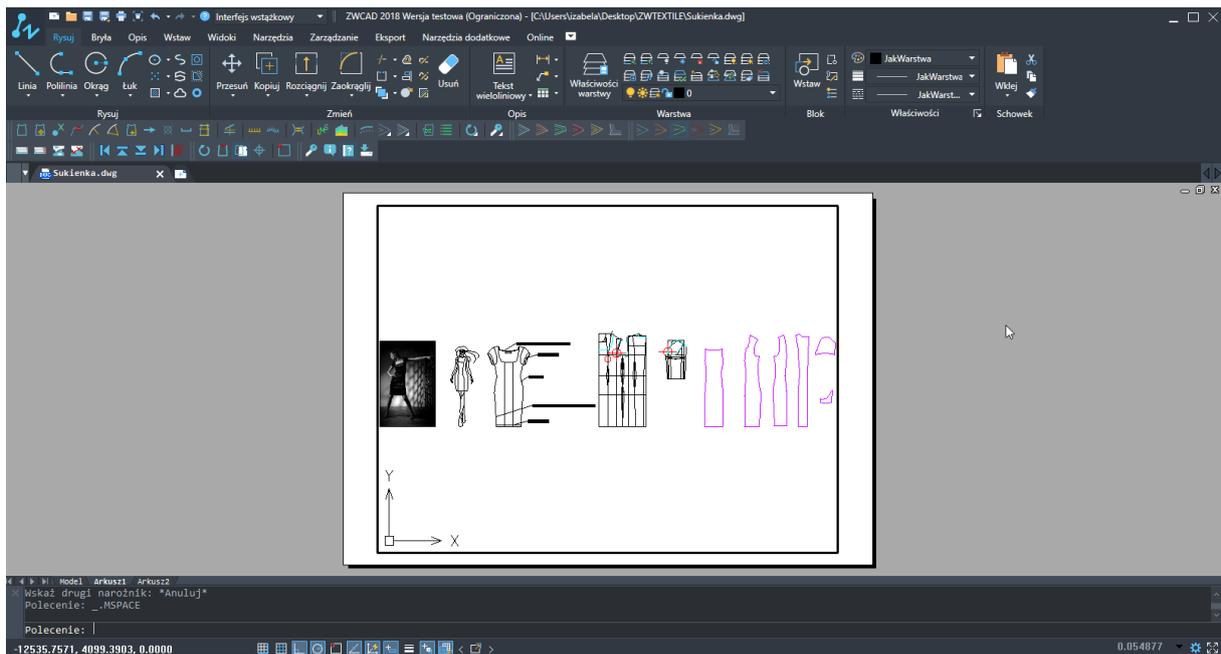
In order to exit the viewport, left mouse click twice anywhere outside of the viewport space e.g. on the paper space.

The outline of a viewport can be edited. Once its selected, it can be edited according to users' needs.



After increasing the size of a viewport, we are faced with the following view:



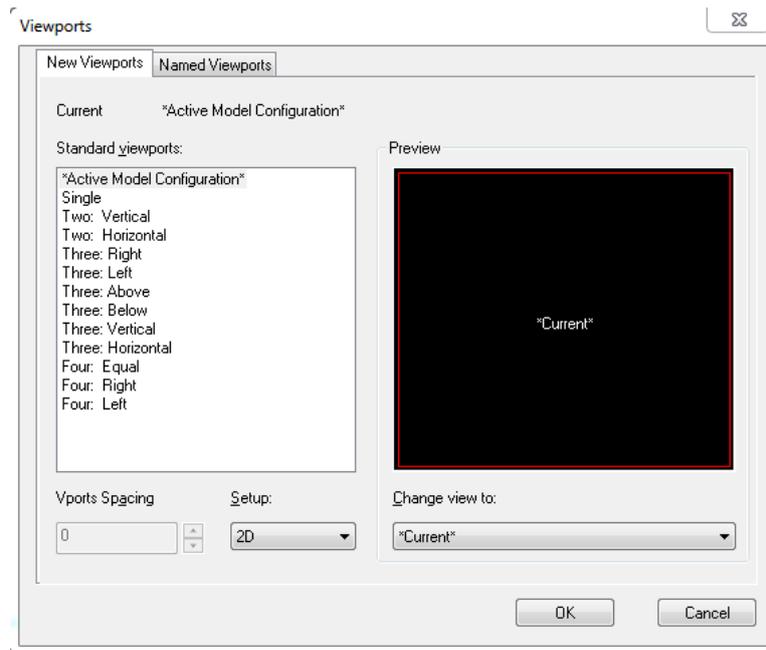


## How to add a viewport?

By default when we access a layer we have 1 visible viewport. However, this is not a rule that cannot be changed.

Viewports can be added to every layer by using the command “vports”.

Please enter the command “vports” and confirm by pressing Enter. A window will appear that is responsible for adding viewports in the current layer.

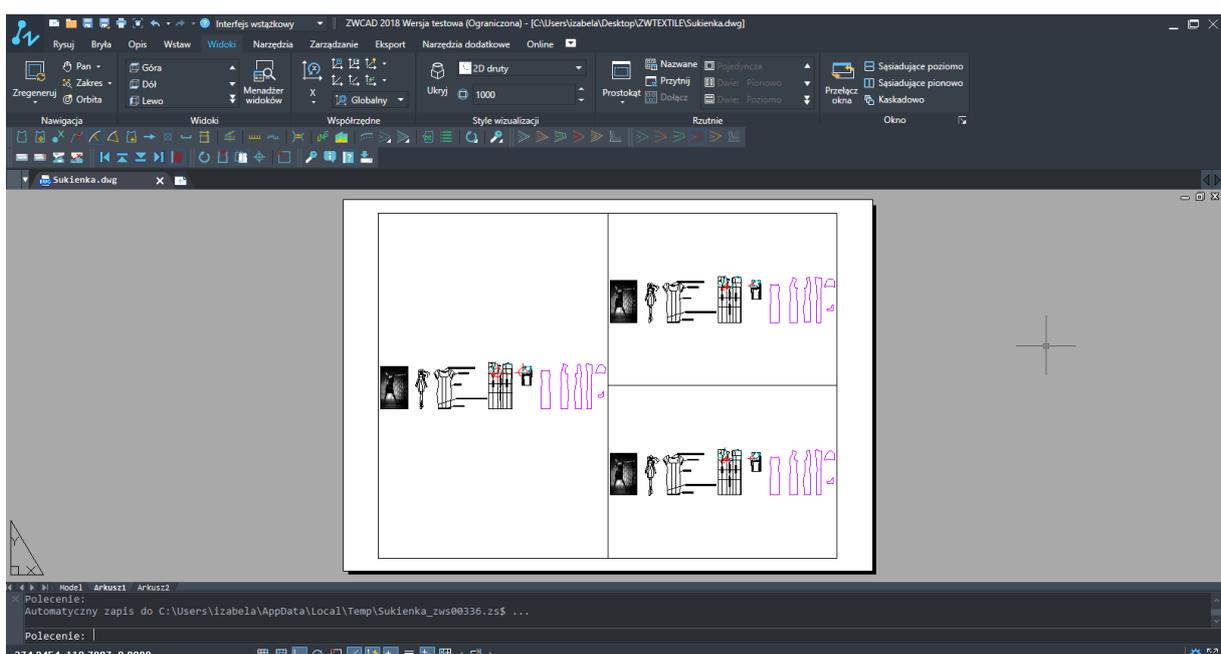


In the dialogue window we can see that on the left there is information regarding the type of viewport which we can add to the drawing, on the right hand side there is also a preview.

It is necessary to choose the right type of viewport, once that is done click on “Ok” – you can choose the viewport “Left” for example.

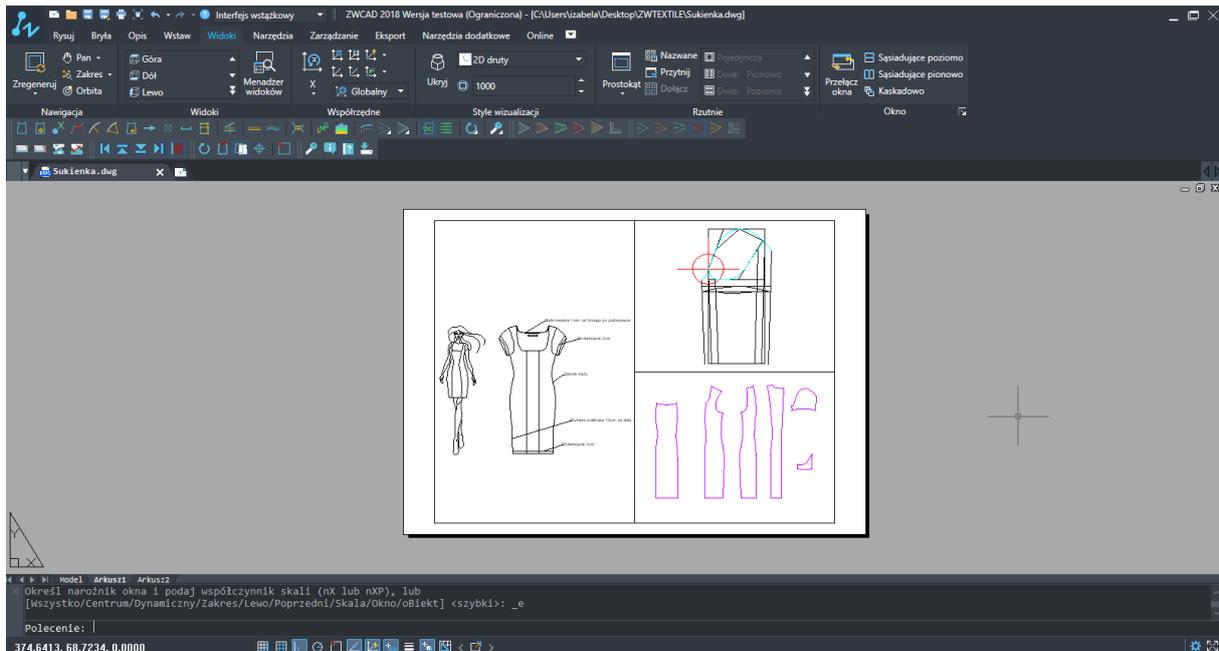
In the command bar there will be a request asking the user to define a limiting rectangle, we can also choose to automatically adjust it by pressing Enter.

Selected viewport will be added to a layer in a chosen space.



Adding multiple viewports allows the user to add various elements of a model on a single layer.

Each viewport is a separate element, that can be set up according to the content and view required.



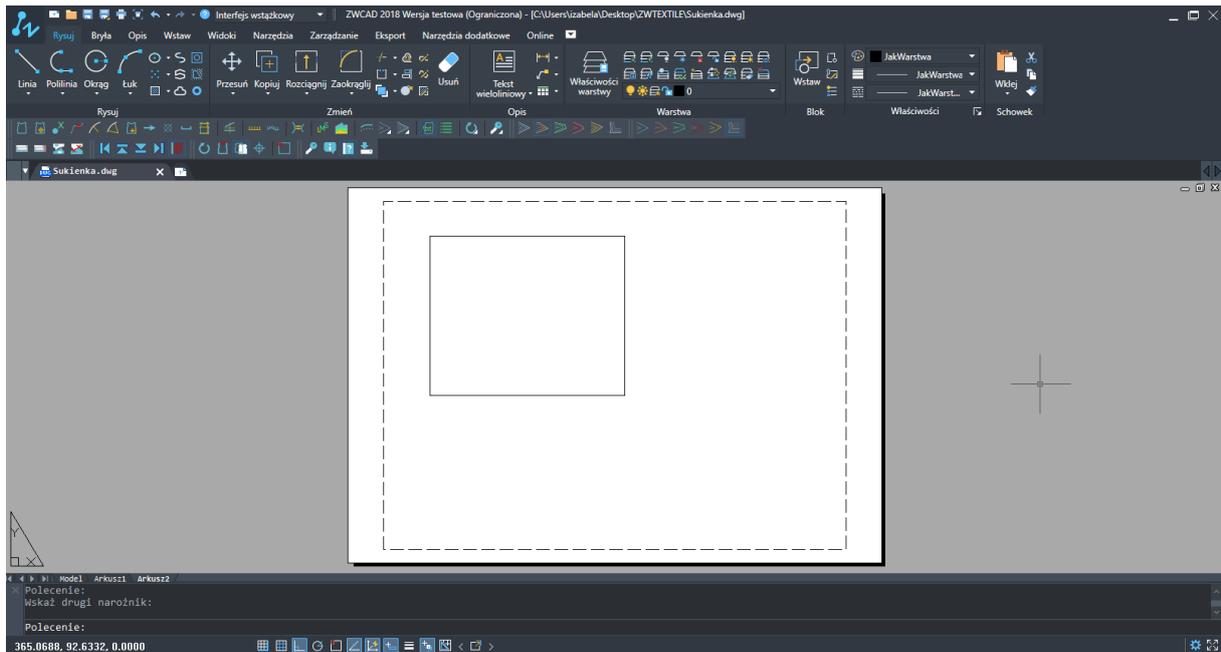
### Creating a viewport in a specific shape

Apart from ready viewports we can also create one by hand.

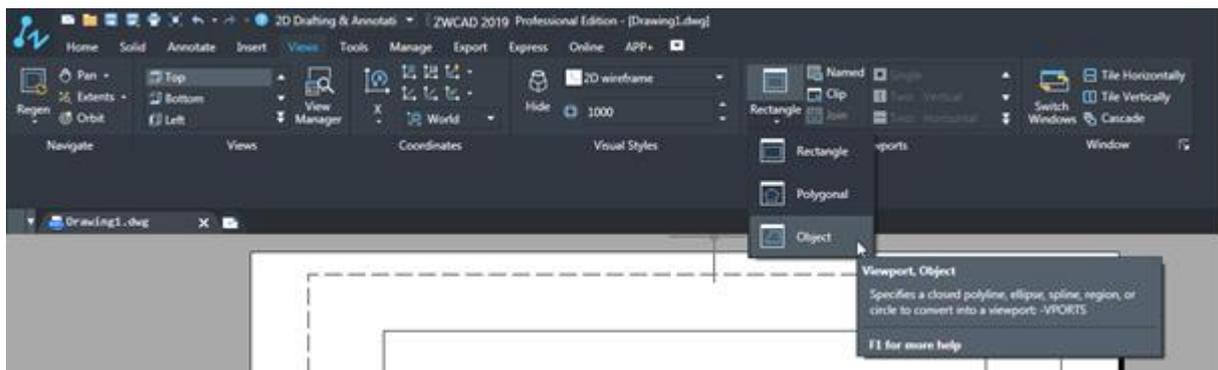
It is necessary to create a closed object that will be our viewport.

Existing outline of a viewport can be edited and a new one can also be added.

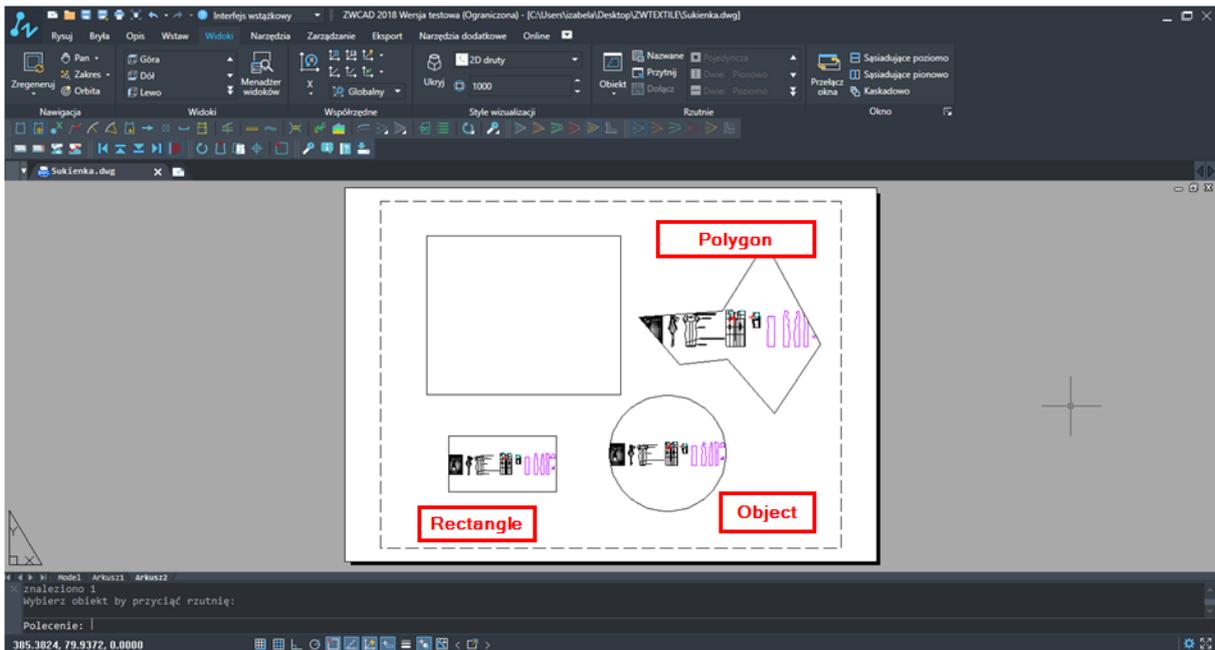
In the tab



In the tab “View” -> group “Layouts” we can see additional tools that can be used to create a single viewport.

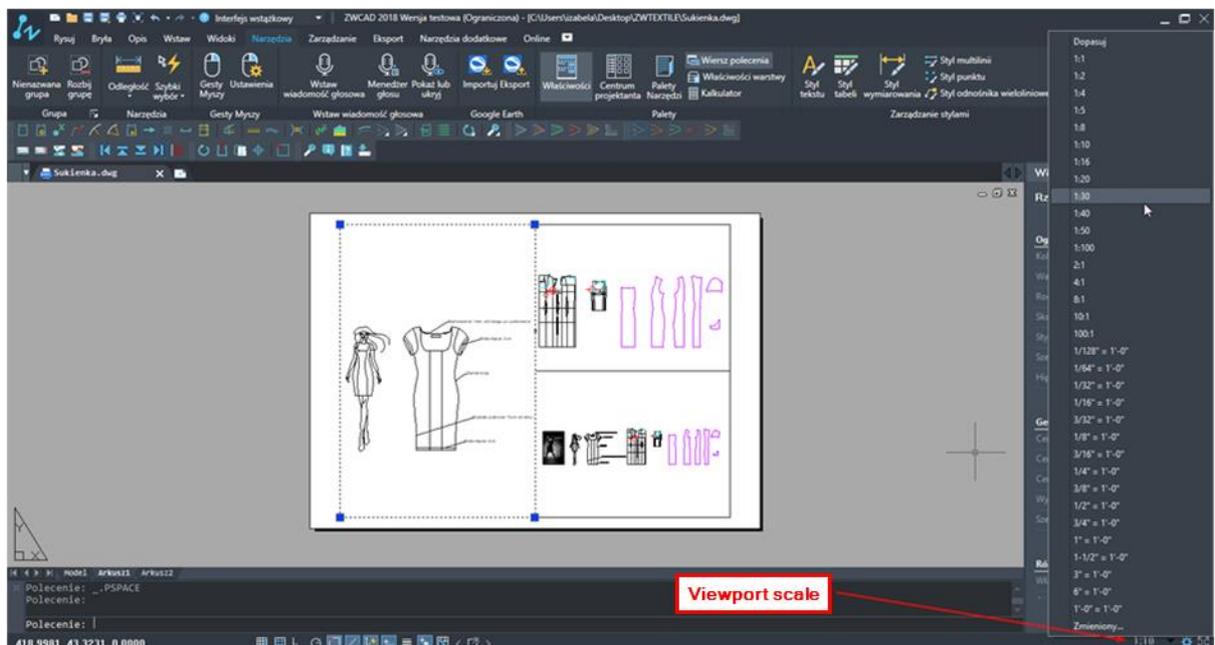


Selecting the option “Object” allows us to create a viewport from an already existing element e.g. a circle.

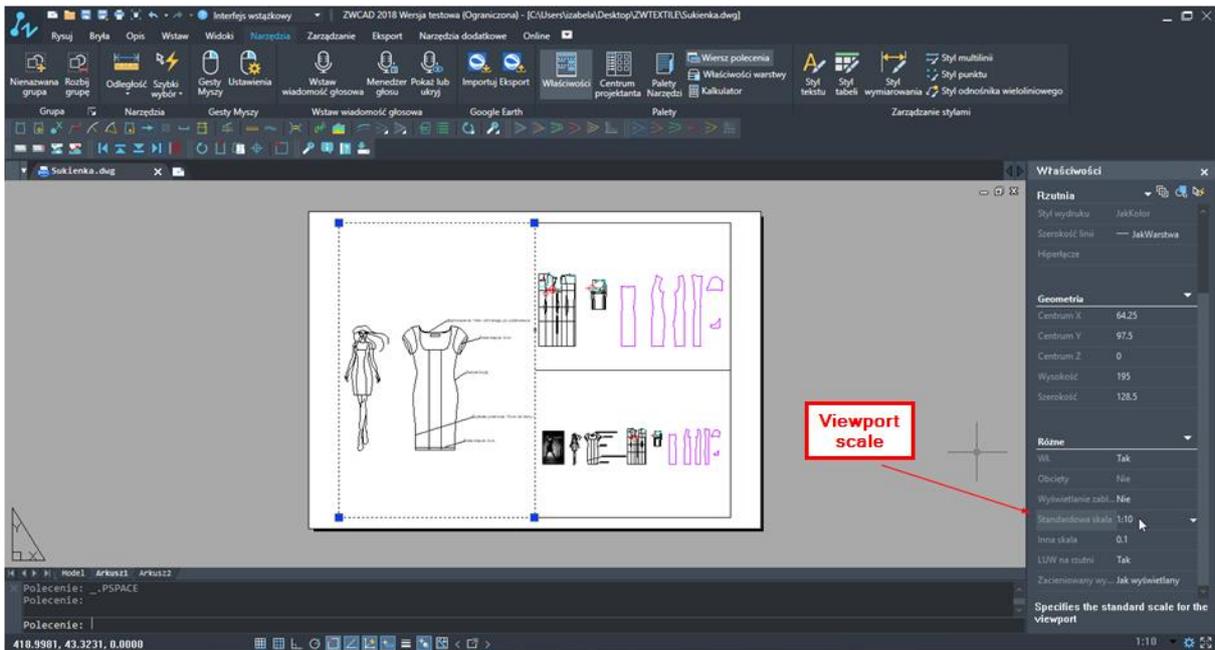


### Setting the scale of a viewport

Every viewport has a scale. The scale can be set by hand according to the view that we would like to set by zooming in or out of an active viewport. It is possible to set the scale by right clicking on the viewport or accessing the properties in the right bottom corner of the program:



Scale in the properties of an element:

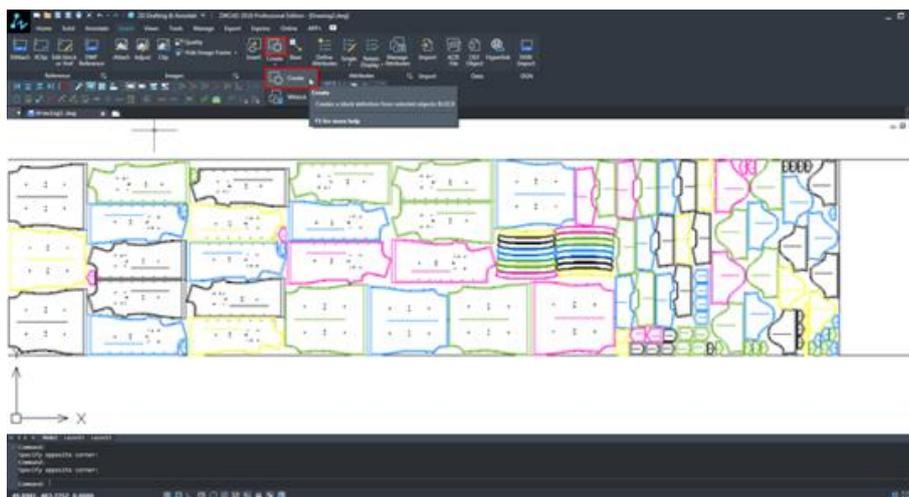


## 2) Layout shrinkage

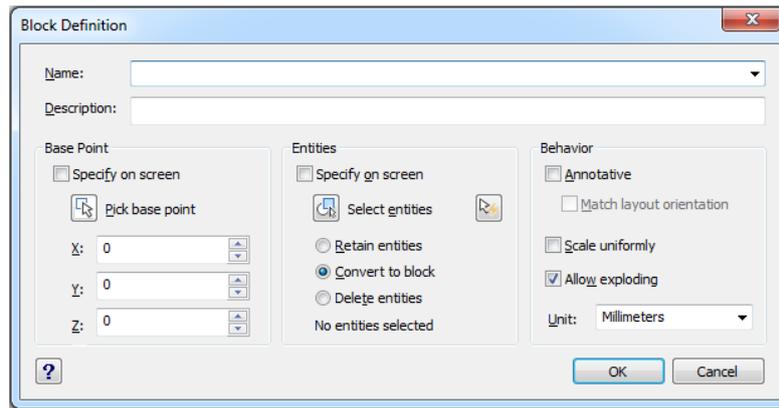
Scale – used for specifying fabric shrinkage to layouts

In order to create fabric shrinkage use the function Create a Block without having the fabric layout selected on the current drawing.

Ribbon Draw -> Block -> Create



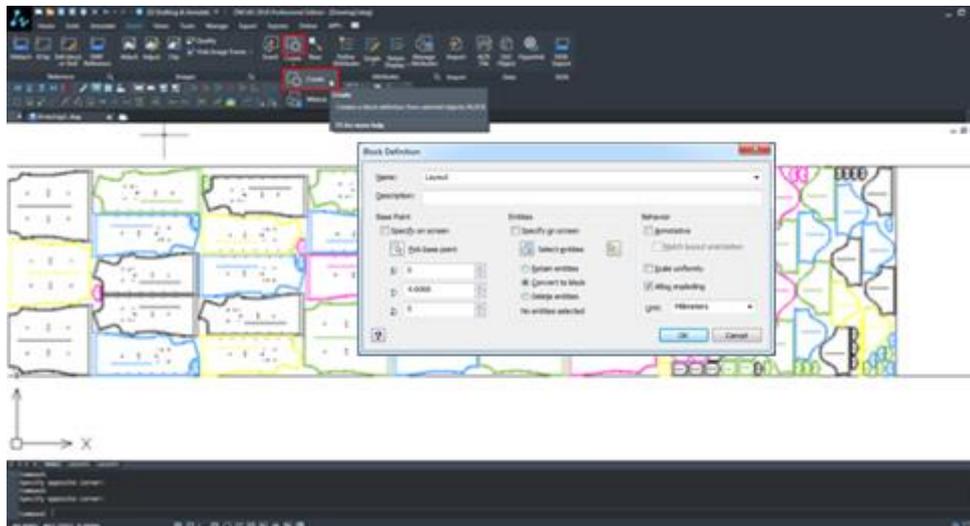
Block definition window will appear:



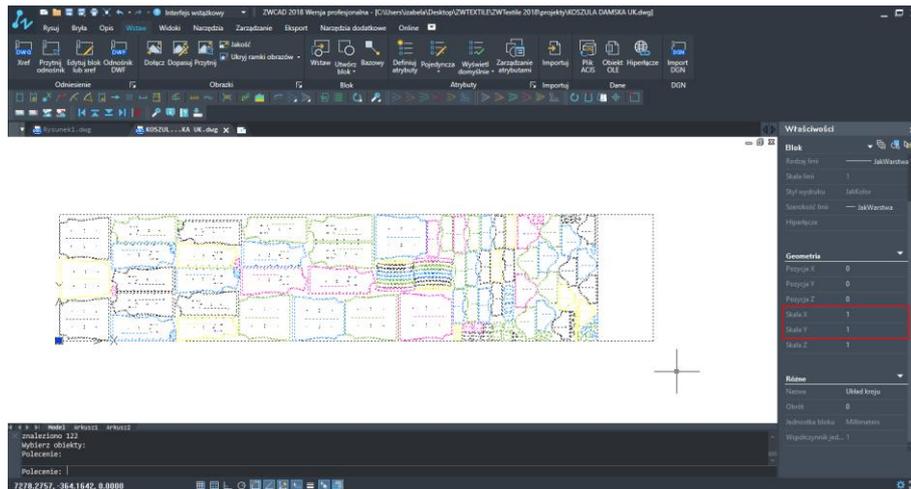
Input the name of a Block, its base point by using following functions:

 Specify base point of the block

 Select objects



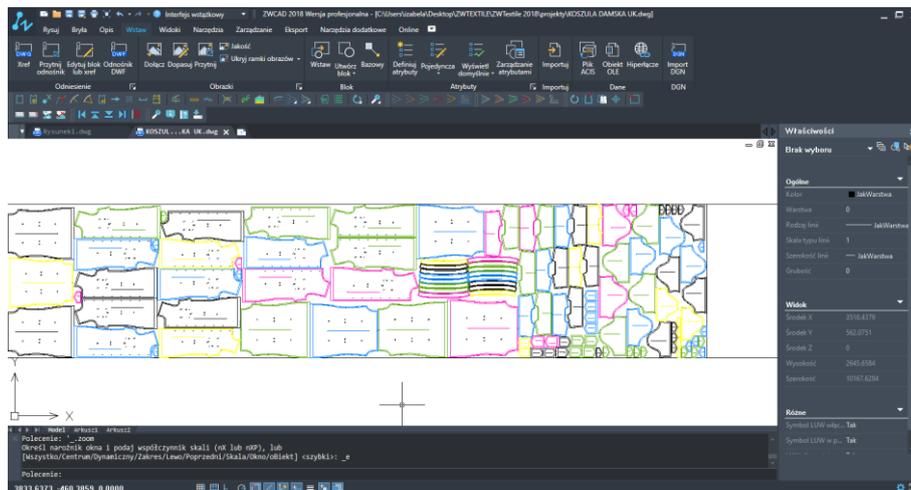
After inserting elements to the Block definition window click Ok . The block will be created. Scale changes refer to the drawing, it means that scale X is the level of the drawing, length of the fabric layout. Counting the fabric shrinkage on the basis of adding 5% to the length of the layout = scale X 1.05 in order to change the scale values, select the layout which is currently a block.



When the block is selected, its parameters will be displayed.

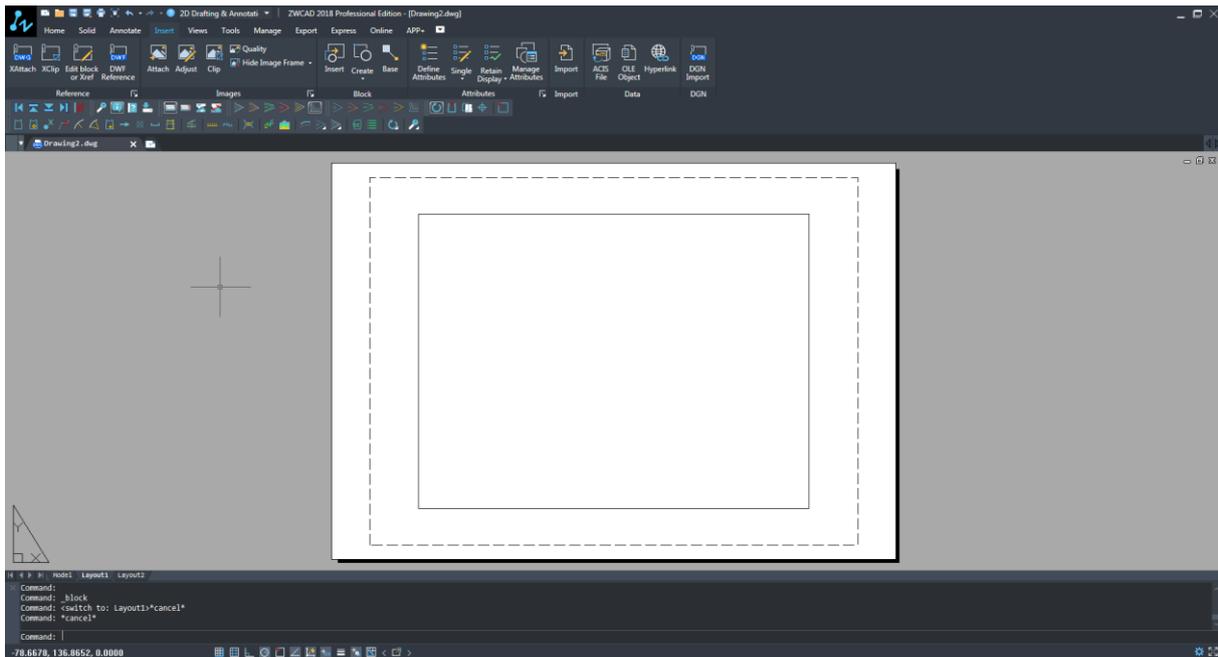
In the field **Geometry** -> **Scale X / Y / Z** enter a new scale value e.g. X, which  
With fabric shrinkage of 5% we extend it to the X axis.

After inserting a value, the fabric layout will be extended to e.g. Y axis by 7%.

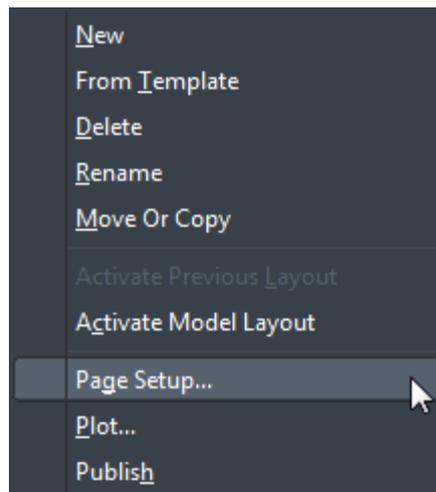


### 3) Editing layout size

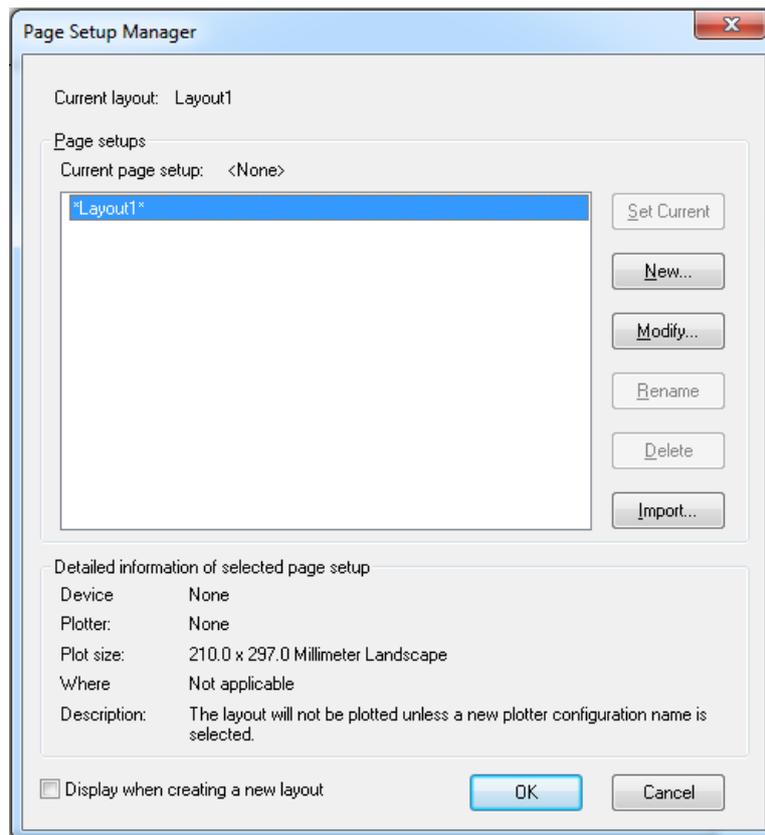
In order to change the measurements of the visible layout in ZWCAD, access the tab called **Layout1**.



Right click on the layout tab and select the option Page Setup

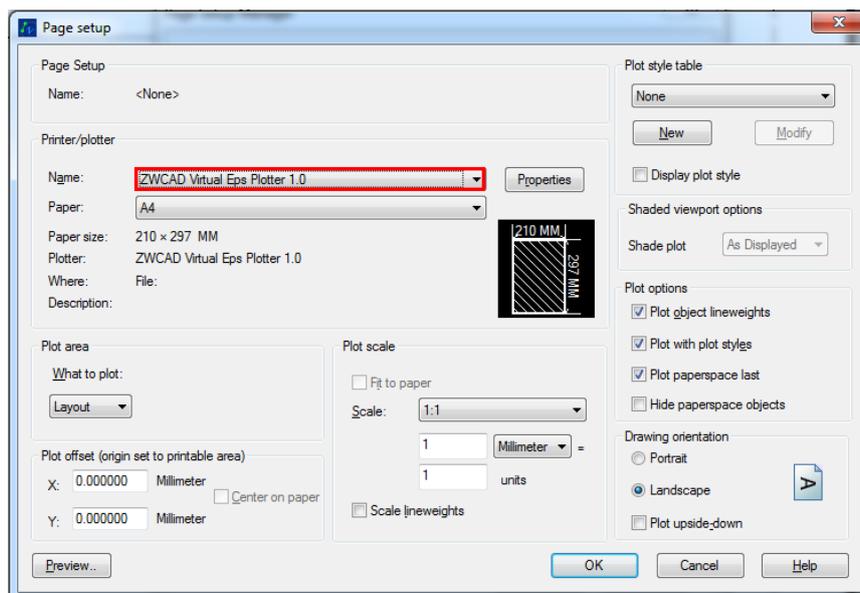


A window will appear in which you can add a new layout or edit the current one.



Click on **Modify...**

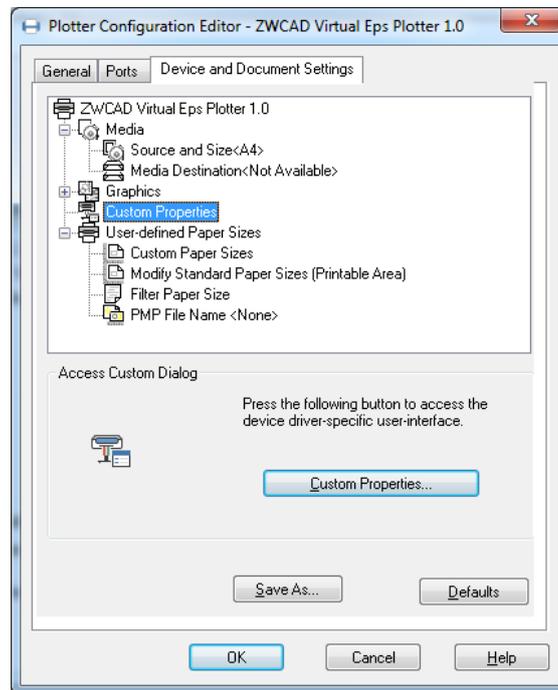
A window will appear that will let you edit page settings of the layout. Now you will need to select a printer from this list **Printer/Plotter** -> **Name** :



When a printer is selected, **Properties**, will become clickable. Access properties of the

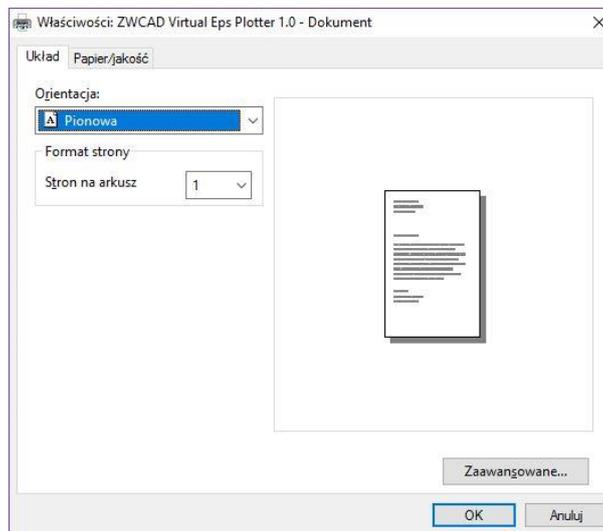
printer.

Plotter configuration window will appear and in the tab Device and document settings click on Custom properties under Graphics.

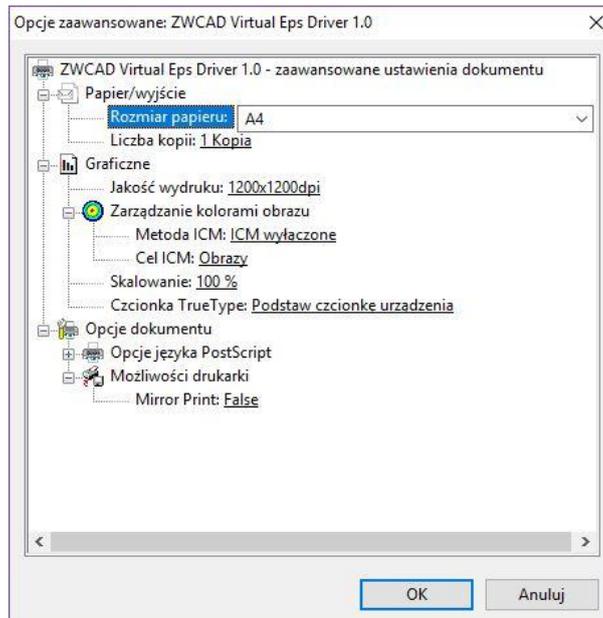


On the panel above click on Custom properties to access printer configuration.

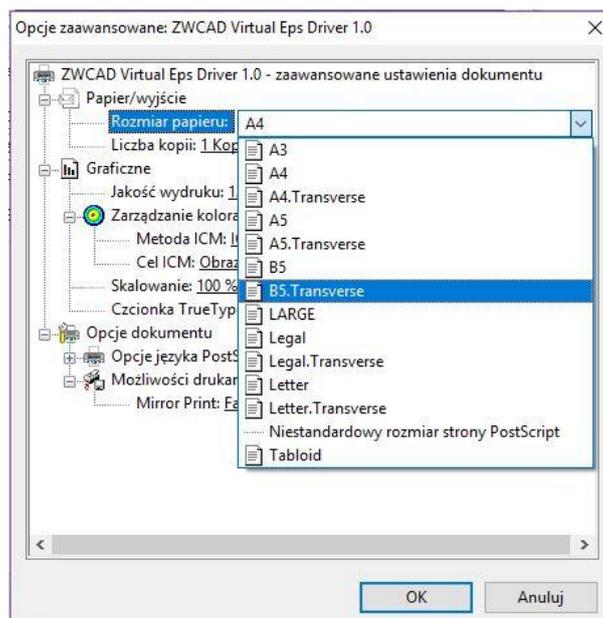
A window will appear and under the tab Layer click on Advanced.



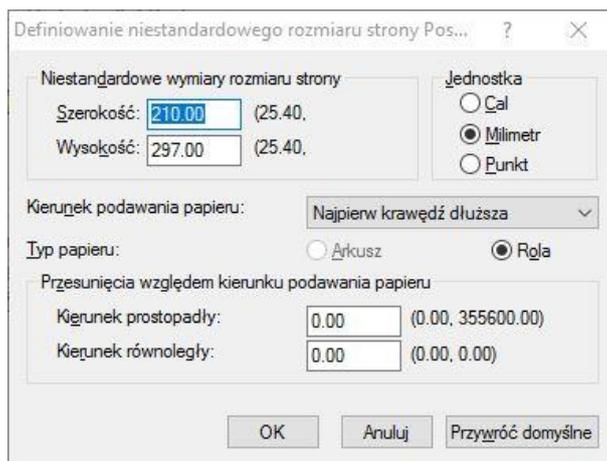
Advanced settings of the selected printer will appear.



In the tab Paper/Exit -> Paper size: please extend the list of available sizes and select Custom page size PostScript.

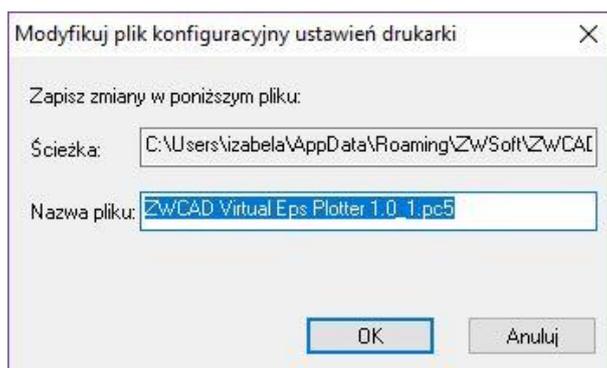


When the changes are applied, a Define window will appear that will let you change the parameters of the layer.



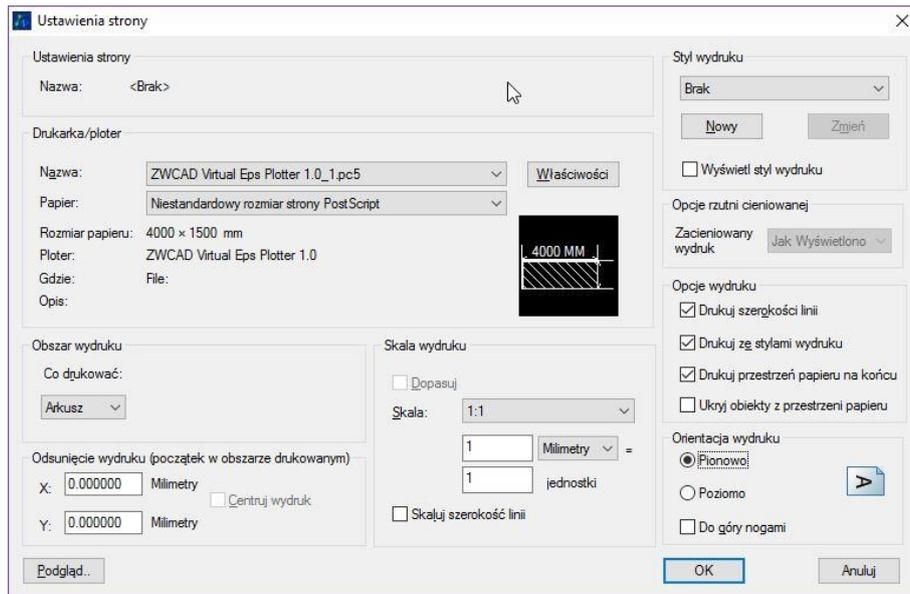
Now click on OK in every window.

After specifying all the settings and parameters, confirmation window will appear.



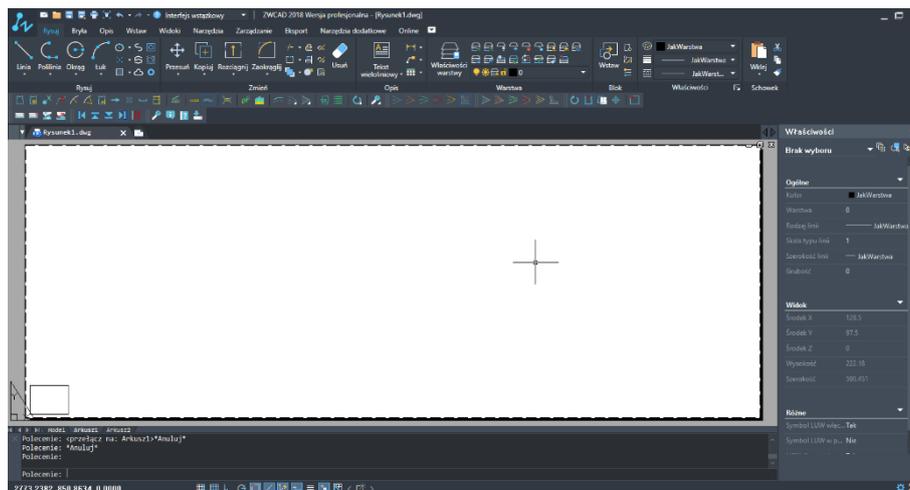
Click OK.

The size of paper will change in the Page setup according to the settings that were previously applied.



Click OK in the layer settings window.

The layer size in ZWCAD will change.

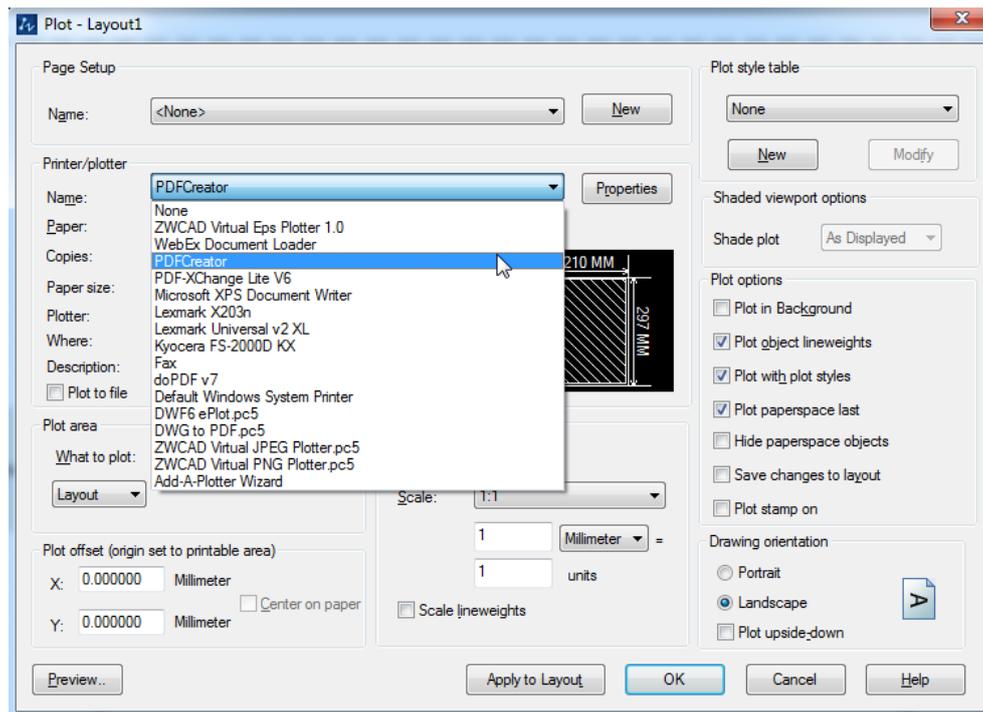


#### 4) Custom layer size- print

To change layer size to custom, you need to input the changes in the Print setup. To do so click on print icon in the upper toolbar of the program.

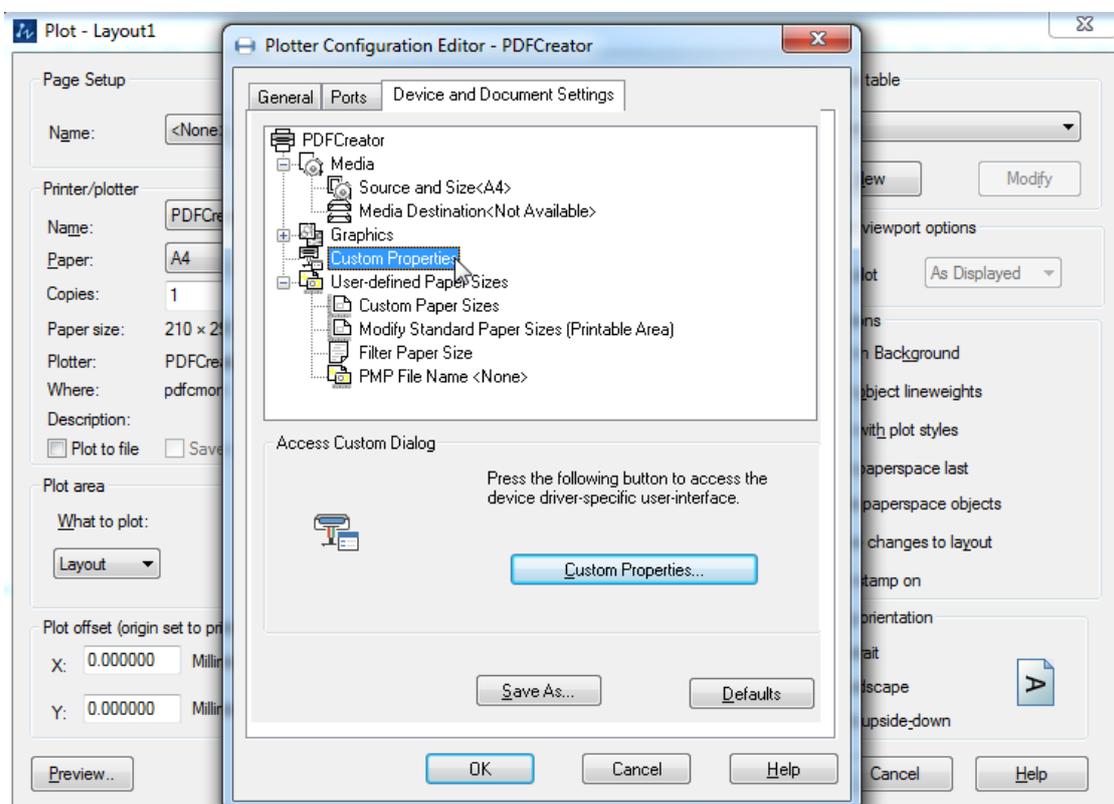
Print settings window will appear, select a printer from the list Printer/Plotter ->

Name :

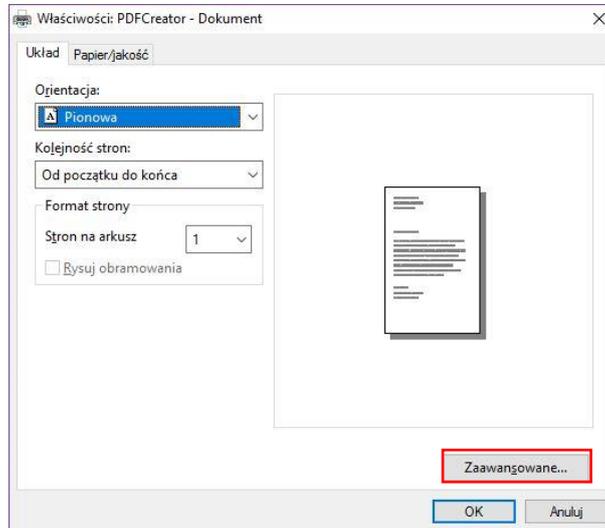


Printer Properties will become clickable, please access the properties.

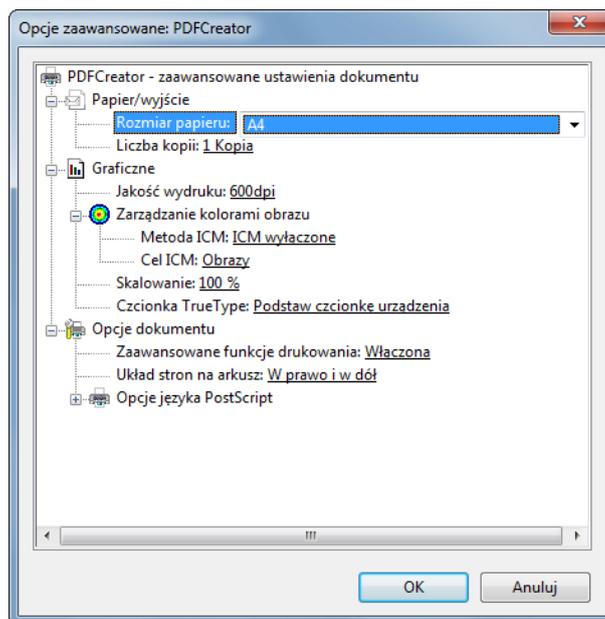
Plotter configuration window will open and in the tab Device and document settings click on Custom properties in the Graphics tree.



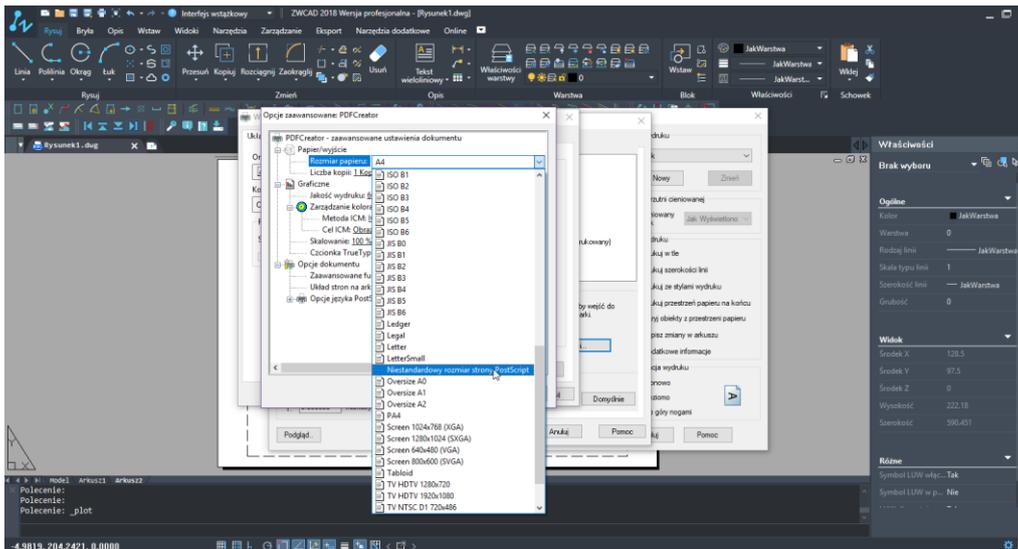
In the panel that appears click on Custom Properties to enter printer settings  
 Now click on advanced



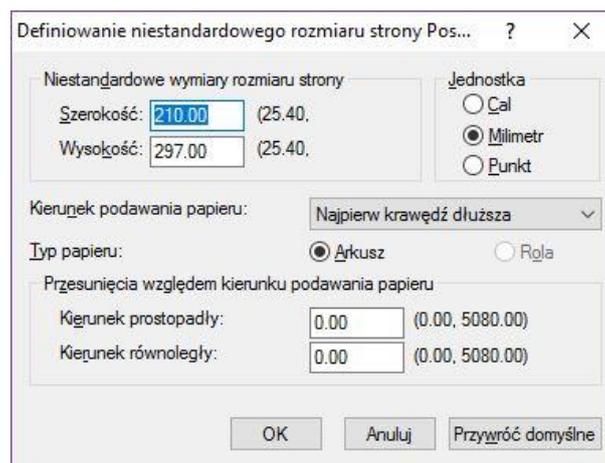
Advanced options of selected printer will appear



In the tab Paper/Exit -> Paper size choose Custom page size  
 PostScript



After all the changes have been applied Custom page size PostScript window will appear where you can enter the layout parameters.



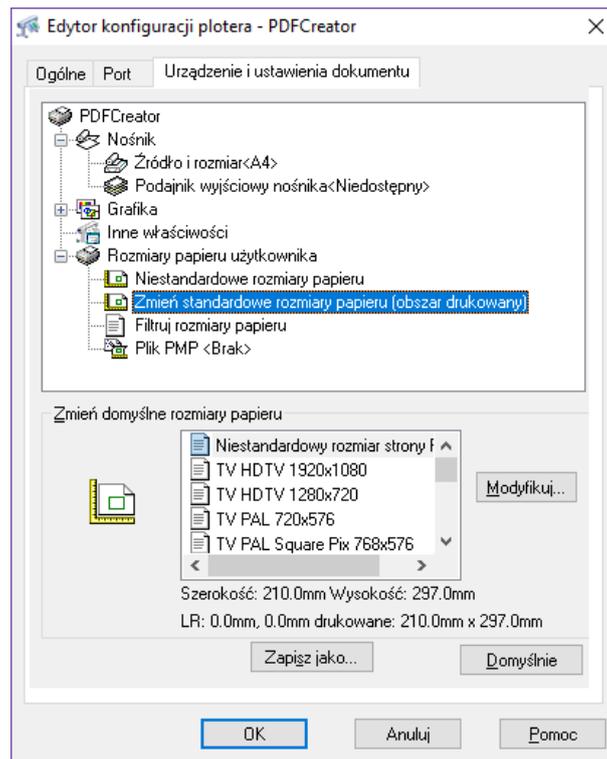
Now click on OK in all of the dialogue Windows.

If in the print window you click on Add to layer, the settings applied will also be visible on the layer in ZWCAD.

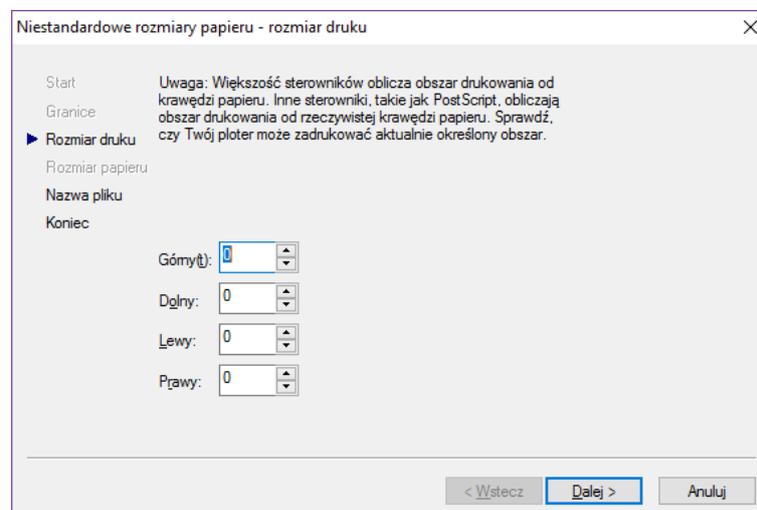
## 5) Margins

Margin values can be edited at any time with ease.

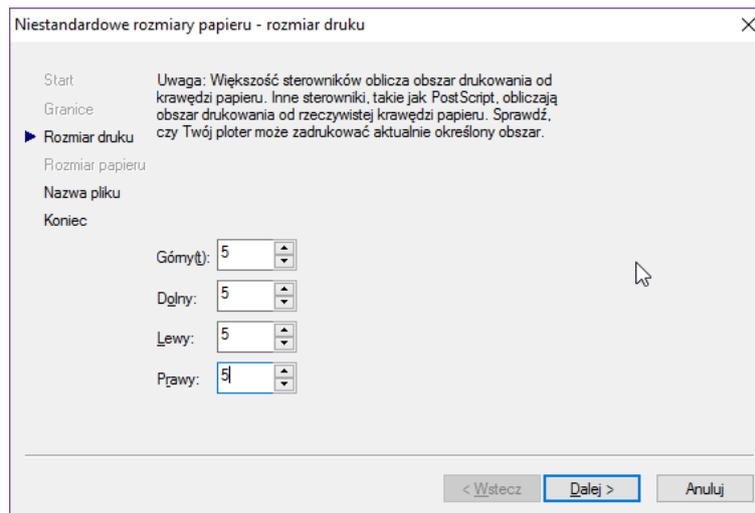
In order to do it, Access the settings just like in the examples above and choose from the list: Modify standard paper size and choose the Custom size. Now click on Modify.



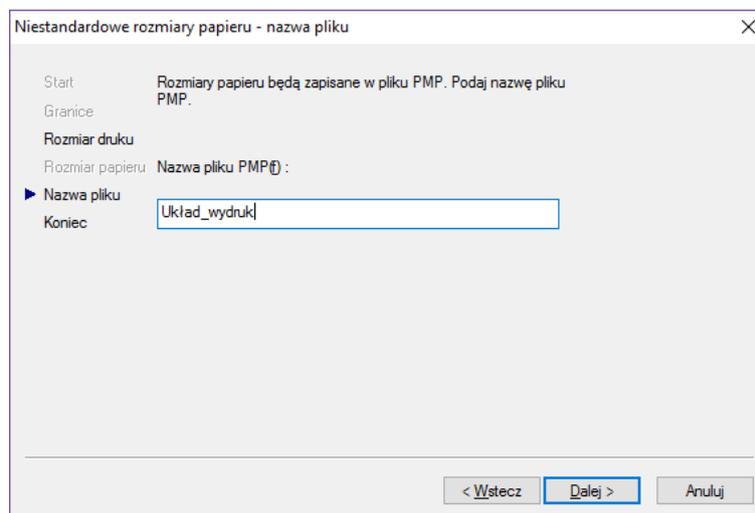
A window representing print size will appear, where different values can be entered so that the margins suit your needs.



After inputting all the values click on Next



Custom file name can also be inserted, when done click on Next

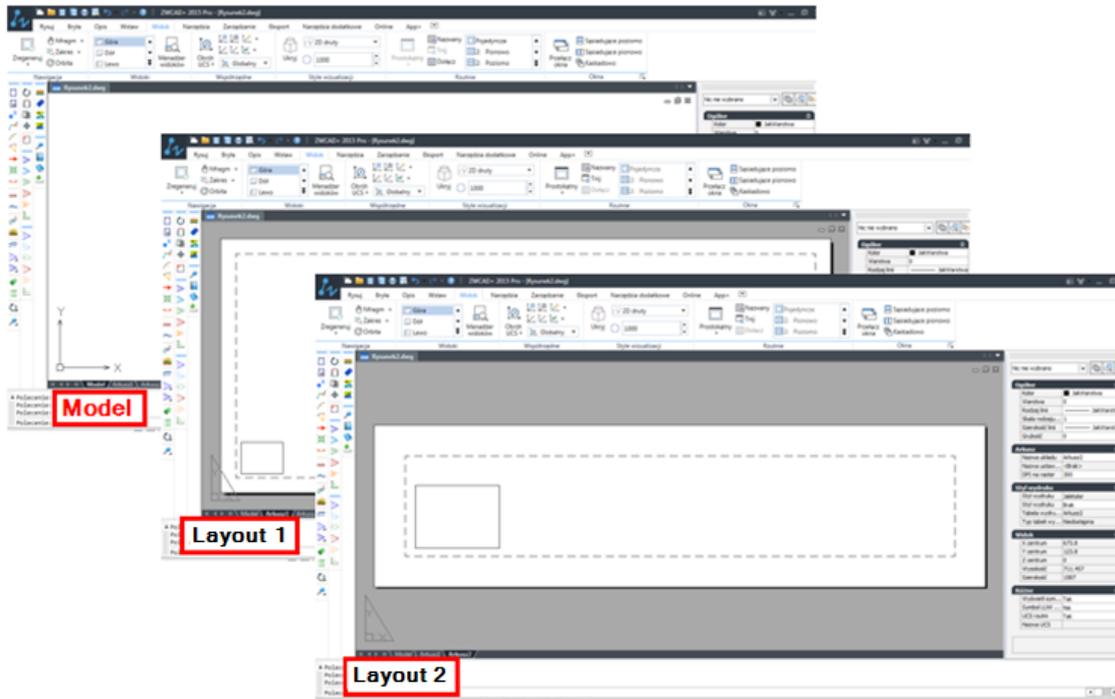


Changes will now be saved.

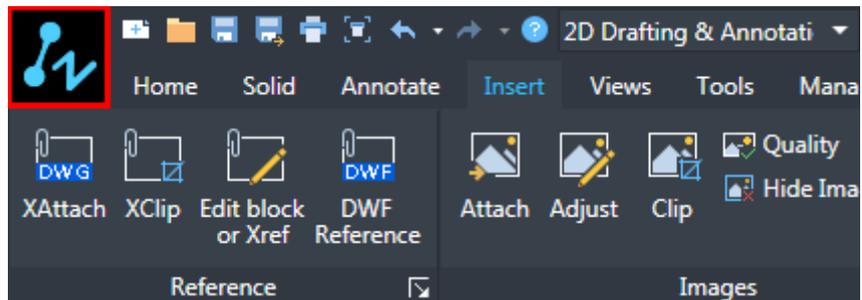
## 6) Drawing template

It is possible to create a file in ZWCAD with defined parameters, which can be later turned into a template.

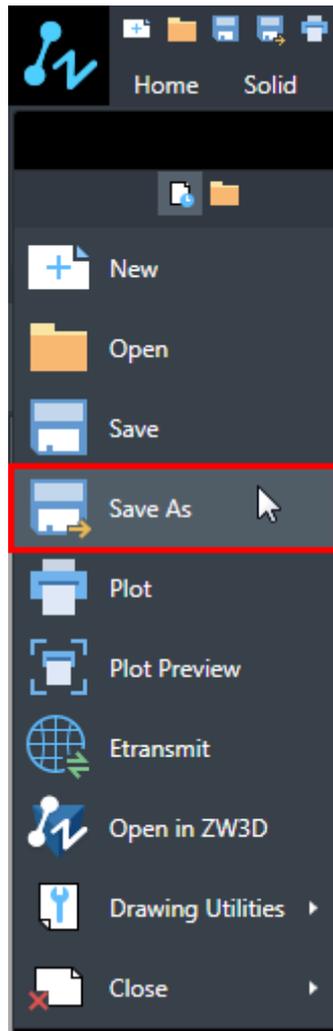
1. Open .dwg file
2. Input layer settings (custom paper size)
3. You can create as many layers as you desire with different parameters.



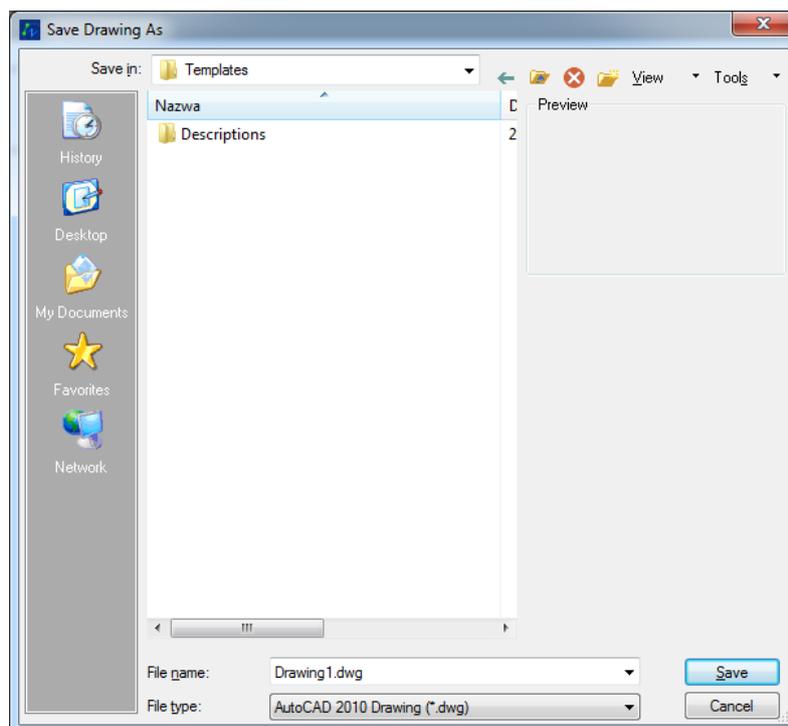
4. Now you can save the file as a template.
5. Click on ZWCAD logo in the top left corner:



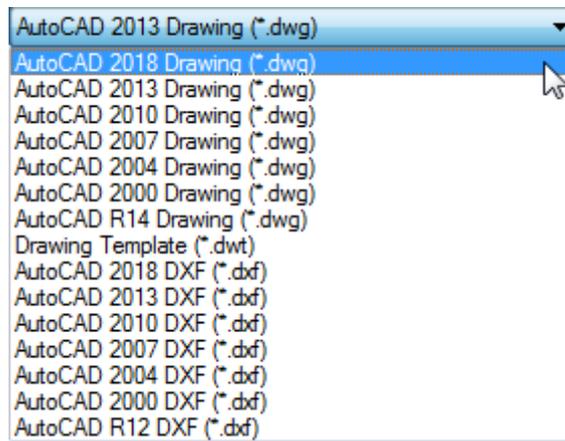
6. Drop down menu with variety of options will appear and click on Save As:



7. Save dialogue window will appear, asking you to specify the save location of the file.



8. There will be a list that will let you choose different formats of your save. Specify the format in which you would like to save the file in.



9. Now save the file by clicking on Save