



PT16479

Bring Structure into Your Data with AutoCAD Plant Report Creator

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Learning Objectives

- Define the query of your report
- Use the wizard of DevExpress
- Understand the user interface of Report Designer
- Structuring with Grouping, Sorting, Filtering your report

Description

AutoCAD P&ID and AutoCAD Plant 3D create a whole lot of data while you are drawing. We show how you start with a simple report and then start grouping and ordering it in the way you need. We show you how to define the classes you want to use for your report and what how you layout your report. We explain the user interface of Report Designer of DevExpress so you know how to work with the different palettes.

Your AU Expert(s)

Carsten Beinecke has worked in the plant industry for 28 years, starting as a drafter and becoming a supporter and developer for plant software. As the author of books and training manuals for AutoCAD P&ID and AutoCAD Plant 3D, Carsten has helped numerous customers set up and customize these software systems. He has a very deep understanding of the database structure of AutoCAD P&ID and AutoCAD Plant 3D. He supports customers around the world. Carsten is the Product Manager of PlantTools. He started with the development in 2008. PlantTools are apps for AutoCAD P&ID and AutoCAD Plant 3D.



Think First

Before you start creating a new report configuration you should think about the following topics:

- **Sample Documents**

Check if you already have some Excel, PDF or other files you can use to see what you try to accomplish. Or you have a list your customer expect you to deliver.

- **Existing Report**

Is there an existing report configuration for Report Creator you can use to get started? Maybe use an existing equipment list for P&IDs and adapt it to your needs.

- **Classes & Properties**

What are the classes of your project you want to use in your report? Is it just one or do you need to combine multiple classes? Check which classes contain what properties in your Project Setup. This is important if you select multiple classes and you need to have properties of different classes in one column.

- **Structure (Group, Sort, Filter)**

Now you can think how you structure your report. Do you have a list where each object from your drawing is listed individually (for example in an equipment list) or do you group rows together like in a Bill of Material from your 3D piping.

How do you want to sort the rows in your report? Do you need to filter to leave something out of your report?

- **Calculation & Scripting**

Is there a need to “calculate”? This starts already when you need to concat values. You can look at calculation like creating calculations in Excel.

Scripting is not part of this class. This may be needed if everything else doesn't give you what you want. For example, you can group the PipeLineSegments of a PipeLineGroup for a line list. But then you want to have the different sizes of the PipeLineSegments shown in ascending order (i.e. ½”, ¾”, 1 ½”, 2”).

- **Layout**

How does your report looks like in general? Do you have a header which is used just on the first page or on each page? What about a logo from you and/or your customer? What project data from your project setup do you want to see in your header?

- **Output Type & Format (PDF, XLS)**

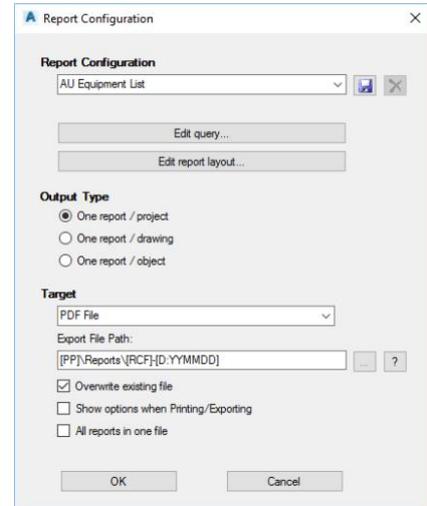
What file format do you want to create? Where do you want your reports to be created? When creating Excel files you need to pay close attention to the layout, because you may get a lot of small rows and columns in Excel from overlapping labels in your layout or when you have gaps between the labels.

User Interface

When creating a new report configuration, you can simply start from top to bottom.

First type in a name. Then you define the query. Next the Layout.

Finally, you define the Output Type. Do you need one report per project. For example, when creating an equipment list. Or do you want the report for each drawing. For example, if you want an instrumentation list for each P&ID drawing. Or one report per object. This is used mostly for creating data sheets.

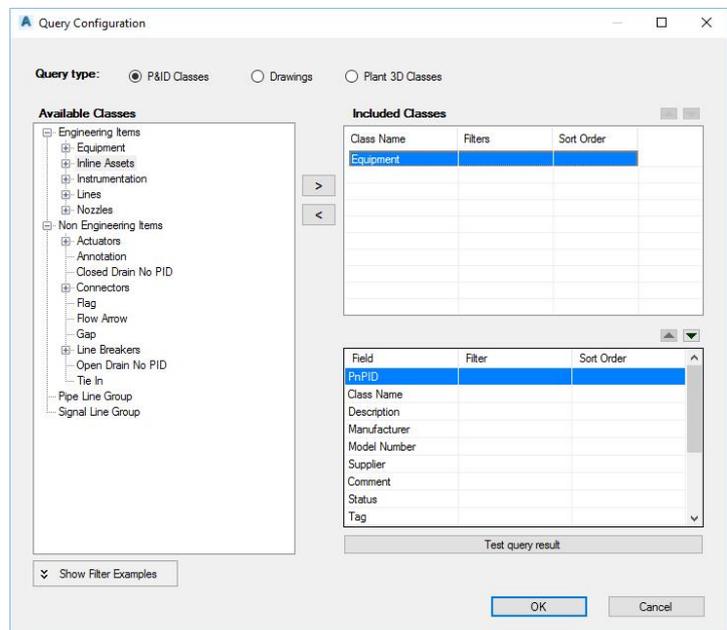


Defining Query

With the query, you define where the data for your report comes from. First you select P&ID or Plant 3D. Next you select the class or classes you need for your report.

You can also sort and filter in the query, but this can be done more conveniently in the layout itself.

The Test button gives you a preview of all available columns of your classes. This way, you can preview if you have everything you need.





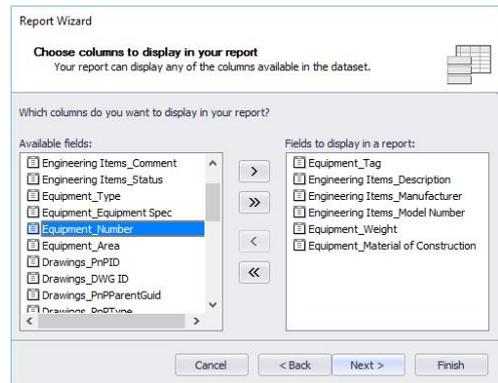
Wizard

When you start a brand-new report configuration and you click on the “Edit report layout...” button, the wizard of DevExpress automatically opens. If you do not need it, you can click on cancel and create the layout from scratch.

The wizard has 5 pages.

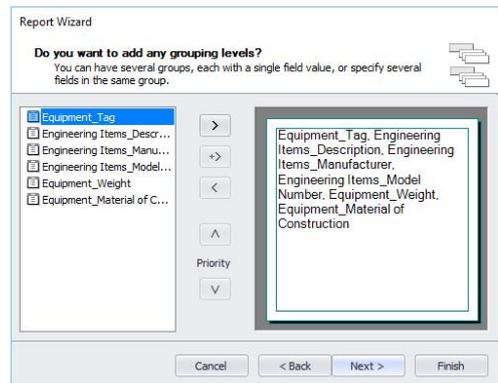
Page 1

Select the properties you need preferably in the order you need them. If you know that you need additional columns for calculations, then just use any property as a filler so you already have an additional column you later can modify.



Page 2

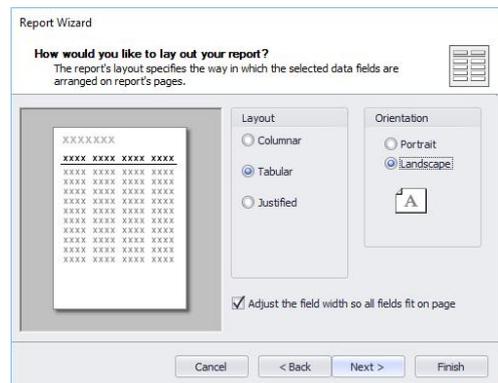
Here you can start grouping your rows. I usually don't do it in the wizard, because the result of the layout may not be what you expect. So I click on “Next >” and skip over it.



Page 3

Here you most often choose “Tabular” (except when creating data sheets, then it's “Columnar”).

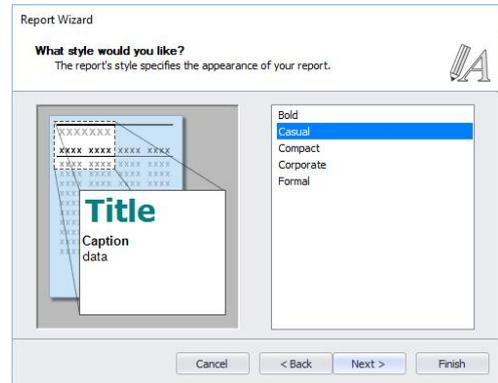
And, the orientation must be selected. Mostly “Landscape”.





Page 4

Here you can choose a predefined style. Not that important, since you will later probably change everything anyway.



Page 5

Finally, the header of the report.



User Interface DevExpress

When the wizard is done, you see the layout of the “Report Designer” which is from the company DevExpress.

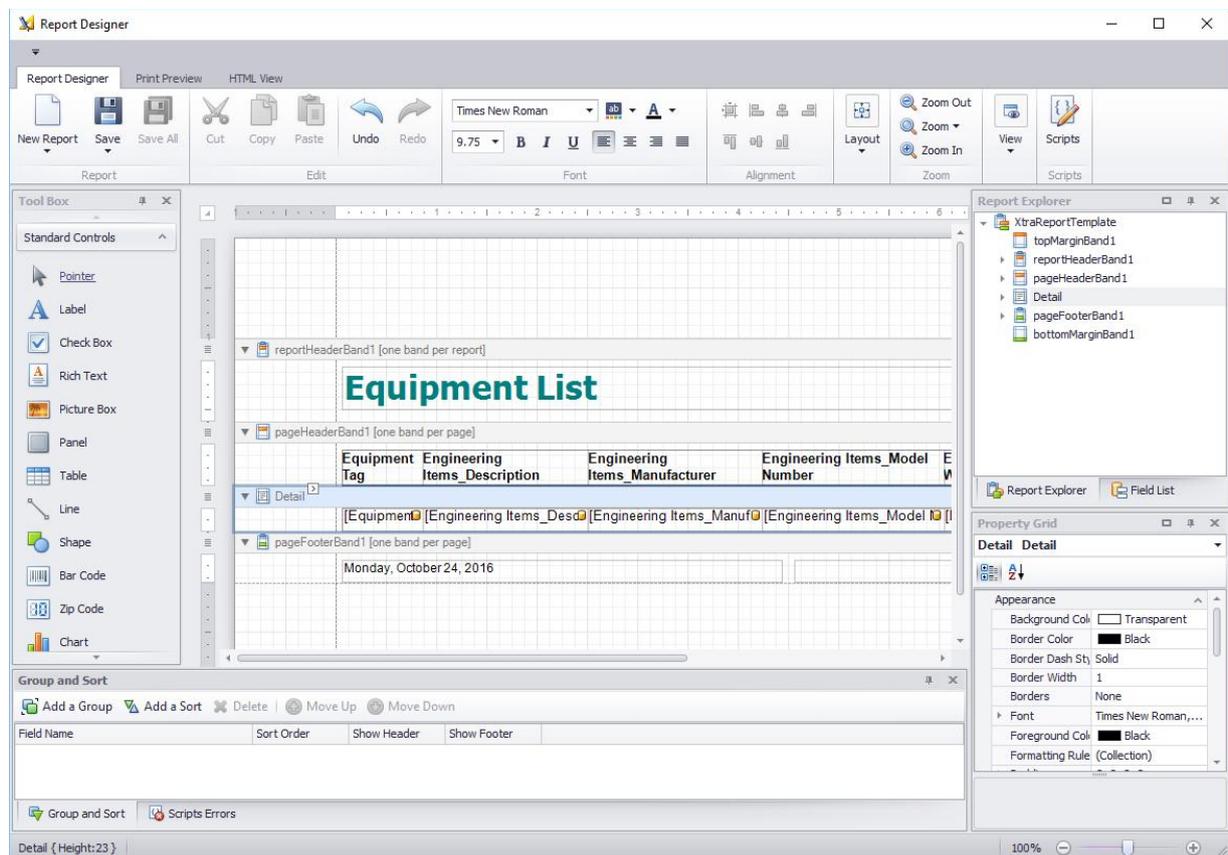
At the top, you see a ribbon mostly used for formatting.

On the left, you see the available tools for your layout. The tools you will most likely use are “Label” (for text and fields), “Picture Box” (for Logos), “Table”, “Line”.

On the right top, you can switch between the “Report Explorer” which shows the structure of the layout and the Field list, which are your properties.

The lower right shows the properties of whatever you select.

Below you see groups and their sort order.

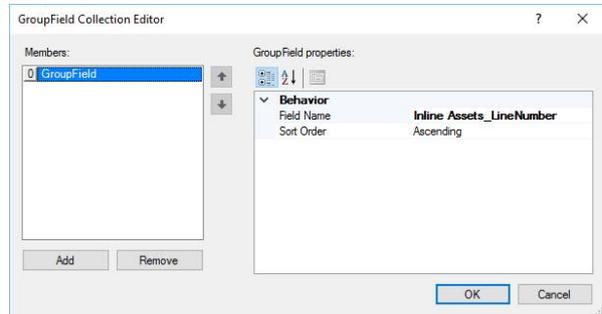


Structuring

To structure your report the way you want it, you have several options or tools available.

Grouping

Grouping means, that you want to find similar rows and add them up or sum them up. For example, in a Bill of Material you want to add the length of all pipes with the same PartSizeLongDesc (The long description identifying a specific type of pipe for a specific size).

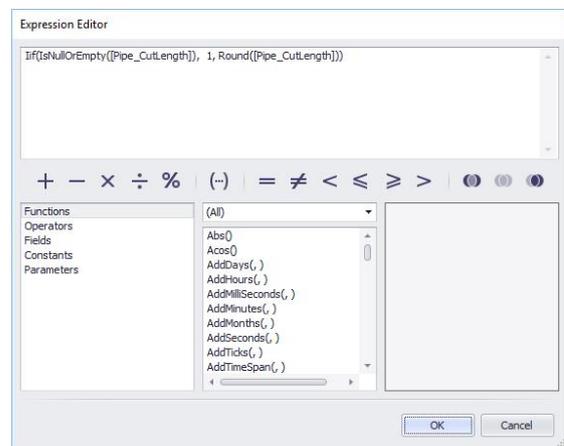


You can group by using just one property or multiple.

Calculation

With calculations, you can essentially do what you also do in Excel. You can concatenate properties, add IF statements and do complex mathematical calculations.

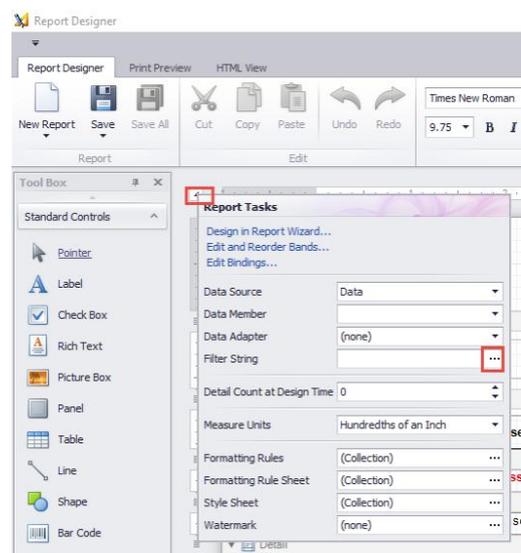
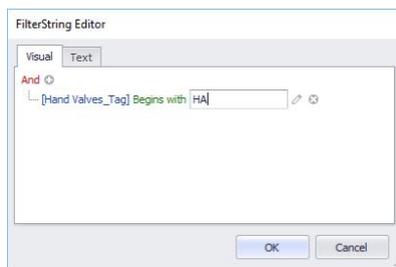
You can use all properties of your classes.



Filtering

As mentioned before, you can filter also in the query, but it is more convenient and much more flexible, if you use the FilterString Editor.

The FilterExpression Editor can be opened by clicking on the little arrow at the top left corner of your layout and then by clicking on the “...” button in the dialog.





Scripting

Scripts can be written in C#, Visual Basic, Jscript .NET.

Scripts can be used when calculations aren't enough anymore. One example is, when you see the different sizes of the line segments used for one line group in descending order.

3", 1 1/2", 1", 1/2"
3", 2", 1", 1/2"
1", 1/2"

The following picture shows an example from another case.

```
1 using System.Collections.Generic;
2
3 List<int> sizesList = new List<int>();
4 List<string> DWGTitleList = new List<string>();
5
6 private void AllSizesLabel_SummaryGetResult(object sender, DevExpress.XtraReports.UI.SummaryGetResultEventArgs e)
7 {
8     sizesList.Sort();
9     string str = "";
10    for (int i = sizesList.Count - 1; i >= 0; i--)
11    {
12        if (i < sizesList.Count - 1)
13        {
14            str += ",";
15        }
16        str += sizesList[i];
17    }
18
19    e.Result = str;
20    e.Handled = true;
21 }
--
```

Scripting is not part of this class.



Demo

Writing in detail about the examples shown during class, would be endless. Therefore you can watch a 50 min video with all the detailed info.

Example 1 – Equipment List

This shows a simple equipment list ordered by Tag.

Equipment List

Equipment Tag	Engineering Items_Description	Engineering Items_Manufacturer	Engineering Items_Model Number	Equipment Weight	Equipment_Material of Construction
B-001	BLOWER		8952-AH-3245		
E-001	GENERAL HEAT EXCHA		1234-5678		
P-001	PUMP		99-3214		
TK-001	JACKETED VESSEL		TK198-ABC		

Example 2 – Pumps and Blowers List

This example uses the Blowers and Pumps class, orders by Tag and has a calculated field to show the flow capacity.

Pumps and Blowers

Equipment Tag	Engineering Items_Description	Engineering Items_Manufacturer	Engineering Items_Model Number	Flow Capacity
B-001	BLOWER		8952-AH-3245	100 m ³ /h
P-001	PUMP		99-3214	10 m ³ /h



Example 3 – Valves List by Line# and Description + Size + Spec

This is a valve list where the valves are grouped by line number and as a second level of grouping, they are grouped by Description, Size and Spec to get the number of valves.

Hand Valves_Tag	Inline Assets_Size	Inline Assets_Spec	Engineering Items_Description	Inline Assets_LineTag
Line#	1000			
1	6"	CS150	CHECK VALVE	6"-CS150-CWR-1000
1	6"	CS150	GLOBE VALVE	6"-CS150-CWR-1000
1	1/2"	CS150	VALVE GENERAL	1/2"-CS150-CWR-1000
2	6"	CS150	VALVE GENERAL	6"-CS150-CWR-1000
Line#	1001			
1	4"	CS150	CHECK VALVE	4"-CS150-CWR-1001
1	4"	CS150	GLOBE VALVE	4"-CS150-CWR-1001
Line#	1002			
2	4"	CS150	GLOBE VALVE	4"-CS150-CWR-1002
2	4"	CS150	VALVE GENERAL	4"-CS150-CWR-1002
Line#	1003			
1	24"	CS300	BUTTERFLY VALVE	24"-CS300-AV-1003
Line#	1004			
1	20"	CS300	BUTTERFLY VALVE	20"-CS300-AV-1004

Example 4 – BOM from 3D Piping

This is a report with data coming from 3D piping. It is also grouped by line number and then by PipeSizeLongDescription.

Quantity	Engineering Items_PartSizeLongDesc	Engineering Items_Size	Engineering Items_CompatibleStandard	Engineering Items_Weight
Line#	1000			
76	PIPE, SEAMLESS, 4" ND, PE, ASME B36.10	4"	ASME B36.10	68.00
196	PIPE, SEAMLESS, 6" ND, PE, ASME B36.10	6"	ASME B36.10	310.80
505	PIPE, SEAMLESS, 8" ND, PE, ASME B36.10	8"	ASME B36.10	1201.81
1	ELL 45 LR, 8" ND, BW, ASME B16.9	8"	ASME B16.9	24.58
1	ELL 90 LR, 4" ND, BW, ASME B16.9	4"	ASME B16.9	8.59
1	ELL 90 LR, 6" ND, BW, ASME B16.9	6"	ASME B16.9	22.48
3	ELL 90 LR, 8" ND, BW, ASME B16.9	8"	ASME B16.9	134.25

The video shows each example in a step by step instruction. It shows more than shown during the class.

Video Link: <http://autode.sk/2eAuVCc>