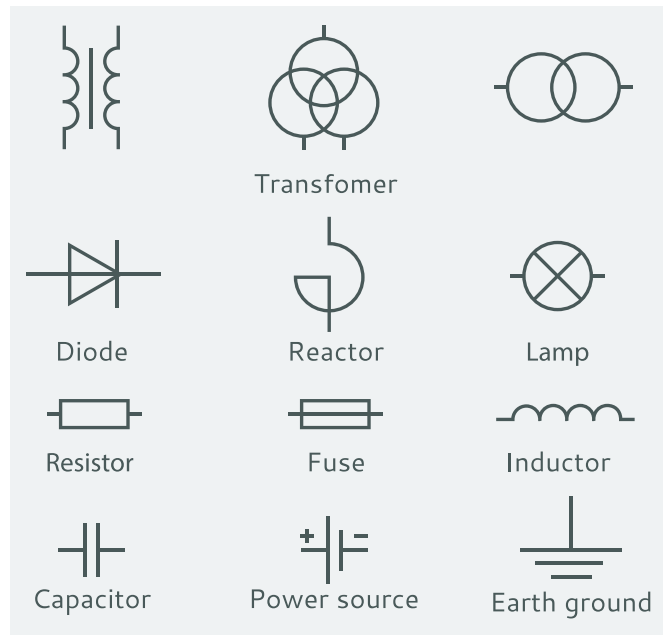


Blocks: Creation

AutoCAD has many types of symbols: this lesson focuses on block symbols. A block is a collection of geometric objects that are united into a single object given an arbitrary name. Blocks are the single most cost-effective tool in AutoCAD. Blocks can be realistic looking representations of objects or symbols that represent objects. Once created, these electrical blocks can be inserted into and sized in any other drawing.



Objective:



Create blocks and wblocks.

Key Terms:



attributes
base point
block

browse for drawing file
window
design center

reference
tool palette
wblock

How to Create Blocks and Wblocks

BLOCKS

A **block** is a collection of geometric objects that are united into a single object given an arbitrary name. Blocks can be static or you can create blocks with dynamic properties. A dynamic block has attached attribute properties. A block resides within the drawing the CAD operator/drafter created the block. Blocks are one of the most important entity types in AutoCAD. They are used in every type of drawing. If the CAD operator/drafter is not using blocks, one of the most powerful tools is setting on the shelf unused. Once a block is created, it can be inserted into a drawing over and over. This saves time and helps with drawing consis-

tency. Many organizations set up their own blocks so the different CAD operators/drafters avoid confusion. Geometry that will be used to create a block should be created on layer zero. This prevents the CAD operator/drafter from bringing in unwanted layers with the block.

References

A block used in a drawing is called a **reference**. All blocks in a drawing reference back to the original block. This helps the drawing file size stay smaller. If you modify a block all the references change automatically. An example of referencing would be a block of a door, after inserting all the door blocks you decide to modify the size of the door. In this case you would modify the door block; then all of its references (inserted door blocks) automatically update or change to match the modified door block.

Attributes

The CAD operator/drafter can keep track of block data using attributes. An **attribute** is information that is created and included with a block definition such as; company name, part number, date of creation, etc. and can be extracted to an excel file or a drawing table.

Design Center

AutoCAD contains a small library of standard blocks that can be used in any drawing called the **design center**. The design center can be accessed using the keyboard shortcut CTRL + 2 or by typing adcenter at the command prompt. Either way will deploy the design center window as shown in FIGURE 1. The design center is a palette like the properties palette or the layer manager palette.

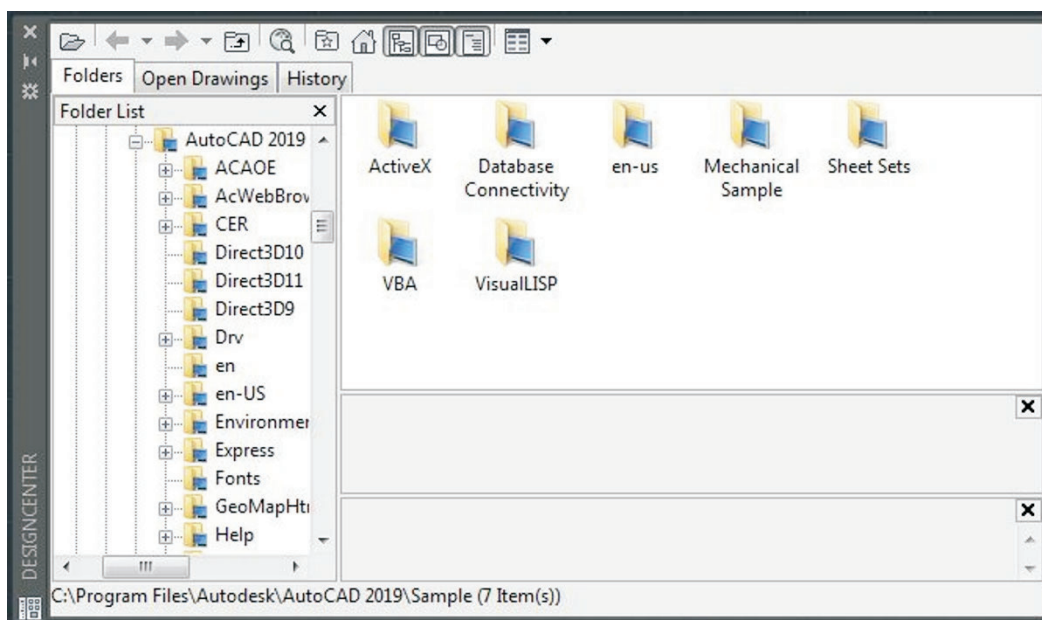


FIGURE 1. AutoCAD's Design Center Window. (AutoCAD screen shot reprinted with the permission of Autodesk, Inc.)

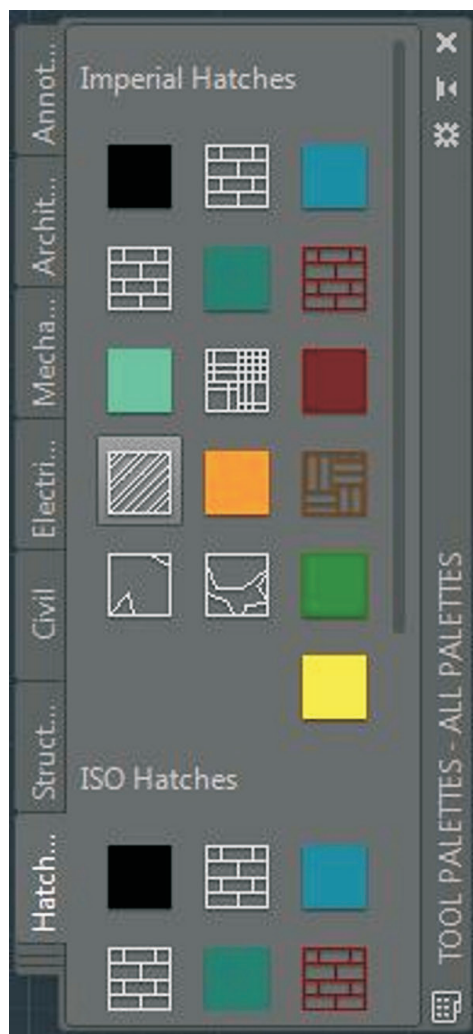


FIGURE 2. AutoCAD's Tool Palette. (AutoCAD screen shot reprinted with the permission of Autodesk, Inc.)

block at the command prompt or go to the insert menu in the home tab of the AutoCAD ribbon and select the create block icon as shown in FIGURE 3. This action opens the 'Block Definition Dialog Box' that steps the user through the process of creating a block as shown in FIGURE 4.

- ◆ Type in the name of the block that will be created. For this exercise, you type in the name 'Test' as shown in FIGURE 5.

Tool Palette

AutoCAD also has many simple and dynamic blocks found in the tool palette. The tool palette can be accessed by CTRL + 3. The **tool palette** is a window that displays 10 tabs that contain different categories of blocks. Categories like; tables, hatching, structures, electrical, etc. as shown in FIGURE 2. The CAD Operator can change or add tabs and control what is on each tab.

Block Creation

To create blocks in AutoCAD, the CAD operator/drafter can begin the process in one of two ways. Type

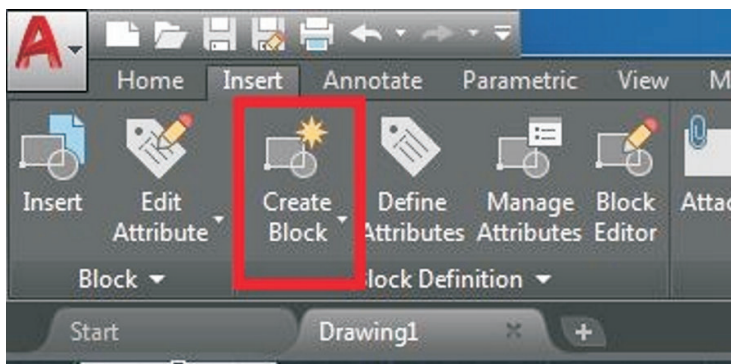


FIGURE 3. AutoCAD's Create Block Icon. (AutoCAD screen shot reprinted with the permission of Autodesk, Inc.)

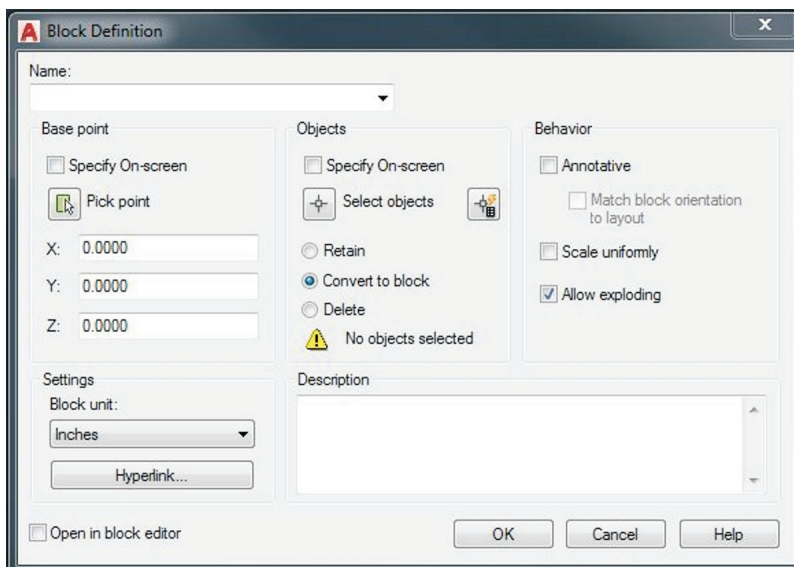


FIGURE 4. AutoCAD's Block Definition Window. (AutoCAD screen shot reprinted with the permission of Autodesk, Inc.)

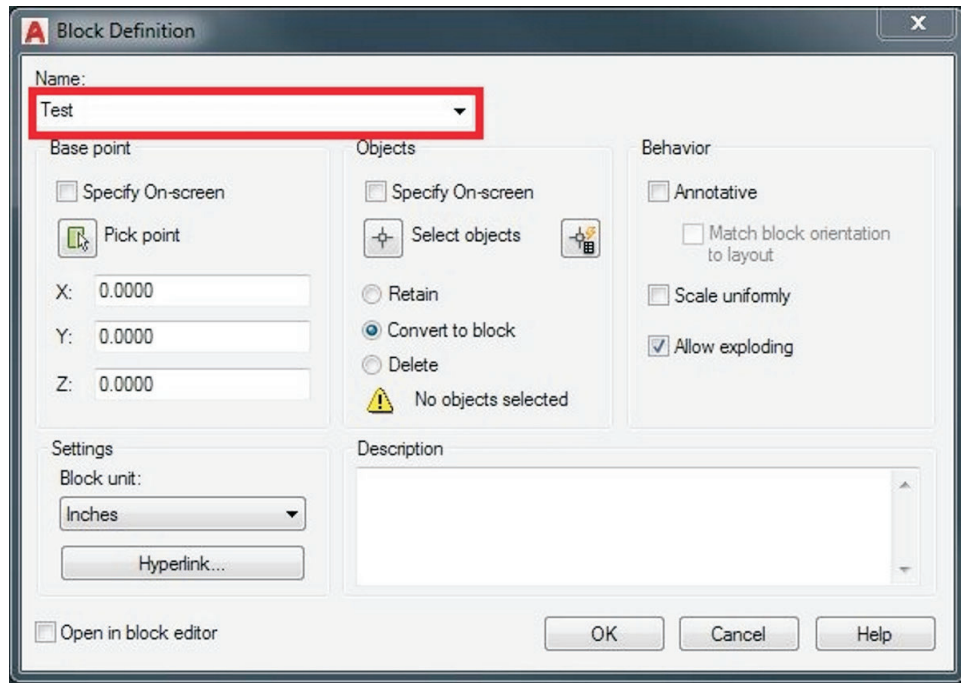


FIGURE 5. AutoCAD's Block Definition Window With 'Test' Name. (AutoCAD screen shot reprinted with the permission of Autodesk, Inc.)

Base Point

The next step is to determine the base point. The **base point** is the coordinate position or the picked point on a geometric object determined to be the origin by the CAD operator/drafter. Either one can be specified by picking the pick point icon or can be entered as an X, Y, and Z coordinate in the base point area of the block definition dialog box. In this case it will be the center of the circle that has a small rectangle in the center as shown in FIGURE 6.

- ◆ The next step is to select the geometry that will be contained in the block. Pick the Select objects icon and then select the geometry on the screen and hit enter as shown

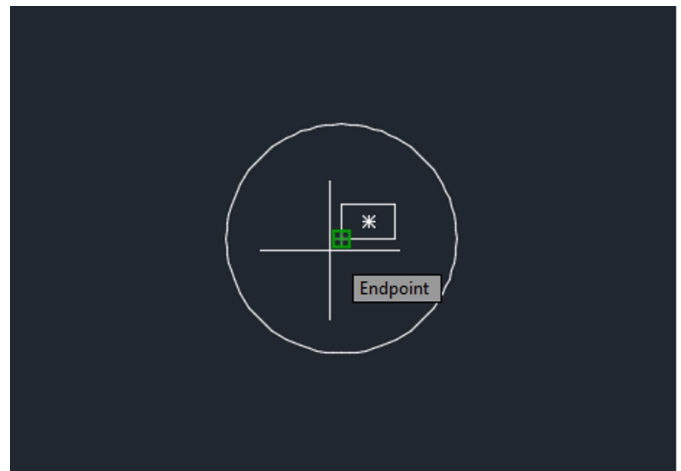
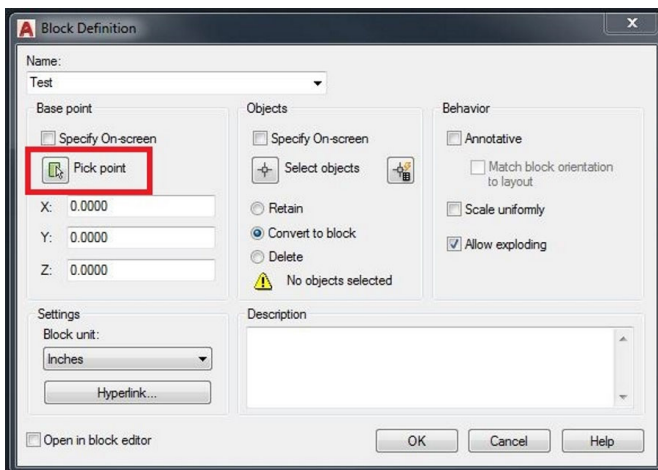


FIGURE 6. AutoCAD's Pick Point and Center of Circle in the Block Definition Dialog Box. (AutoCAD screen shot reprinted with the permission of Autodesk, Inc.)

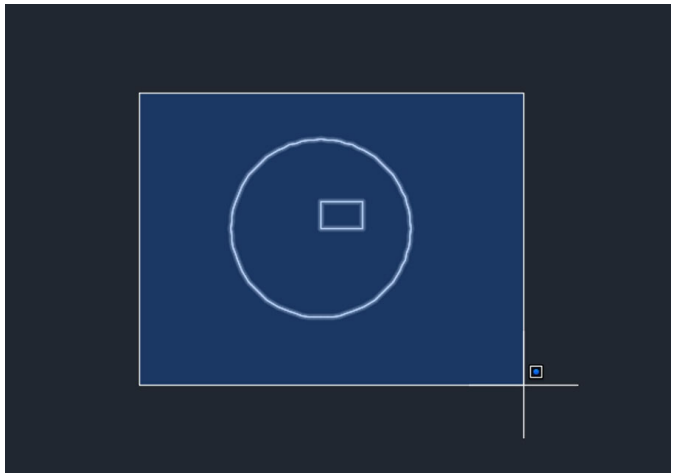
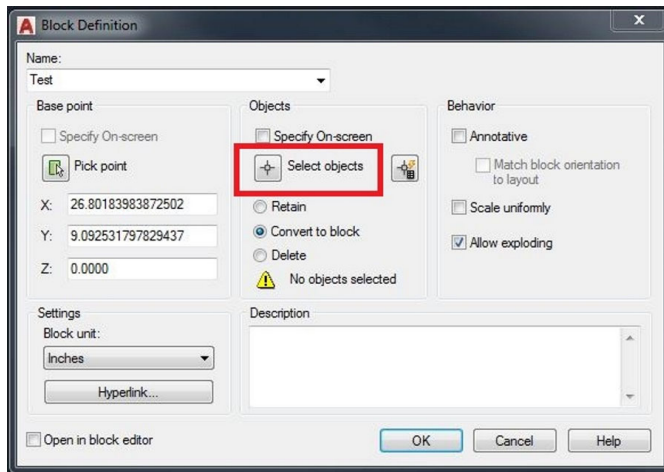


FIGURE 7. AutoCAD's Block Definition Dialog Box With Selecting On-Screen Geometry. (AutoCAD screen shot reprinted with the permission of Autodesk, Inc.)

in FIGURE 7. Retain, convert to block, and delete options can be checked based on the CAD operator/drafter needs. We will leave it in the default mode of convert to block.

- ◆ The behavior category of the block definition dialog box has three categories; annotative, scale uniformly, and explode. Leave all options unchecked except for explode as shown in FIGURE 8. If explode is not checked the block can never be exploded. Also make sure the settings category is set to inches.

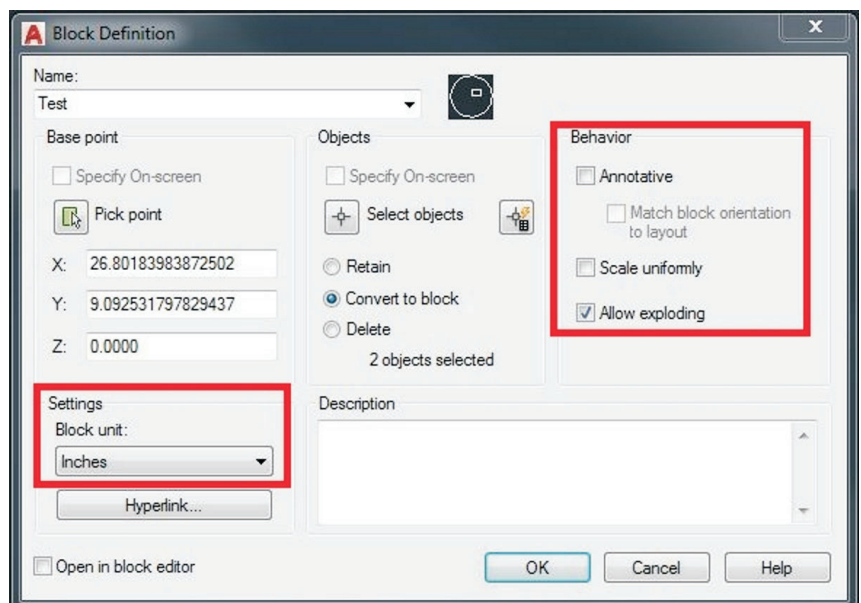


FIGURE 8. AutoCAD's Behavior Options in the Block Definition Dialog Box. (AutoCAD screen shot reprinted with the permission of Autodesk, Inc.)

- ◆ Lastly, give the block a description that alerts the operator/drafter to the details of the block and click the ok button as shown in FIGURE 9. This AutoCAD drawing file now contains one user-defined block called 'Test.'



FURTHER EXPLORATION...

ONLINE CONNECTION: Defining Blocks

CCAD, Inc. has assisted thousands of CAD operators/drafters, engineers, architects, and technicians to use AutoCAD. Their training videos make learning easy. Watch the video, "Defining Blocks, Part 1," at <http://www.ccadinc.com/autocad-tutorials-defining-blocks-part-1.html>.

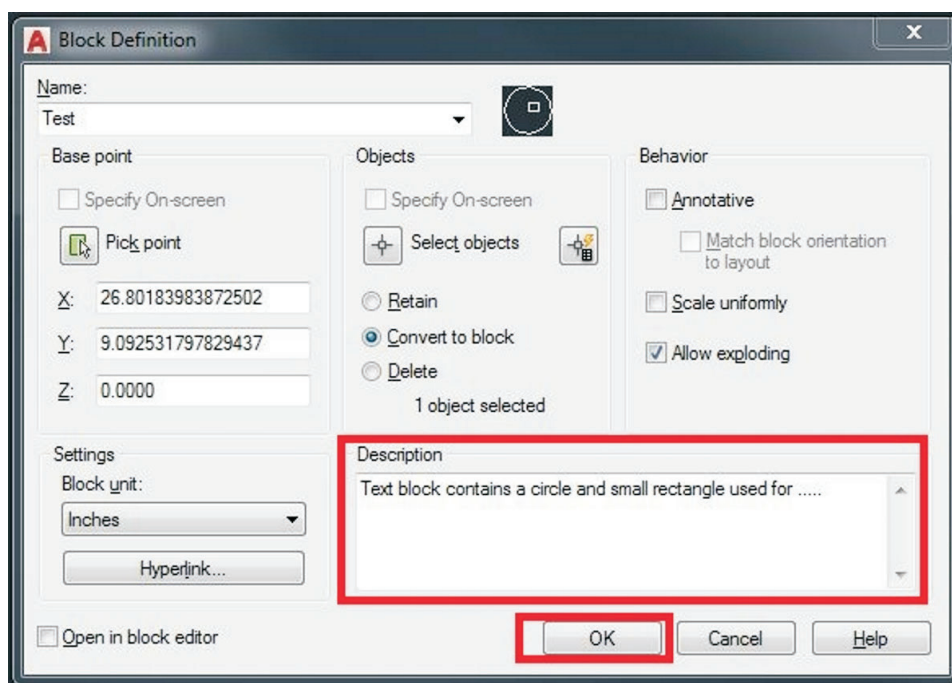


FIGURE 9. AutoCAD's Description Area in the Block Definition Dialog Box. (AutoCAD screen shot reprinted with the permission of Autodesk, Inc.)

CREATE WBLOCKS

A **wblock** (write block) is a collection of geometric objects that are united into a single object given an arbitrary name and saved outside of the current drawing file. Wblocks can be static or you can create wblocks with dynamic properties. Wblocks with dynamic properties are called dynamic blocks. A wblock resides outside the drawing the CAD operator/drafter use to created the block. Geometry that will be used to create a wblock should be created on layer zero. This prevents the CAD operator/drafter from bringing in unwanted layers with the wblock. Once a wblock is created, it can be inserted into a drawing over and over. This saves time and helps with drawing consistency. Many organizations set up their own wblocks so the different CAD operators/drafters avoid confusion. What is the difference between a block and a wblock? A block is saved inside the drawing file it was created in and a wblock is saved outside of the drawing file it was created in.

References

A wblock used in a drawing is called a **reference**. All wblocks in a drawing reference back to the original wblock. This helps the drawing file size stay smaller. If you modify a wblock all the references change automatically. An example of referencing would be a wblock of a door, after inserting all of the door wblocks you decide to modify the size of the door. In this case you would modify the door wblock; then all of its references (inserted door wblocks) automatically update or change to match the modified door wblock.

WBlock Data

The CAD operator/drafter can keep track of wblock data using attributes. Attributes are information such as; company name, part number, date of creation, etc. associated with a wblock and can be extracted to an excel file or a drawing table.

WBlock Creation

To create wblocks in AutoCAD, the CAD operator/drafter can begin the process in one of two ways. Type wblock at the command prompt or go to the insert menu in the home tab of the AutoCAD ribbon and select the create block down arrow icon and select the wblock icon as shown in FIGURE 10.

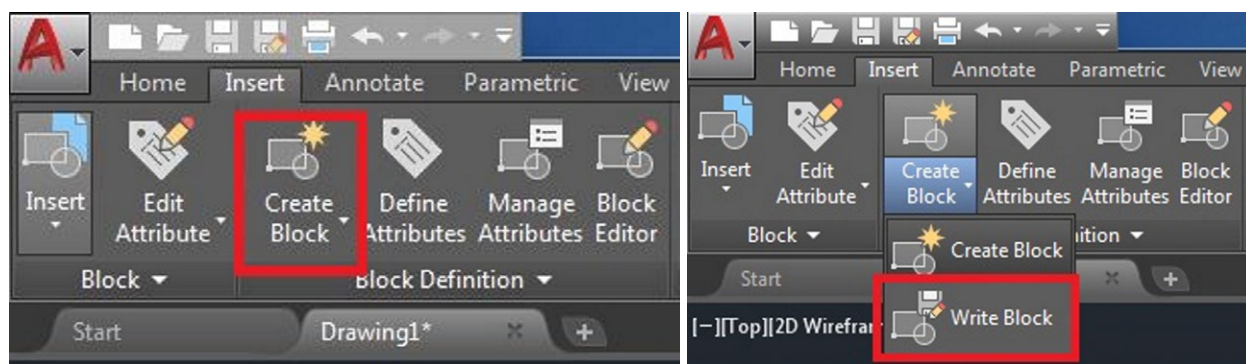


FIGURE 10. AutoCAD's Create Block Down Arrow and Write Block Icons. (AutoCAD screen shot reprinted with the permission of Autodesk, Inc.)

Wblock Creation

The steps to create the wblock are the same as the steps to create a block, except for a few differences. The destination category of the write block dialog box asks the CAD operator/drafter to determine where the wblock will be saved. This is done by clicking on the displays a standard file selection dialog box icon as shown in FIGURE 11. The source area should have the objects option selected.

- ◆ When the icon is picked, it opens the browse for drawing file window as shown in FIGURE 12. The **browse for drawing file window** allows the CAD operator/drafter to pick the location AutoCAD will save the wblock. The CAD operator/

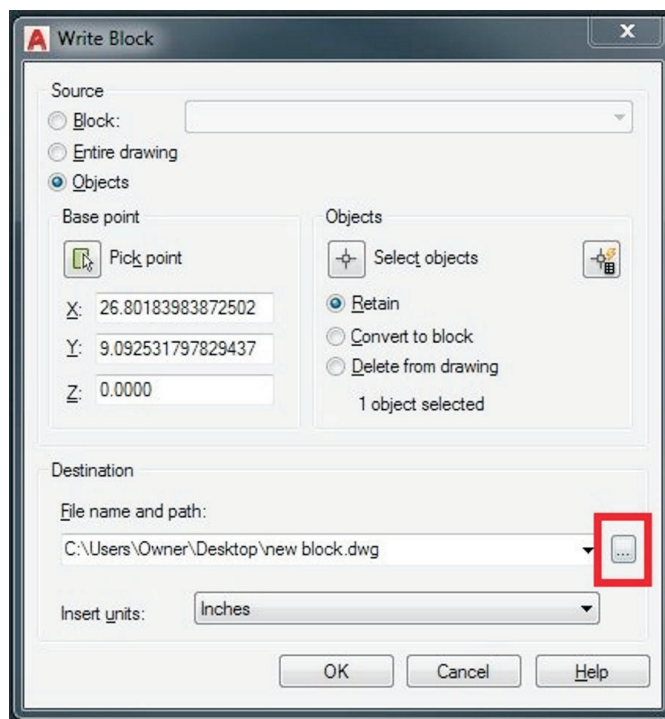


FIGURE 11. AutoCAD's Standard File Selection Dialog Box Icon. (AutoCAD screen shot reprinted with the permission of Autodesk, Inc.)

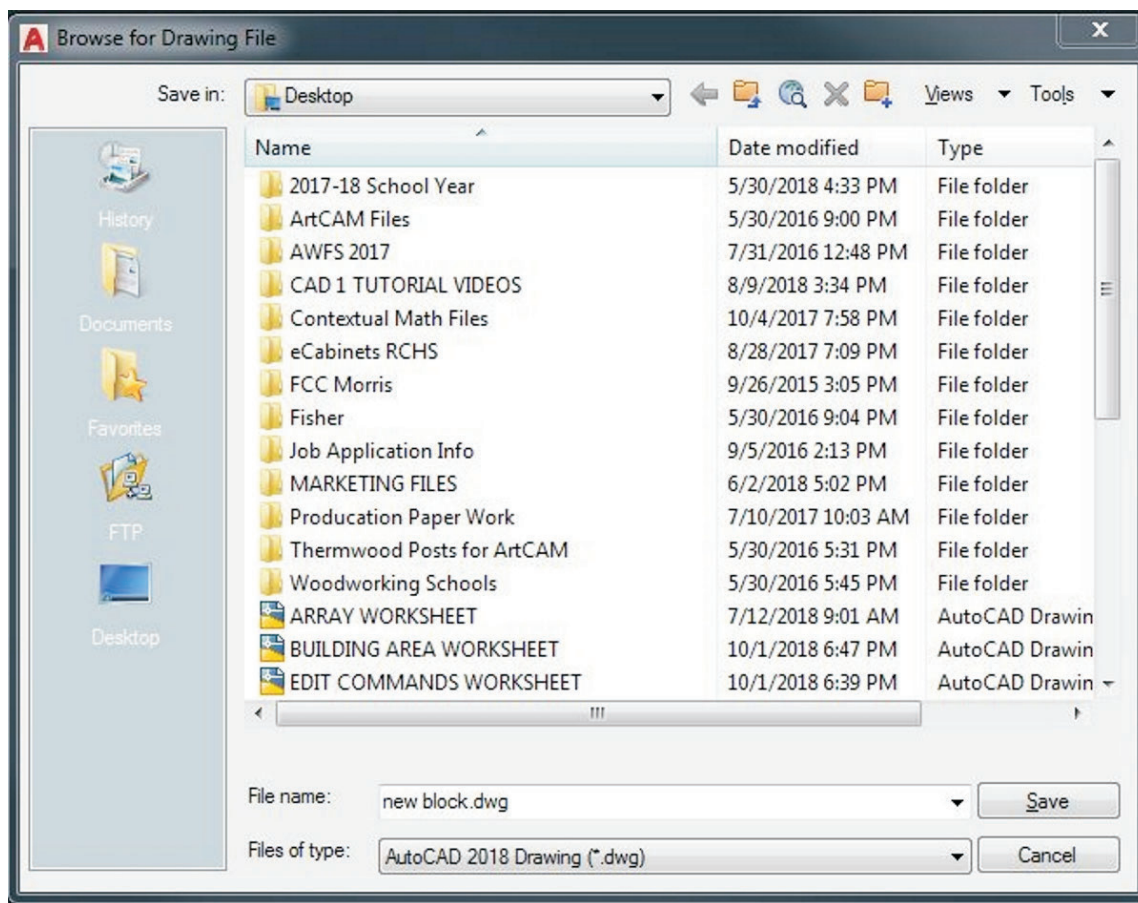


FIGURE 12. AutoCAD's Browse For File Window. (AutoCAD screen shot reprinted with the permission of Autodesk, Inc.)

drafter then selects the location where the wblock will be saved. This would typically be in a predetermined location where all company/organization wblocks are saved. The CAD operator/drafter gives the wblock a name, and then clicks save. The write block dialog box will reappear. Click on the insert units down arrow and select the appropriate units. In our case it is inches. Then click the ok button. Watch the top left area of the AutoCAD screen as the ok button is clicked. AutoCAD will display a small window briefly showing the wblock being created.

Summary:



Creating blocks and wblocks is how CAD operators/drafters save time and money. This also maintains accuracy between drawings and CAD job titles. Amassing a large library of blocks is the most cost effective tool a CAD operator/drafter can create.

Checking Your Knowledge:



1. What is a block called once it is inserted into a drawing?
2. How is a drawing file's size contained?
3. Differentiate between a block and a wblock.
4. What is the purpose of AutoCAD's 'browse for drawing file window'?
5. What is the information attached to a block called?

Expanding Your Knowledge:



Blocks are the most cost effective tool in the AutoCAD toolbox. You can draw something once and save it as a block and then insert it into any and all future drawings that require that block. This is a great time saver. YouTube can be a great resource for AutoCAD tutorials. Go to YouTube and search for "How to Insert Blocks in AutoCAD." You can also set up a free student account with Autodesk. Go to <https://www.autodesk.com/education/free-software/featured> to get a free account and browse the free software for students. Then, go to <https://knowledge.autodesk.com> for additional tutorial videos.

Web Links:



Block Command

<https://knowledge.autodesk.com/support/autocad/learn-explore/caas/CloudHelp/cloudhelp/2018/ENU/AutoCAD-Core/files/GUID-B03434BE-0F68-4E31-BA8D-640EEC1D7FC9-htm.html>

Block Definition Dialog Box

<https://knowledge.autodesk.com/support/autocad/learn-explore/caas/CloudHelp/cloudhelp/2018/ENU/AutoCAD-Core/files/GUID-03B61417-F040-4EB0-AFEA-B229AD303D91-htm.html>

Commands for Basic Blocks

<https://knowledge.autodesk.com/support/autocad/learn-explore/caas/CloudHelp/cloudhelp/2018/ENU/AutoCAD-Core/files/GUID-91EBC702-B874-4400-83E2-B134099B2974-htm.html>