

# Do Bread and Butter, Feel Like a King: Use Standard AutoCAD Tools to Produce Astounding Results

In this session, we will learn how to use standard tools within AutoCAD to produce top-class information. Dynamic features and attributes can be combined in blocks to produce astounding results. Adding the power of data extraction to produce lists and documentation allows even relative beginners to use the tools which are the bread and butter of CAD draughting to look like experts.

We will see how to add attributes and dynamic parameters to blocks, which will be used in the drawing of building elevations. These can then be adapted and annotated to produce a complete set of panels required to fill each building side. Using the data extraction tool, we will see how to produce the necessary lists for describing the panel set.

Resources available:

- PDF's of the finished elevations
- DWG's of each task for the start as well as the end result

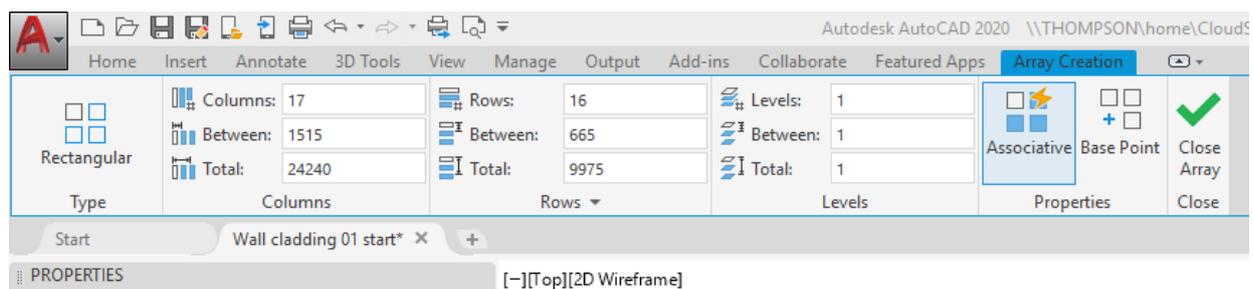
## Task 1: Simple elevation.

- Aim: draw panels
- Procedure:

Draw rectangle from 0,0 (1500 x 650 mm)

Copy using array command – fill in with following values:

17 columns 1515 mm, 16 rows 665 mm



Link to explanation from Autodesk about the ARRAY command:

<https://knowledge.autodesk.com/support/autocad/learn-explore/caas/CloudHelp/cloudhelp/2020/ENU/AutoCAD-Core/files/GUID-181BF535-D6F4-4B90-B04D-EB99C5488DAB-htm.html>

If someone would like to know how many panels are in the elevation, simply multiply  $17 \times 16 = 272!$

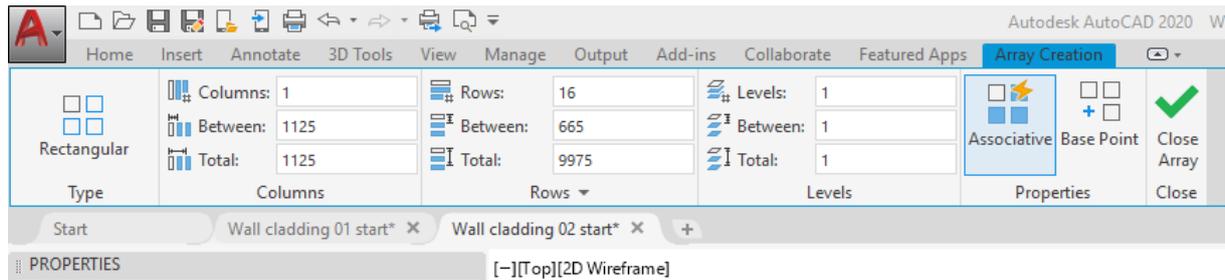
## Task 2: Simple elevation with corner panels

- Aim: list and count all panels according to type
- Procedure:

Draw rectangle from 0,0 (750 x 650 mm)

Copy using array command – fill in with following values:

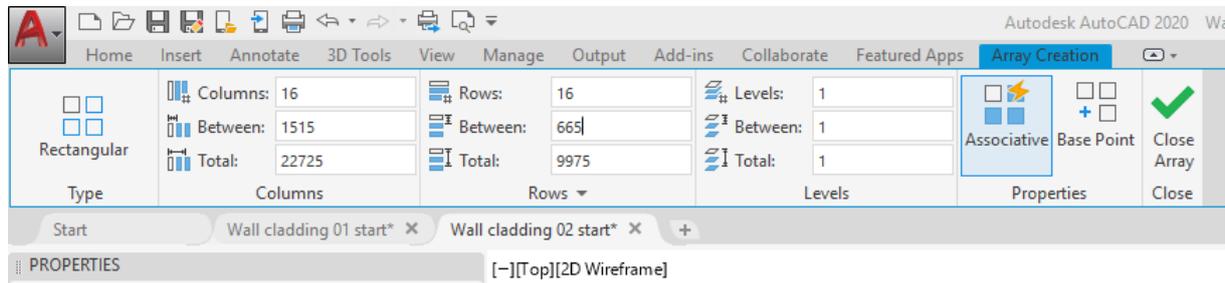
1 column, 16 rows 665 mm



Draw rectangle 15 mm from lower corner of existing corner panel (1 500 x 650 mm)

Copy using array command – fill in with following values:

16 columns 1515 mm, 16 rows 665 mm



Mirror left corner to right hand side.

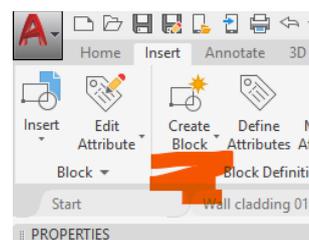
Count the panels – 16 corner panels per corner,  $16 \times 16 = 256$  standard panels.

### ➤ Can we automate this?

Change the rectangles into blocks and have the blocks counted and listed!

(Cannot create block in Array editing environment, so redo as blocks and ARRAY as above!)

Use the CREATE BLOCK command in the Insert tab - or type bl



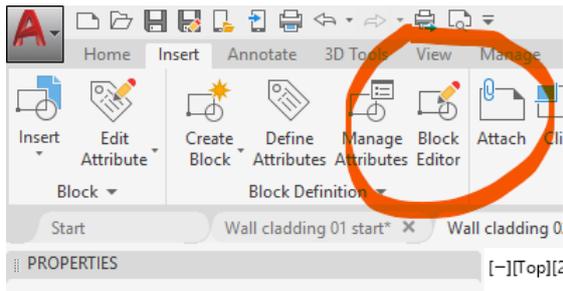
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It is not impossible to have the blocks listed already at this stage, but it makes more sense to add attributes first!

We will add two: Panel Type (Corner & Standard) and Panel Number (01 & 02)

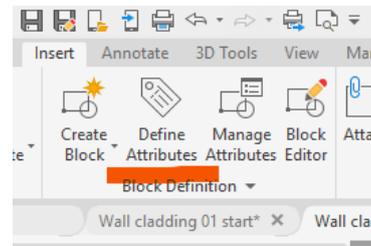
Link to explanation from Autodesk about adding attributes to blocks:

<https://knowledge.autodesk.com/support/autocad-lt/getting-started/caas/CloudHelp/cloudhelp/2020/ENU/AutoCAD-LT/files/GUID-67A2DDAD-2217-412F-8AEF-D4495192F45B-htm.html>



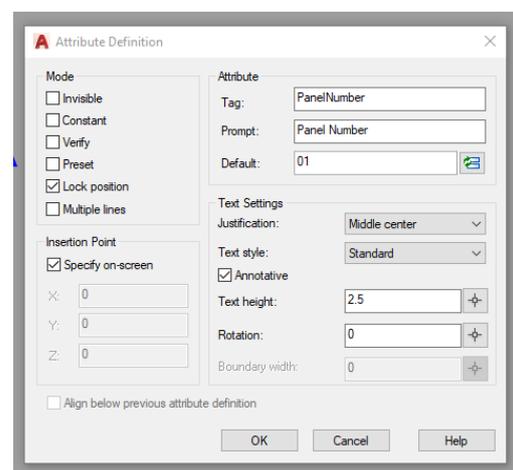
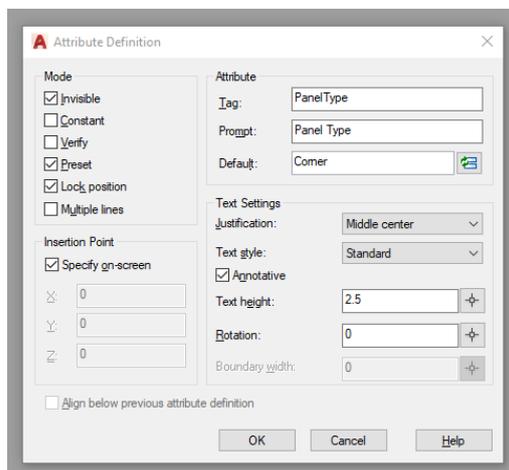
Use BLOCK EDITOR to add attribute – found in Insert tab

Then DEFINE ATTRIBUTES in same command group



Definition 01

Definition 02



Position as desired, close block with save.

➤ **Important: after having made changes to attributes in existing blocks, you must synchronize them before the changes can be seen!**

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In this case, since the blocks we want to synchronize are in an array, use the Manage Attributes button (or type BATTMAN), followed by a regeneration (type RE) to have the changes take effect!

Repeat for the standard panel – use CTRL-C to copy the Attributes and change using the Properties Manager, synchronize with BATTMAN and update with RE. May have to change the annotation scale at the bottom of the screen in the Status Bar!

You may notice that the text in the corner panels on the right is mirrored. To correct this optically, simply mirror the column again and everything should be as desired! To have it absolutely correct however, insert a new panel as a block, mirror that and repeat the array command!

### ➤ Now comes the real magic – let us list the panels using the Extract Data command!

Link to explanation from Autodesk about the Extract Data command:

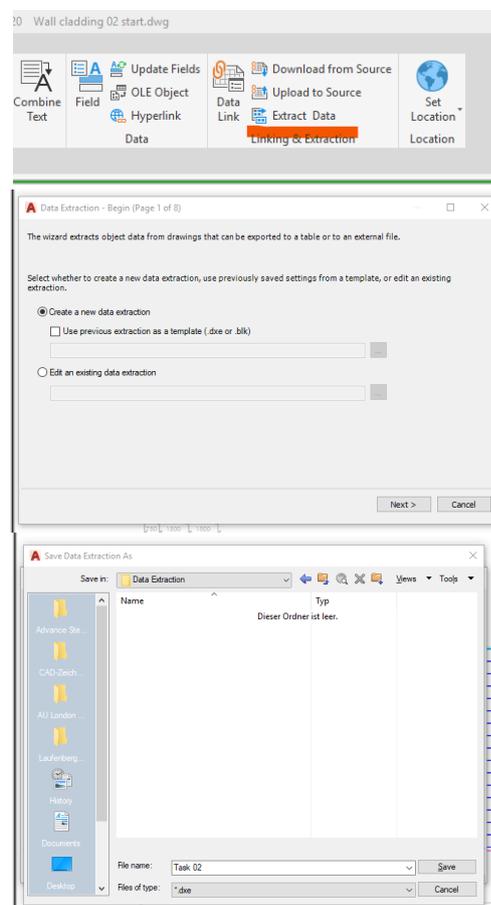
<https://knowledge.autodesk.com/support/autocad/learn-explore/caas/CloudHelp/cloudhelp/2020/ENU/AutoCAD-Core/files/GUID-5A39FFE8-10AC-4AE5-8EF4-D097C8261D1A-htm.html>

First change to Layout.

1. Still in the Insert Tab, select Data Extraction:

2. Create a new data extraction

3. Save the .dxe file



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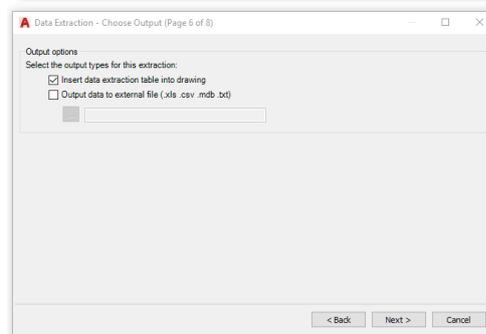
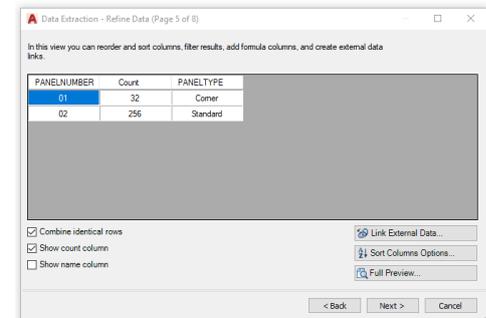
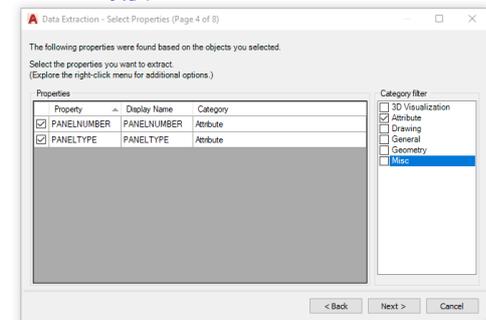
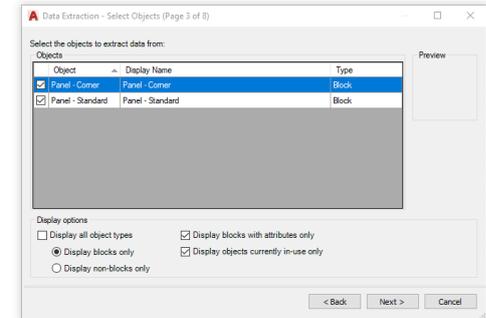
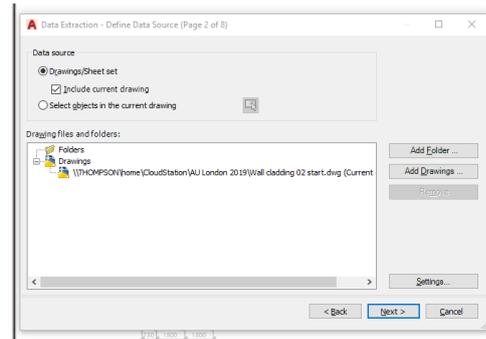
4. Including the current drawing is a good idea (click Next)

5. Select only blocks with attributes, deselect all object types (click Next)

6. Deselect everything except attributes on the right (click Next)

7. Deselect show name (click Next)

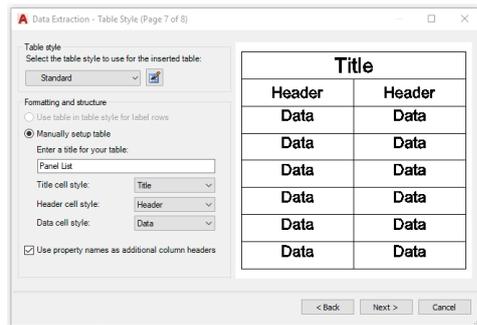
8. Select Insert data extraction table into drawing (click Next)



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9. Enter a title for your table  
(click Next)

10. Click finish and select a  
suitable insertion point!



Done!

I like my tables a little smaller, so I have simply scaled it by a factor of 0.5.

## Task 3: Simple elevation with corner panels and windows

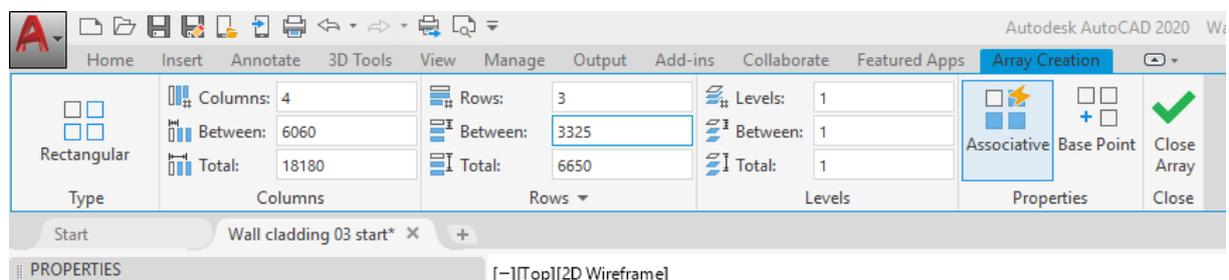
- Aim: list and count all panels with Panel Number, Length, Width and Type
- Procedure:

Start with completed task 02!

✓ **Did you know?**  
**You can remove unwanted objects in an array by marking them with a left click while pressing the CTRL key and then deleting!**

Delete unwanted panels (2 x 3), insert Block Window 01 bottom left of opening. Copy using array command – fill in with following values:

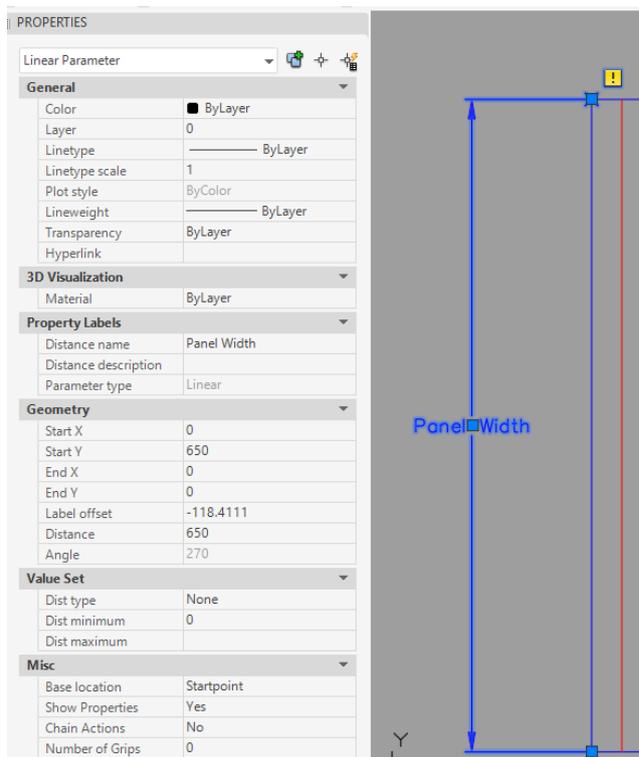
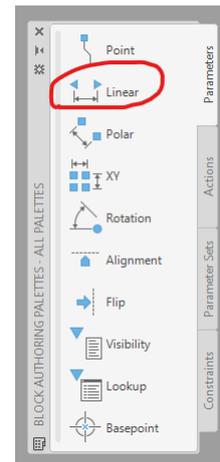
4 columns 6060 mm, 3 rows 3325 mm



Now use Block Editor to open the block Panel - Corner. We will now add dynamic parameters as the quickest way of adding width and length. The Parameter names are case sensitive!

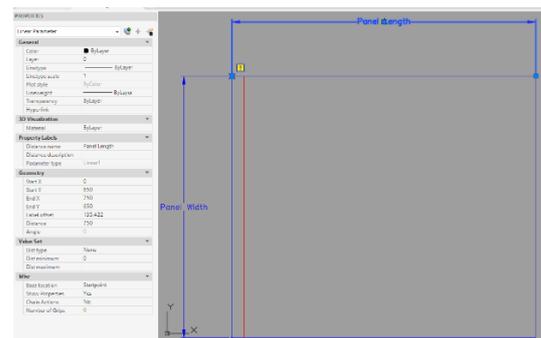
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We will be using a linear parameter



After inserting the parameter I have then marked it and using the properties manager, changed the number of grips (at the bottom of the properties list in the misc section) to 0 (since we will not want to change anything in this direction), and named it Panel Width.

We repeat the process from right to left for the Panel Length – Number of Grips = 0 and name Panel Length



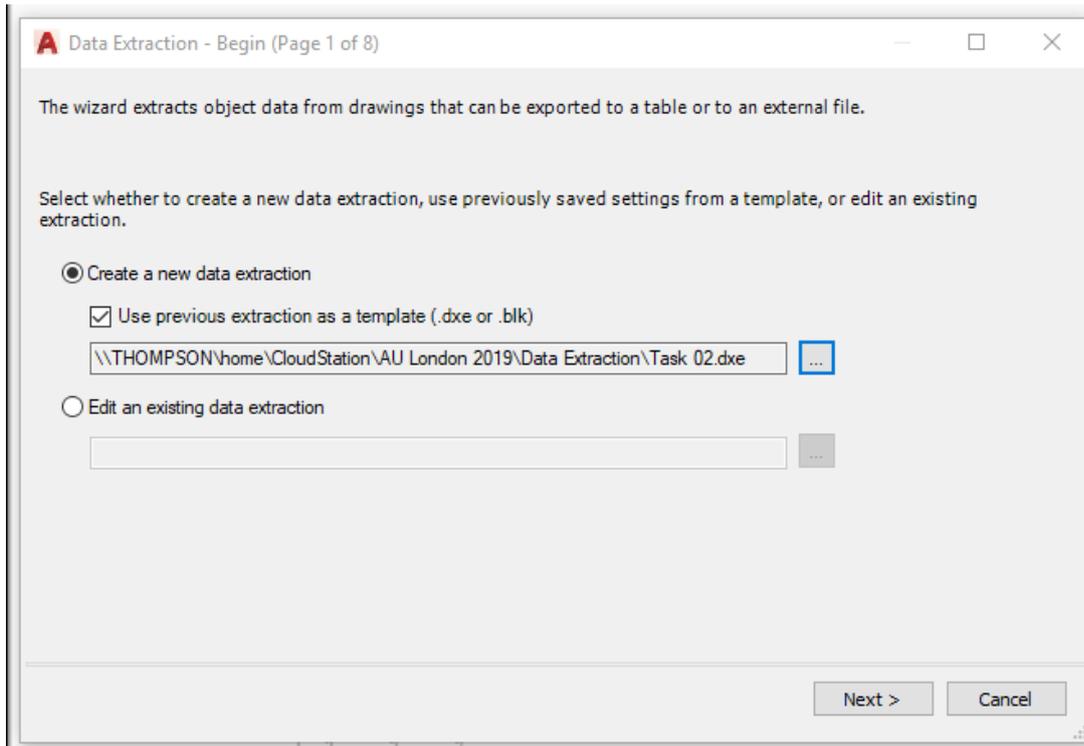
We can now repeat the process for Panel - Standard using the block editor and setting parameters with exactly the same names, but please be sure to define the length from left to right – later we will see why!

Now let us see what happens when we create a table using data extraction!

Having saved our drawing using the name Wall cladding 03, we can proceed with our data extraction as before, changing first to the layout.

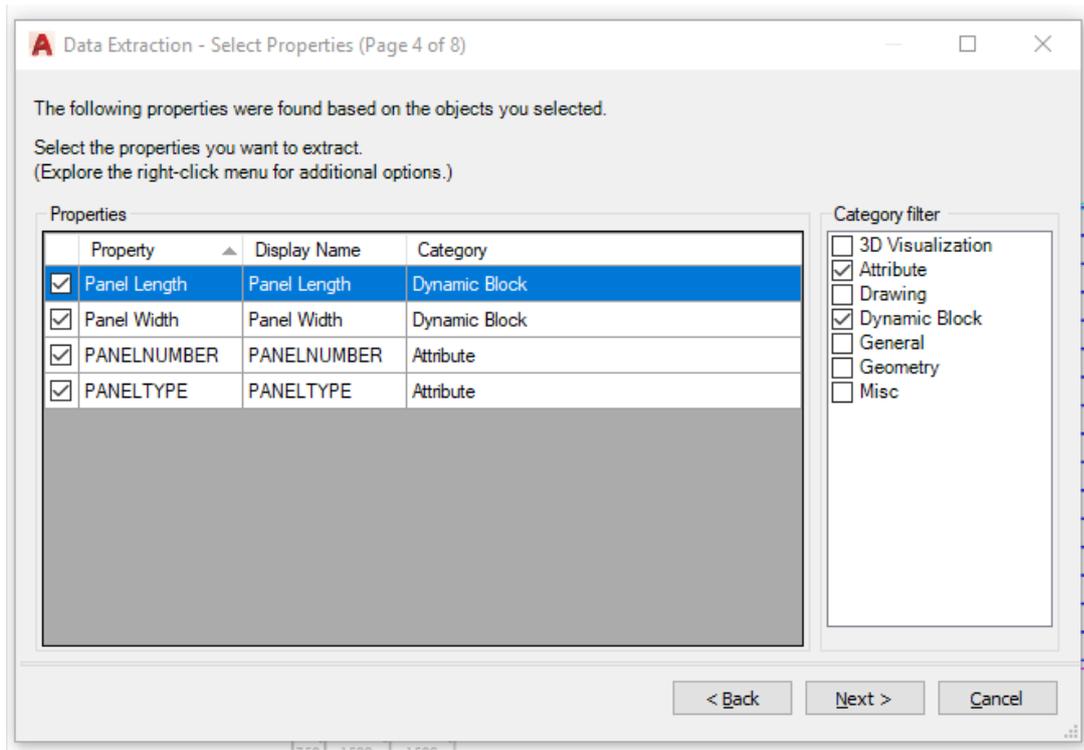
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This time we can use a previous extraction as a template:



And having clicked on Next, save the dxe file with a sensible name. Since we are now using a drawing with a different name than the one in our template, we should select the current drawing in the next dialogue:

On page 3 we deselect all object types as before, click Next, but now on page 4, we can also select our values from our linear parameters!



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Now we can just go through to the end with next and finish, inserting the table where desired.

Panel List				
PANELNUMBER	Count	PANELTYPE	Panel Length	Panel Width
01	32	Corner	750.0000	650.0000
02	184	Standard	1500.0000	650.0000

My table now contains my panel sizes, but with four decimal places. The easiest way to change this is over the AutoCAD icon/Drawing Utilities/Units – or simply type UNITS – and change the display accuracy (Precision) as desired.

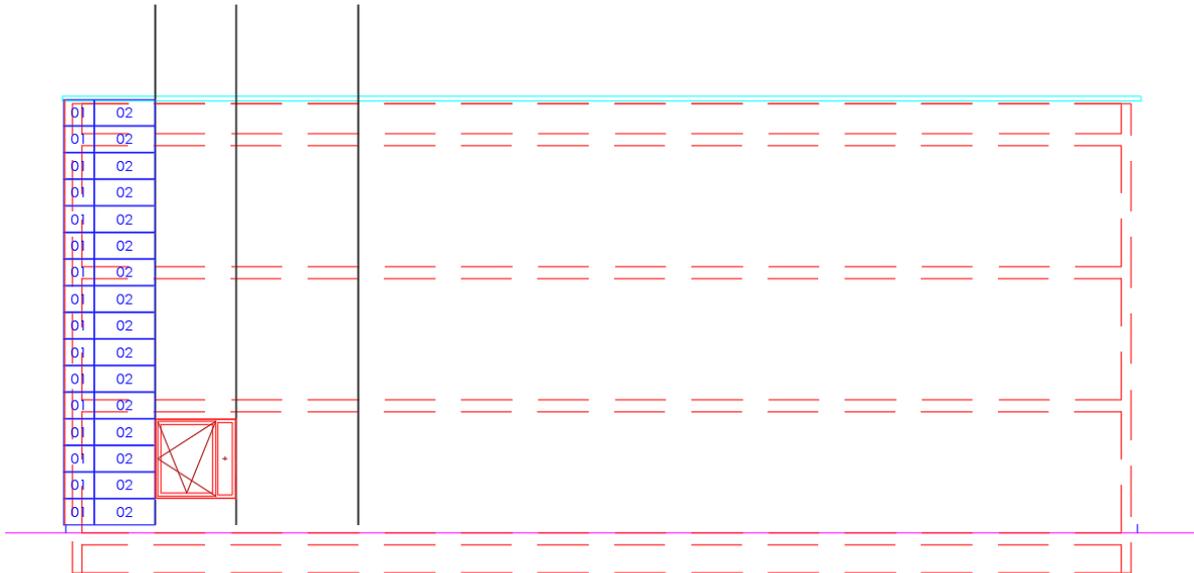
Our table will not be automatically updated, but if you mark the extraction table with a left click, a right click will call a context menu up, and there you should select Update Table Data Links.

Panel List				
PANELNUMBER	Count	PANELTYPE	Panel Length	Panel Width
01	32	Corner	750.0000	650.0000
02	184	Standard	1500.0000	650.0000

## Task 4: Elevation with corner panels standard panels of different lengths, overflows and windows

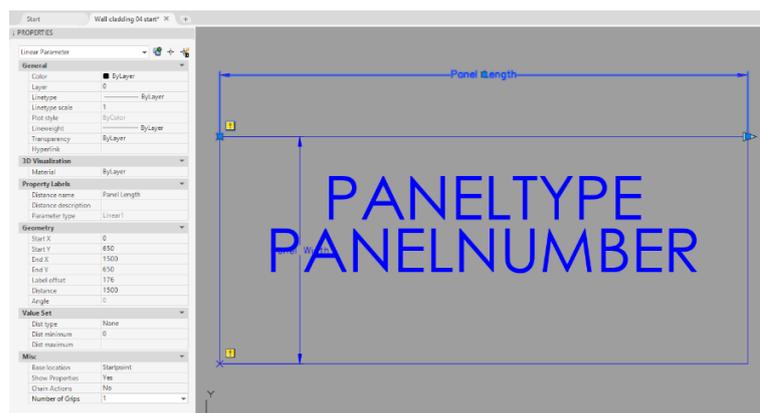
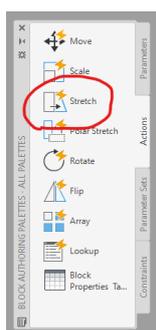
- Aim: Use attributes, dynamic features and data extraction to count and list the panels, as well as displaying the panel sizes and extra features!
- Procedure:

Insert corner panel and copy with array as before, follow up with one column of the standard panel. Insert Window 02 in the next column. It should now look like this:



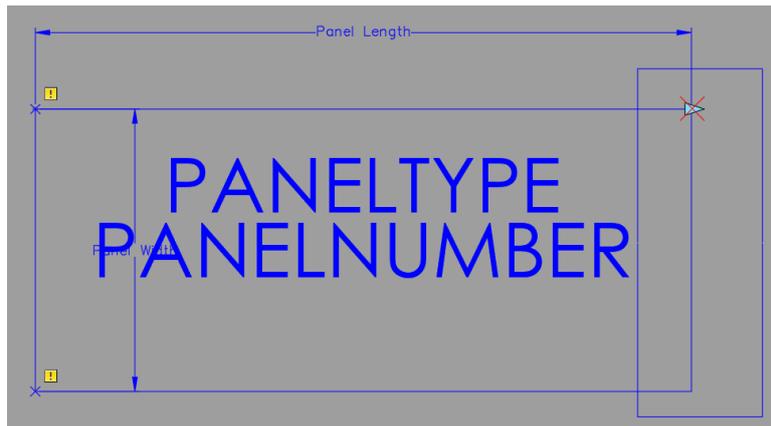
Window 02 is only 1995 mm wide. Ideal would be a standard panel with the possibility of changing the length!

Open Panel – Standard with the block editor as before, mark the parameter Panel Length with a left click and use the property manager to change the number of grips (in misc) from 0 to 1.



In the Block Authoring Palette, in the Actions tab, choose stretch. Mark the Panel Length parameter, click on the end point top right of the panel (a red cross should appear there) and then use the selection rectangles to 1<sup>st</sup> mark where will be stretched and 2<sup>nd</sup> what objects should be stretched!

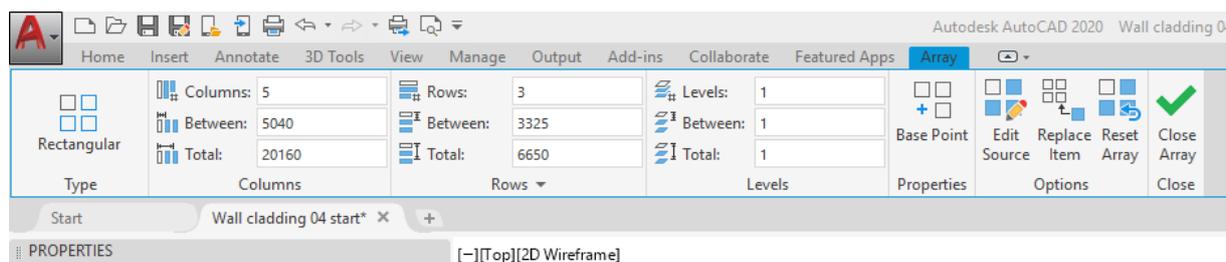
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Now insert another Panel – Standard block under the window, giving it the number 03. It will be too small, but on left clicking on the block, you will see a light blue arrow grip top right. Pull on that with the left mouse button and see how the panel longer and shorter. Pull to the full width of the window.

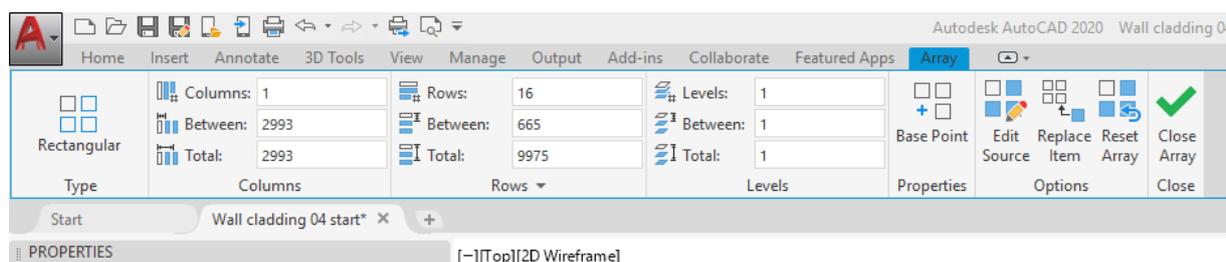
Now I would copy the Windows with array with the following values:

5 columns 5040 mm, 3 rows 3325 mm



Now copy the larger standard panels in the column of the windows using array with the following values:

1 column, 16 rows 665 mm.



Using CTRL with a left click, mark unwanted panels and delete.

Now copy the various panel columns to fill up the rest of the elevation – the arrays with panel 02 can be set to have 2 columns. To finish off, insert a corner panel on the right, mirror it and copy using array as before.

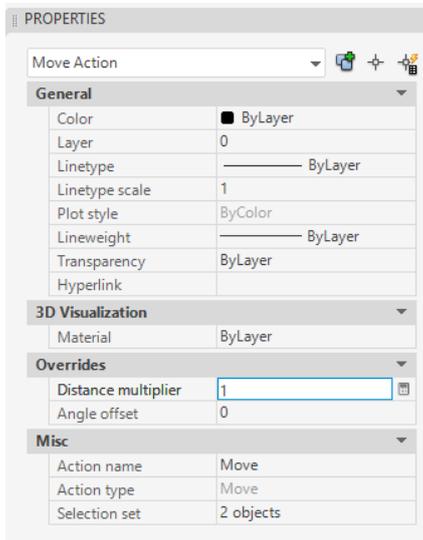
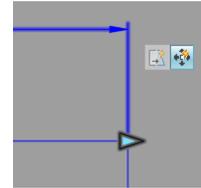
Adjusting the Panel Standard Block so that the text is always in the middle:

Open Panel – Standard with the block editor as before, in the Block Authoring Palette, in the Actions tab, choose Move. Mark the Panel Length parameter, click on the end point top right of the panel (a red cross should appear there again) and

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then select the block text (the attributes). Now they will move as the block is stretched.

Mark the Move Action icon with a left click...



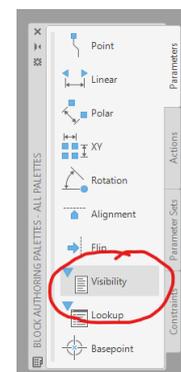
...and change the value of the distance multiplier from 1 to 0.5. Now the Text should always stay in the centre as the panel gets larger and smaller.

Another variable which can be used very easily is a visibility parameter. We can use this to have a hole in the panel for an overflow in the top panel row.

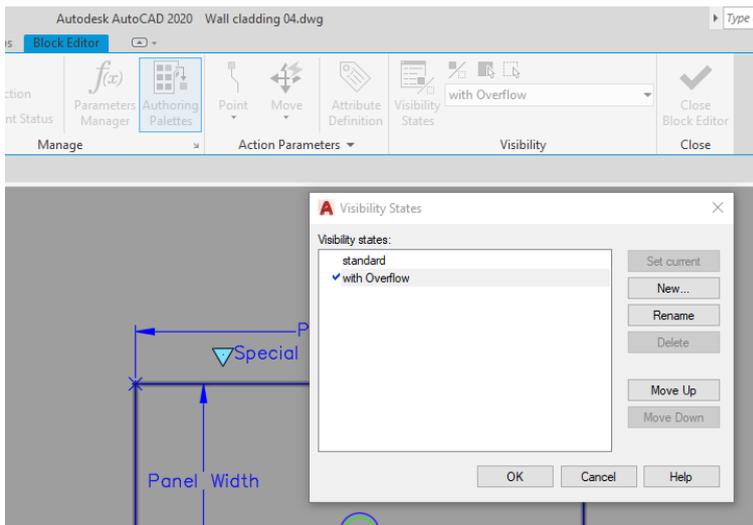
Open Panel – Standard with the block editor as before and draw a circle  $r = 50$  150 mm from the middle of the bottom line. Change to layer Rain Pipe, offset by 15 mm and change the outer circle to layer Panel. Mark the Move icon, right click, new selection set, text AND our new circles. Now our Overflow AND the corresponding hole in the panel will always stay in the middle of the panel.

Now to the tricky bit: how to have the overflow sometimes visible, sometimes not.

In the Block Authoring Palette, in the Parameters tab, choose Visibility. Name the parameter Special Features.



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In the Block editor tab is a Visibility States button. Click it, make a new visibility state called with overflow (with all objects visible) and rename the other state standard. Click OK.

Select Standard as current visibility state, mark the two circles with a left click, then with a right click choose Hide for current state under Object visibility. Close the block with save.

Using CTRL + left click, delete the panels from the arrays where a panel with an overflow should come. Insert panel - standard in the spaces left and mark them with a left mouse click and change the visibility status to 'with Overflow'.

Change to the layout, carry out a data extraction as before and watch the magic happen!

## Task 5: Elevation with 5 panel types, overflow pipes and window strips.

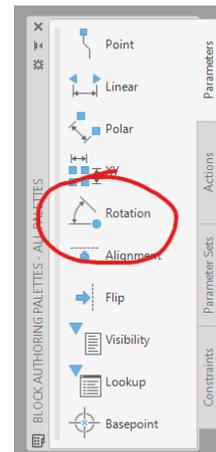
Features:

- Complex geometry
- Colour-coding to identify panel type -
- 5 different panel types have 5 different cross-sections!
- Outside corners are mitred

The problem not one of difficulty, but of keeping count of the different types and sizes. The method is the same as above – just the cut angle is extra to the list before.

Create block, block name 01L02, base point bottom right, use linear parameter to define Panel Width – Number of grips = 0. Repeat for Panel Length, but with 1 grip and set up a Stretch Action combined with it as before. Define attributes Panel Name and Panel Type also as before.

Define Angle: use a Rotation parameter with name Cut angle and with grips set to a value of 0!



### Bread and Butter

- ✓ quick and easy
- ✓ standard process
- ✓ Uncomplicated
- ✓ Tastes good

### Feel Like a King

- ✓ Blocks
- ✓ Attributes
- ✓ Dynamic features
- ✓ Data extraction