

Making a Titleblock and A-B-C-D Borders

In this chapter, you will cover the following to World Class standards:

- **Designing a Titleblock**
- **Drawing a Titleblock**
- **Creating a Drawing using a Template**
- **Drawing the Titleblock using the Line, Offset and Trim tools**
- **Inserting the Titleblock labels using the Mtext, Move, Copy and Edit Text tools**
- **Saving the Titleblock file**
- **Standard Architectural and Engineering paper sizes**
- **Creating an A Size Border**
- **Creating a B Size Border**
- **Creating a C Size Border**
- **Creating a D Size Border**

If you watch a crew of workers build a bridge, you may see a construction site manager looking over a set of drawings while supervising the erection of steel girders or the pouring of a foundation. These drawings have many orthographic projections showing the front, top, right side, left side, and perhaps even additional details about the project. Designers print these drawings on sheets of paper with special sizes and names like “D Size Sheet.” If drawing in a set of prints must be printed on the same size of paper. On every blueprint there is a rectangular region referred to as the titleblock which contains the drawing name, project, signatures, dates, an identification number, sheet number, revision level, and scale. The titleblock also displays the company name, address, city, state, zip code, and possibly either a phone number or email address. A properly prepared drawing has signatures and stamps showing the construction manager and crew that the information provided has been approved for manufacturing. Without this essential data and authorization, the construction company may not have the permission to legally construct the job.


<p>WCC</p> <p>World Class CAD 1147 Rice Ave Gahanna, Ohio 43230 www.worldclasscad.com</p>	Drawing Name:			
	Project:			
	Drawn By:	Date Drawn:		
	Checked By:	Date Checked:		
	Approved By:	Date Approved:		
	Scale:	Drawing No.:	Sht.:	Rev.:

Figure 9.1 – A draft of the titleblock

Designing a Titleblock

As an architect, designer, or engineer, at some point in your career your manager may ask you to design or modify an existing titleblock. Sounds easy to you, right? As you have discovered, each task in the world of manufacturing involves specified knowledge. Designing a titleblock in this chapter will not only give you some important insight into planning essential drawing data, but by actually creating your own titleblock from scratch you will learn what to expect when viewing another company’s prints. Although drawing formats will vary from one organization to another, described here are sections commonly used in most titleblocks.

Drawing Name

Drawing Name:

The first item of information shown in a titleblock is the “Drawing Name,” which will be present on every print. In the field of architecture, names will likely resemble *First Floor Plan* or *Foundation Plan*. In mechanical engineering, the names can have unusual titles, like *Screw, Hex Hd 1/4-20 – 2 LG* or *Bracket, Steel Mounting*. The first word of the drawing identifier matches a common list of descriptions so the organization’s drawing database can be sorted easily by their categories, such as *Screw* or *Bracket*.

Project

Project:

The project description is another very important section of a titleblock. Again, in the field of architecture, the project identification might be something like *James Street Steel Bridge*. In mechanical engineering, the project can be the final product/assembly to which the drawing is associated, like *403/404/406 Vertical Motor Mount Assembly*.

Drawn By and Date Drawn

Drawn By:	Date Drawn:
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A titleblock should also contain a section describing who created the drawing, and when the created it. In many cases, the person who started and ended the drawing would type either their name or sign the drawing in the “Drawn By” section of the titleblock. This will depend on the particular company’s protocol for releasing drawings to the manufacturing shop or construction site. When a person does not finish his/her initial drawing attempt and another CAD drafter or designer takes over the project, the individual that completes the entire drawing is considered the drawer. When another individual adds or removes any entities to or from the original drawing, this does not entitle that person to take credit for the design and replace the drawer’s name. The addition or subtraction would be considered a revision and would be added to the drawing’s revision block, along with the documentation in a file or database explaining the change. When a drawing name is changed, the industry in which you will be working can consider your attempt to take credit for another’s work as plagiarism. Knowing who exactly is responsible for the drawing is important for patent filing and investigations due to an accident or product failure.

Instead of just typing your name in the drawing, you may want to have an electronic signature in the Drawn By block. This makes the document much more authentic because signatures hold more authenticity than a set of initials or a typed name.

For the “date drawn” section of the titleblock, always put the date the drawing was started. Often design times are somewhat prolonged in duration, so the initial drawer will be modifying the entities in the CAD drawing while other elements of the project are coming together. A project manager must check and approve each print before it can be released to another department or organization. You can use the date of checking or approval to get an idea of when the drawing was finished. You will discover over time how significant the drawing start date will become. In a project documenting hundreds or even thousands of parts and assemblies,

having a matching Date Drawn, Date Checked, and Date Approved is almost worthless for project analysis. Just a few simple logical questions would be unanswerable if these dates are incorrect.

When did the drawing start?

How long did the department take to finish different aspects of the effort?

When did the designer first think of that idea?

Always capture the “Drawn By” and “Date Drawn” information in the first day you create the computer aided design file.

Checked By and Date Checked

Checked By:	Date Checked:
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Most companies, either through time or through experience, have found that quality is the number one issue in the business of architecture and engineering. These companies will enforce a multiple signature rule in their departments, and this will be evident when viewing their titleblock. The “Checked By” signature, typed name, or initial shows that the drawing has been 100% inspected for proper form, fit and function. It shows that someone has checked dimensions and tolerances with corresponding parts and assemblies, reviewed the notes to see if they are exhibiting proper material, finish, coating for corrosion control and appearance, and other special concerns. The checker becomes one the most important individuals in the design process, eliminating silly mistakes that could cause the project to overrun or terminate.

Approved By and Date Approved

Approved By:	Date Approved:
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The project manager, in most cases a highly experienced designer, engineer, or architect, should be the only person able to sign off in the “Approved By” and “Date Approved” blocks for release of the drawing. The job supervisor has to have the knowledge to control the entire content in the package of blueprints but may not check every single item, because the drawer and checker verify every detail in the creation of the CAD file. Typically, the project director will have multiple reviews where his/her team and other specialists sort through the most important details to examine significant portions of the design. The project manager can have reports on file showing calculations and various approvals from other engineers and architects.

You will learn many facets of the building trade and design theory throughout your career, but you must realize that the majority of professionals in your field will eventually take on a level of responsibility sometime during their tenure. Therefore, you must take every opportunity to learn the correct method of detailing object lines, dimensioning, noting, and displaying the views in correct orthographic presentation. There are standards in nearly every country outlining the methods for constructing a project. In the end, when the drawings are complete, you may be the individual signing off the package of drawings for release.

**Drawing Number,
Sheet Number
and Revision**

Drawing No.:	Sht.:	Rev.:
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The Drawing Number is a serial descriptor identifying the individual blueprint so that there can be a level of control when discussing, ordering, building or inspecting a part or assembly. Some part numbers are generated from a database that may have existed a decade or even a hundred years before you arrived at the corporation. When your supervisor asks you to check out fifty drawing numbers for the project, you can enter the data list and capture the next fifty numbers available for distribution. This process of blocking out drawing numbers requires listing the number and project. With each completed drawing, go back into the organization’s catalog of numbers and record the proper name, drawer and date drawn in the database. Your company may have additional fields in the catalog database that they will require you to fill out for documentation of the project.

Other companies use a logical numbering system, like *2005-031-002*, which could mean the part was designed in the year 2005, that the print was in the thirty-first project of the year and the second drawing of the project. Many groups apply logical coding system to identify their drawings. You only need to study the company’s drawing number method to learn how to deploy the system.

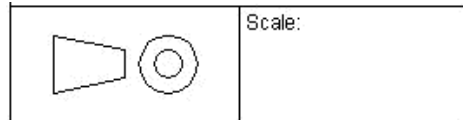
The block containing the Sheet Number may be blank or hold a “1” for the first sheet of the group of drawings holding the same Drawing Number. When an architect completes a package for a residential home with 25 drawings, each print has the same Drawing Number and has a label with its own Sheet Number, which will be 1, 2, 3, or 4, progressing all the way to 25. Some companies will show the text *Sheet 1 of 25*, but this is not a necessary label for every page, since an additional print in the set will cause a CAD operator to change the number 25 to 26 in each label. For ease, you might just add the additional reference to the package’s title print, which is usually the first print, showing the Sheet Number and Name.

**Organization’s
Name and
Mailing Address**



The next block that you will create contains the organization’s name and mailing address. Businesses that are proud of their product will display their company’s identification prominently in the titleblock.

US or European View and Drawing Scale



Finally, your titleblock will display a truncated cone with the orthographic view of either one or two circles. When two circles are showing, the orthographic projections are those familiar in the United States. For countries using the ISO (European) drawing style, the rotation of the part to create the six standard views of Top, Bottom, Right, Left, Front and Back are the exact opposite of the US standard. For machinist and construction specialists, the introduction of two standards in the international market causes problems not just with measurements of English or Metric units but also with how the two systems view orthographic projections.

The drawing scale can be 1:1 for mechanical drawings or $\frac{1}{4}''=1'$ for architectural prints. All computer-aided designs are drawn one to one scale, but in order to fit a large commercial building on that 24" x 36" architectural "D" size print requires a drawing scale.

Drawing a Titleblock

Now that you know some technical details concerning typical content in a valid titleblock, you are ready to create your own titleblock like the one shown in Figure 9.2. You can put your own name, address and contact number in the organization name and address block instead of the World Class CAD information. You can see the reference dimensions, so you can quickly lay out the titleblock. The block labels are $\frac{1}{16}''$ high, bottom-left justified text and are $\frac{1}{32}''$ from the left line and $\frac{3}{32}''$ from the top line. The company name and address use bottom-center justified text and you can design your logo and address text to fit nicely in the 2-inch-wide by 1.5-inch-high block.

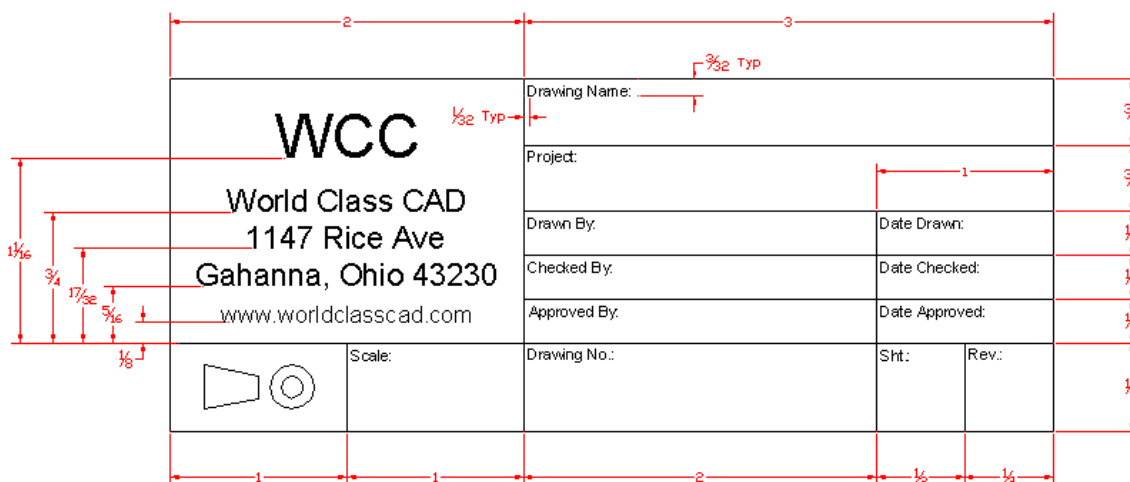


Figure 9.2 - The titleblock with dimensions

Creating a Drawing Using a Template

In the Bracket problem, you will begin the drawing by selecting the template you created in the previous chapter. The “Select template” window will appear after selecting the New icon on the Quick Access toolbar (Figure 9.3). Open the template you just created in the last chapter, Mechanical.dwt.

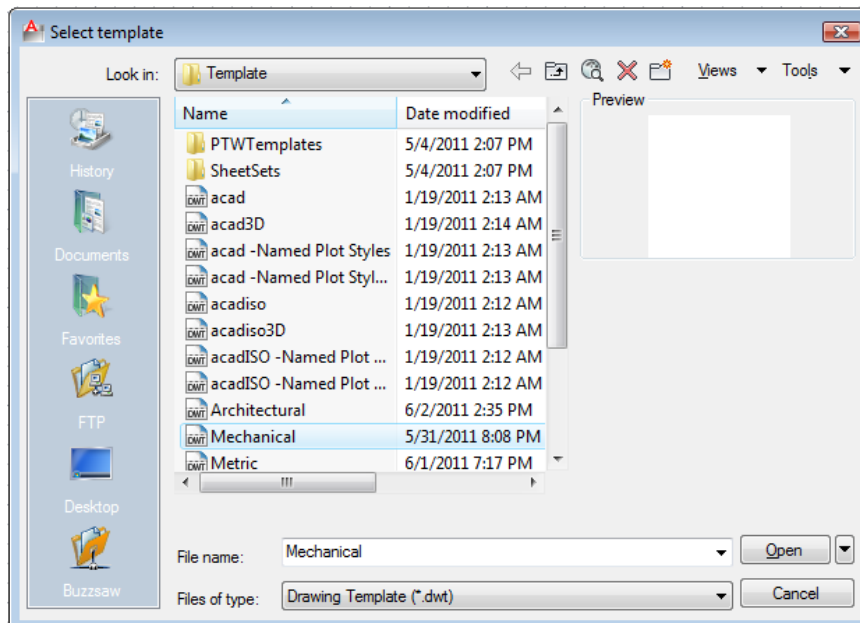


Figure 9.3 - Starting the drawing using the Mechanical template

Drawing the Titleblock Using the Line, Offset and Trim Tools

In the new drawing and on layer 0, you need to draw a 5-inch-wide by 2-inch-tall rectangle using the Line tool on the Draw panel. Offset the horizontal and vertical lines using the Offset tool on the Modify panel, referencing the dimensions that you can see in Figure 9.2 to make the table you see in Figure 9.4.



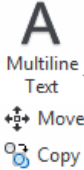
Figure 9.4 –A rectangle drawn with offsetting lines

Next, select the Trim tool on the Modify panel and hit ENTER to make every line a cutting line. Trim away all the lines so that your titleblock looks like the table in Figure 9.5. The next step in the process is to place small labels in each block describing the content.

Figure 9.5 – The titleblock after trimming

Inserting the Titleblock Labels Using the Mtext, Move, Copy and Edit Text Tools

Select the Multiline Text tool on the Text panel under the Annotate tab and pick the intersection Osnap in the top left corner of the desired box when prompted at the command line to select the first corner of the text window as shown in Figure 9.7. For the second point, select a couple inches to the right and above. The Text tab will appear along with a text box. Select the Justification menu from the Paragraph panel and click Bottom Left to align the text on the bottom left of the text box. Change the text height from 0.125 to 0.0625 and type “Drawing Name:” in the text field. Click the Close Text Editor button in the Close panel to place the label.



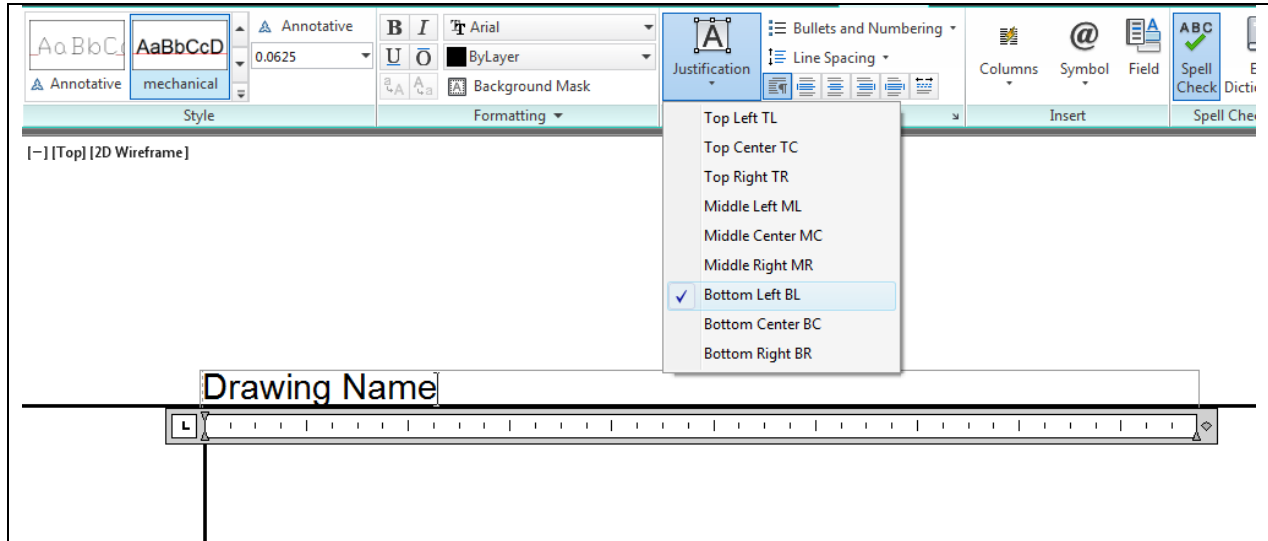


Figure 9.6 – Placing the first text label

You will need to move the text 0.03125 to the right and 0.09375 down. You can do this by selecting the Move tool on the Modify panel. Pick the text “Drawing Name:” and hit Enter to advance to the second half of the Move command. At the prompt, “specify base point or displacement,” select anywhere on the display screen. This is the first time you will use a relative Move command when drawing an entity, so at the “second point of displacement,” type “0.03125,-0.09375” and hit ENTER. The text will appear 0.03125 to the right and 0.09375 down relative to the first position. This is a very powerful type of movement technique (Figure 9.8).

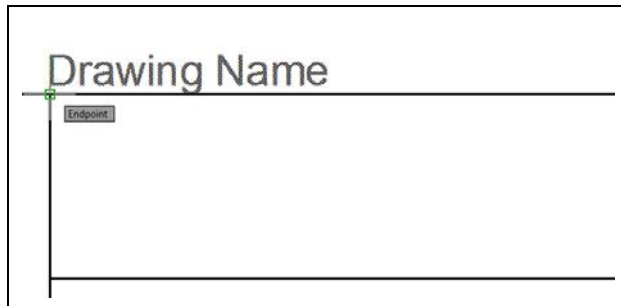


Figure 9.7 – Selecting the base point

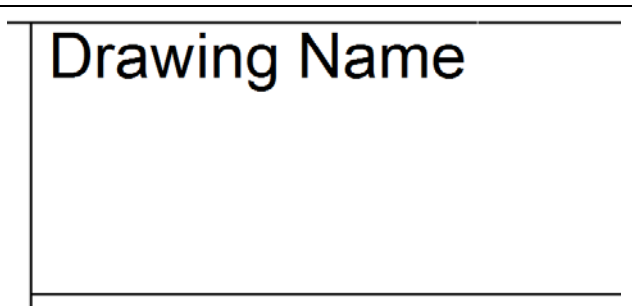


Figure 9.8 – The moved label

To make another label, just copy and paste the first label, using the top left corner Osnap point in each field as the base and displacement points. Select the Copy tool on the Modify panel and select “Drawing Name:” and hit ENTER. At the prompt “specify base point or displacement,” select the same endpoint Osnap you selected in Figure 9.7, the top left corner of the box. At the “second point of displacement,” select the endpoint Osnap shown in Figure 9.9: the top left corner of the new box. The new copy of the label will appear below the second line.

To change the text “Drawing Name:” to “Project,” double-click the text and the Multiline Text tab will appear along with a text box. Replace the old label with the new and close the Text Editor to make the changes (Figure 9.10).

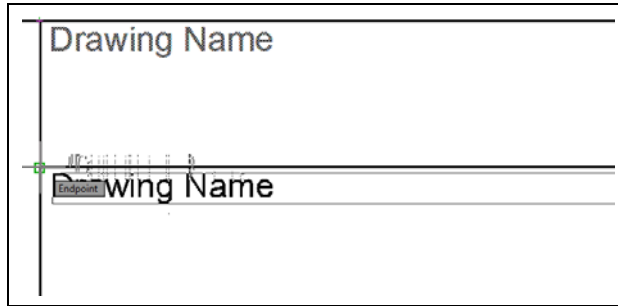


Figure 9.9 – Copying the label

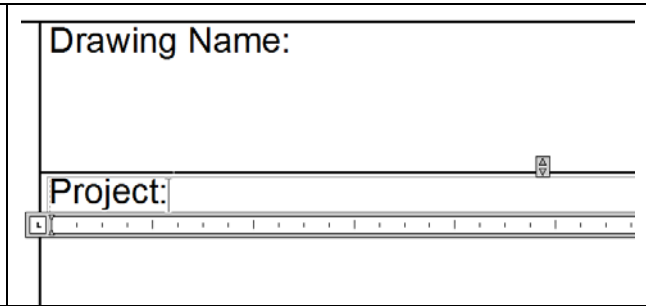


Figure 9.10 – Changing the label

Continue to place text throughout the titleblock following the example in this chapter and eventually every block will contain a label. Use the Circle and Line tools to draw the Drawing View in the bottom left-hand section. You can make a custom Organization Name and Mailing Address if you wish.

Saving your Titleblock File

To move the titleblock to the drawing origin of 0,0 on the x and y axis, select the Move tool on the Modify panel and select all the entities, or type “all” and hit ENTER. At the prompt, “specify base point or displacement,” select the lower right hand corner of the titleblock, which will become the titleblock’s insertion point into another drawing. For the “second point of displacement,” type #0,0 and ENTER. The titleblock will move to the new origin point.

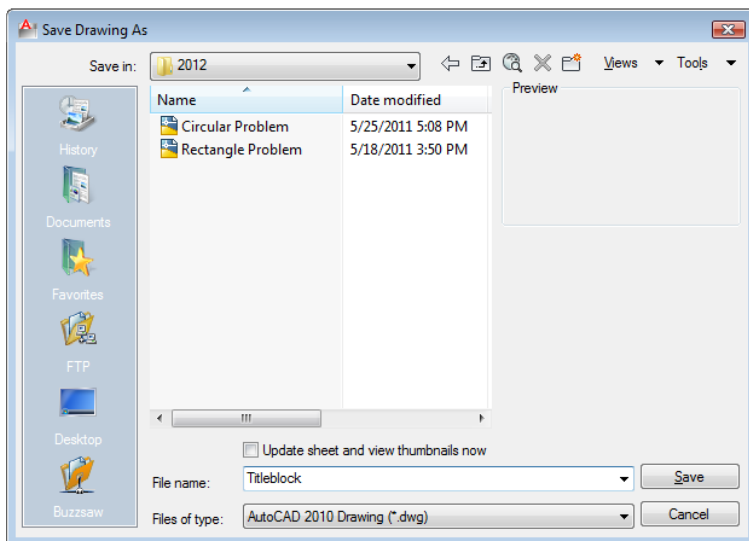


Figure 9.11 – Saving the titleblock

To save the titleblock, select the Save tool on the Standard toolbar. The Save Drawing As window will appear in your graphical display. At the File Name textbox, type “Titleblock” and click the Save button to save the drawing (Figure 9.11).

Standard Architectural and Engineering Paper Sizes

In the architecture and engineering industries, there are two types of paper standards: the one based on the 8.5” x 11” paper ratio and another based on a 9” x 12” paper ratio. If you take a standard letter size piece of paper from a laser or ink jet printer and lay the paper sideways, this would be the mechanical engineering “A” size standard. You would have to order a 9 x 12 single sheet of paper to have the initial building block of the architectural “A” Size. By adding the two pieces of “A” size paper and connecting the longest sides, you would be making “B” sheets. Continue this procedure to create the “C”, “D”, and “E” paper for output of your computer aided design product.

Standard Paper Sizes				
Drawing Letter	ANSI (Mechanical)		Architectural	
	Width	Height	Width	Height
A	11	8.5	12	9
B	17	11	18	12
C	22	17	24	18
D	34	22	36	24
E	44	34	48	36

Figure 9.12 – Standard architectural and engineering paper sizes

The table shown in Figure 9.12 gives both the Architectural and Mechanical sizes. The customary dimensions for metric drawings have their own standard.

Creating an A Size Border

Open a new drawing using the Mechanical template and draw a rectangle that is 11 inches along the x-axis and 8.5 inches along the y-axis using the Polyline tool on the Draw toolbar and starting at the origin (0,0) but drawing the rectangle up and to the left of the starting point. Offset the polyline 0.25 to the inside. Erase the outside polyline to show the border of the mechanical “A” size drawing remaining.



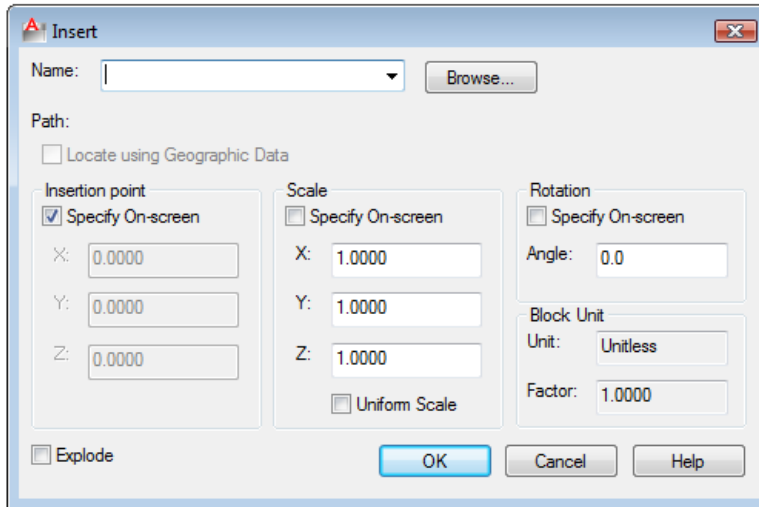


Figure 9.13 – The Insert Window

To insert the Titleblock into the drawing border, select the Insert tool on the Block panel under the Insert tab. The Insert window will appear in the graphical display as shown in Figure 9.13. Select the Browse button and the Select Drawing File window will appear in the graphical display. Select the Titleblock drawing file (Figure 9.14), and then pick the Open button to return to the Insert window. Select the OK button and insert the Titleblock in the drawing on the lower right corner of the border as shown in Figure 9.15.



Insert

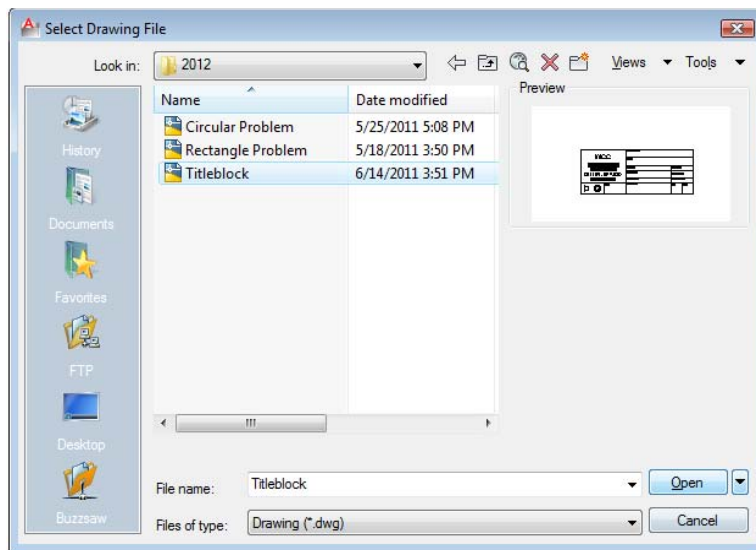


Figure 9.14 – Inserting the titleblock into an A size drawing

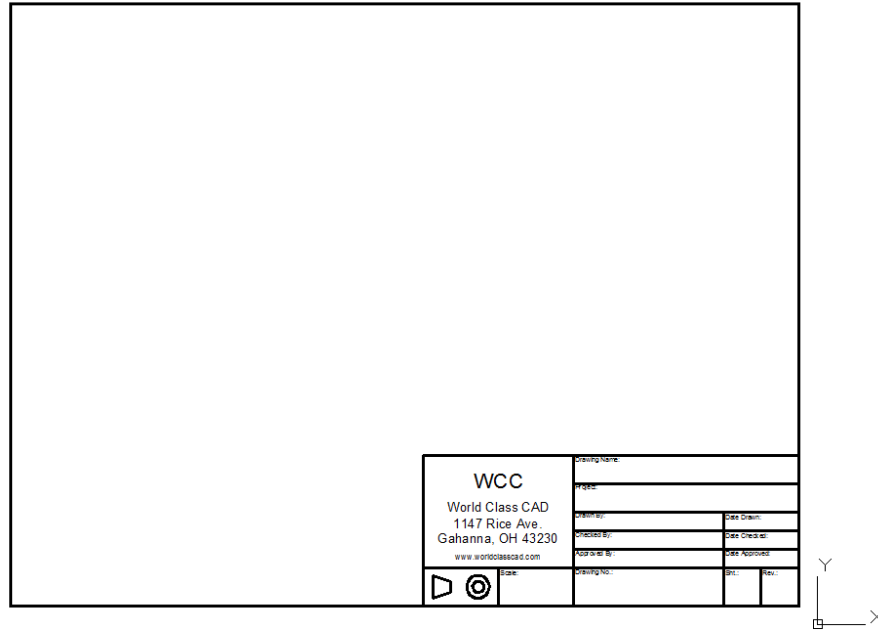


Figure 9.15 – An A size border

Saving the A Size Border

To save the A size border, select the Save tool on the Standard toolbar. The Save Drawing As window will appear in your graphical display. In the File Name textbox, type “A Size Border” and click the Save button to save the drawing (Figure 9.11).

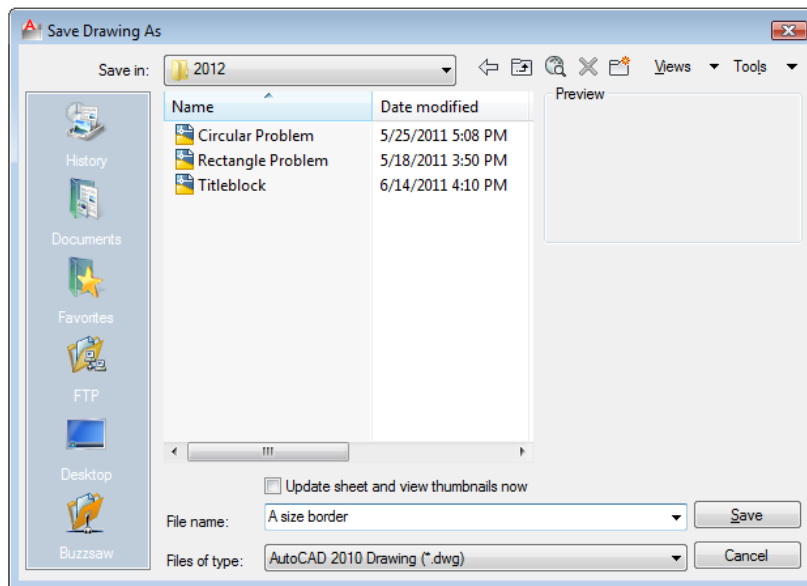


Figure 9.16 – Saving the A size border

Creating a B Size Border

Open a new drawing using the Mechanical template and draw a rectangle using the Polyline tool on the Draw panel starting at 0,0 that is 17 inches along the x axis and 11 inches along the y axis, but to the left of the origin. Offset the polyline 0.50 to the inside. Erase the outside polyline to leave the border of the mechanical “B” size drawing remaining. To insert the Titleblock into the drawing border, select the Insert tool on the Block panel under the Insert tab. In the Insert window, select the Browse button and the Select Drawing File window will appear in the graphical display. Select the Titleblock drawing and then pick the Open button to return to the Insert Window. Select the OK button and insert the Titleblock in the drawing on the lower right corner of the border as shown in Figure 9.17.

To save the B size border, select the Save tool on the Quick Access toolbar. The Save Drawing As window will appear in your graphical display. In the File Name textbox, type “B Size Border” and hit the Save button to save the drawing.

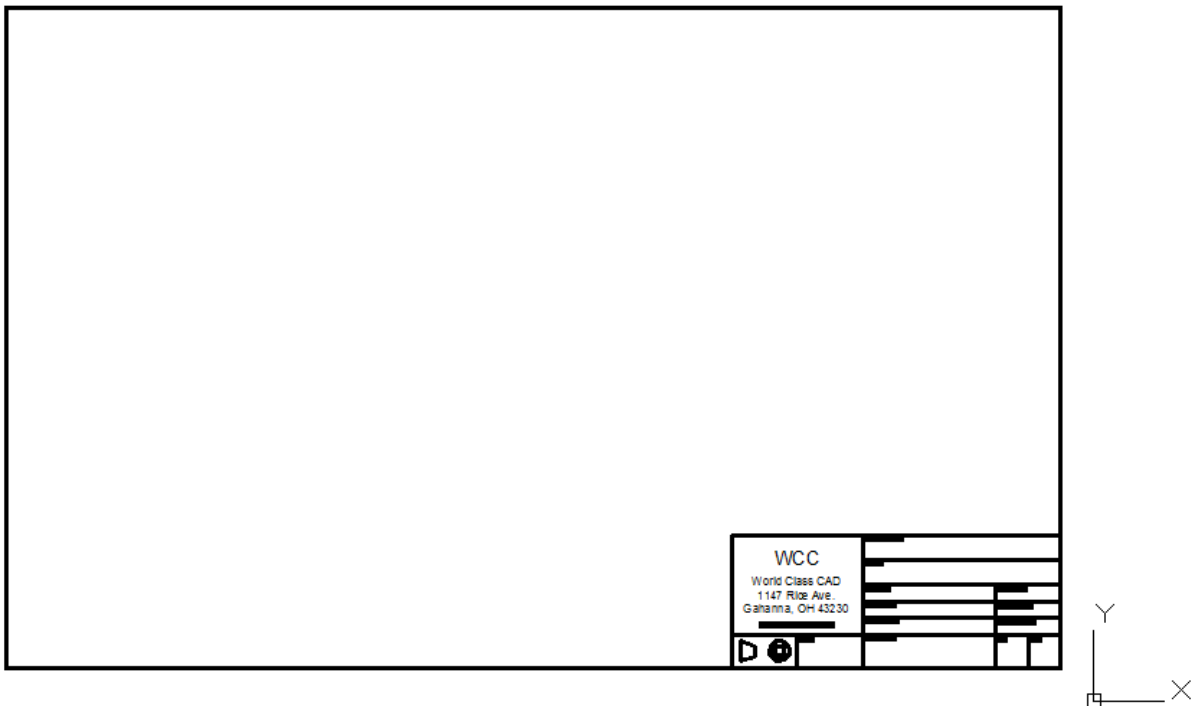


Figure 9.17 – Creating a B size border

Creating a C Size Border

Open a new drawing using the Mechanical template and draw a rectangle using the Polyline tool on the Draw panel starting at 0,0 that is 22 inches along the x axis and 17 inches along the y axis, but to the left of the origin. Offset the polyline 0.50 to the inside. Erase the outside polyline to leave the border of the mechanical “B” size drawing remaining. To insert the Titleblock into the drawing border, select the Insert tool on the Block panel under the Insert tab. In the Insert window, select the Browse button and the Select Drawing File window will appear in the graphical display. Select the Titleblock drawing and then pick the Open button to return to the Insert Window. Select the OK button and insert the Titleblock in the drawing on the lower right corner of the border as shown in Figure 9.18.

To save the C size border, select the Save tool on the Quick Access toolbar. The Save Drawing As window will appear in your graphical display. In the File Name textbox, type “C Size Border” and hit the Save button to save the drawing.

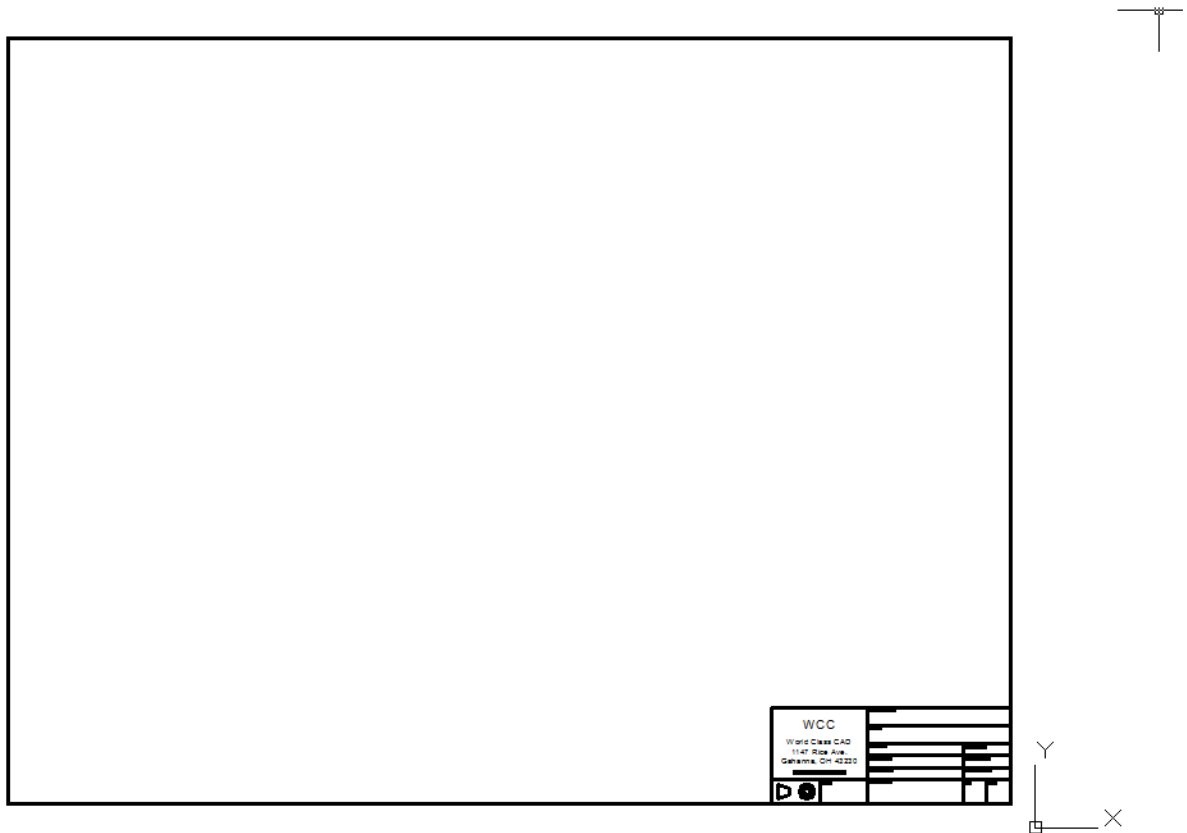


Figure 9.18 – Creating a C size border

Creating a D Size Border

Open a new drawing using the Mechanical template and draw a rectangle using the Polyline tool on the Draw panel starting at 0,0 that is 34 inches along the x axis and 22 inches along the y axis, but to the left of the origin. Offset the polyline 0.50 to the inside. Erase the outside polyline to leave the border of the mechanical “B” size drawing remaining. To insert the Titleblock into the drawing border, select the Insert tool on the Block panel under the Insert tab. In the Insert window, select the Browse button and the Select Drawing File window will appear in the graphical display. Select the Titleblock drawing and then pick the Open button to return to the Insert Window. Select the OK button and insert the Titleblock in the drawing on the lower right corner of the border as shown in Figure 9.19.

To save the D size border, select the Save tool on the Quick Access toolbar. The Save Drawing As window will appear in your graphical display. In the File Name textbox, type “D Size Border” and hit the Save button to save the drawing.

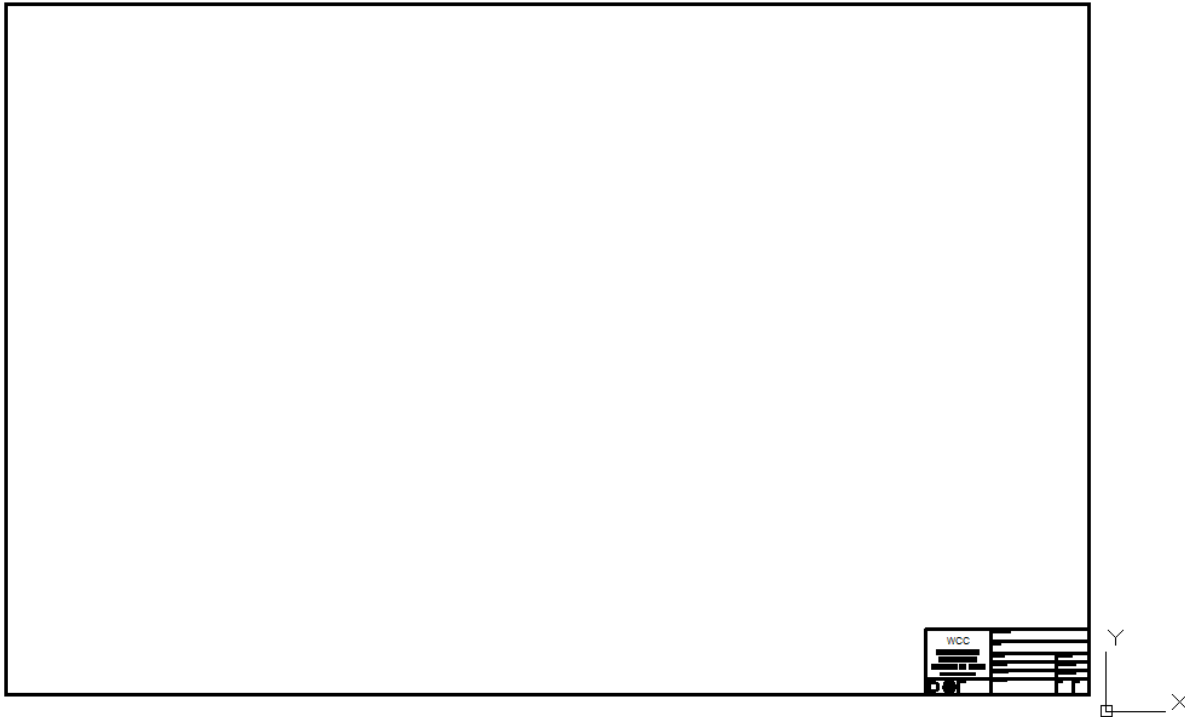


Figure 9.19 – Creating a D size border

You do not need to make the E size sheet because the “E” size border is not a common choice among professionals. Remember that there are at least three different styles of borders present in the field of computer-aided design: Architectural, Mechanical, and Metric, so check with the department manager at any organization for their border size requirements. In addition, the supervisor will probably show you where their standard template and borders are located for your use.

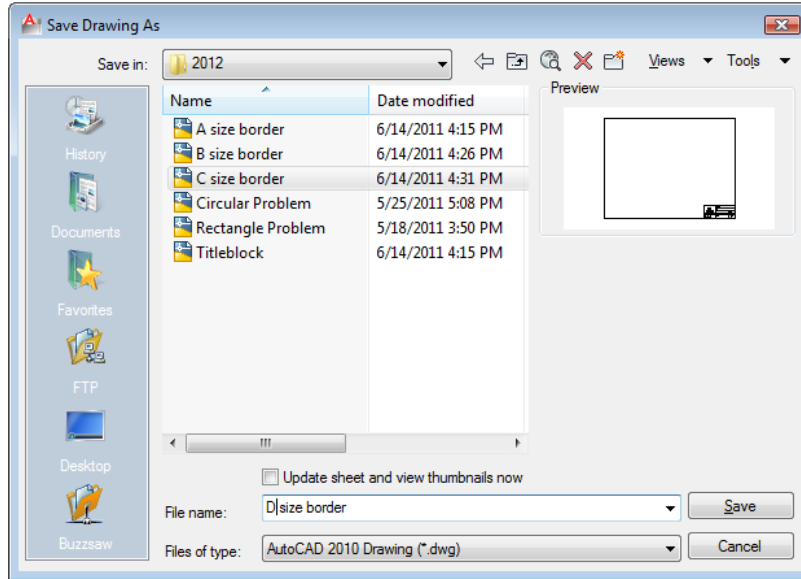


Figure 9.20 – The A, B, C and D size borders

*** World Class CAD Challenge 02-18 * - These tasks are not timed but we do challenge you to test your knowledge for creating borders by making the Architectural A through D borders to maintain your World Class status.**