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An Introduction to AutoCAD for Beginners

Layouts

Display one or more scaled views of your design on a standard-size drawing sheet called a layout.

After you finish creating a model at full size, you can switch to a *paper space layout* to create scaled views of the model, and to add notes, labels, and dimensions. You can also specify different linetypes and line widths for display in paper space.

Model Space and Paper Space

As you know, you create the geometry of your model in *model space*.

Model tab
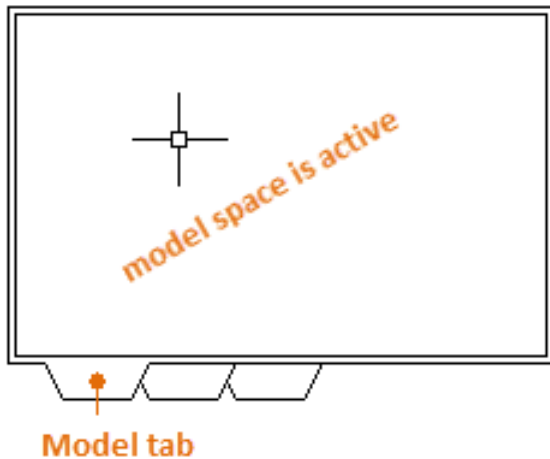
Originally, this was the only space available in AutoCAD. All notes, labels, dimensions, and the drawing border and title block were also created and scaled in the model space.

After *paper space* was introduced, you could click a layout tab to access a space designed specifically for layouts and scaling. In the following illustration, paper space is active. There are currently only two objects in paper space: a drawing border block, and a single *layout viewport*, which displays a view of model space.

block

layout viewport

layout tab
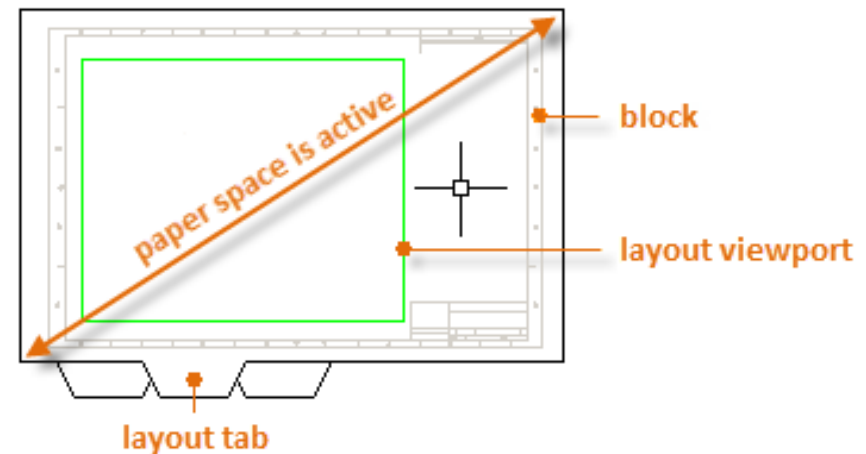
Working with layout viewports is described in more detail later in this topic.

Four Methods for Scaling

There are four different methods in AutoCAD that are used to scale views, notes, labels, and dimensions. Each method has its advantages depending on how the drawing will be used. Here's a brief summary of each of the methods:

→ **The Original Method:** You create geometry, annotate, and print from model space. Dimensions, notes, and labels must all be scaled in reverse. You set the dimension scale to the inverse of the plot scale. With this method, scaling requires a little math. For example, a common scale used in architecture is 1/4" = 1'-0" which is 1:48 scale. If a note is to be printed 1/4" high, then it must be created 48 times as large, or 12" high in model space. The same scale factor also applies to dimensions, and an ARCH D drawing border at that scale is 144 feet long. When the drawing is printed as a D-size sheet, everything scales down to the correct size.

NOTE: Many AutoCAD drawings were created with this method, and many companies still use it. Once everything is set up, the method works well for 2D drawings with single views and inserted details.

→ **The Layout Method:** You create geometry and annotate in model space, and print from the layout. Set the dimension scale to 0 and the dimensions will scale automatically.

→ **The Annotative Method:** You create geometry in model space, create *annotative* dimensions, notes, and labels (using a special annotative style) in model space from the layout, and you print from the layout. Annotative objects display only in layout viewports that share the same scale. The dimension scale is automatically set to 0 and all annotative objects scale automatically.

→ **The Trans-Spatial Method:** You create geometry in model space, create annotations in paper space on a layout with dimension scale set to 1, and you print from the layout. This is arguably the easiest, most direct method, and it is the method of choice for this guide.
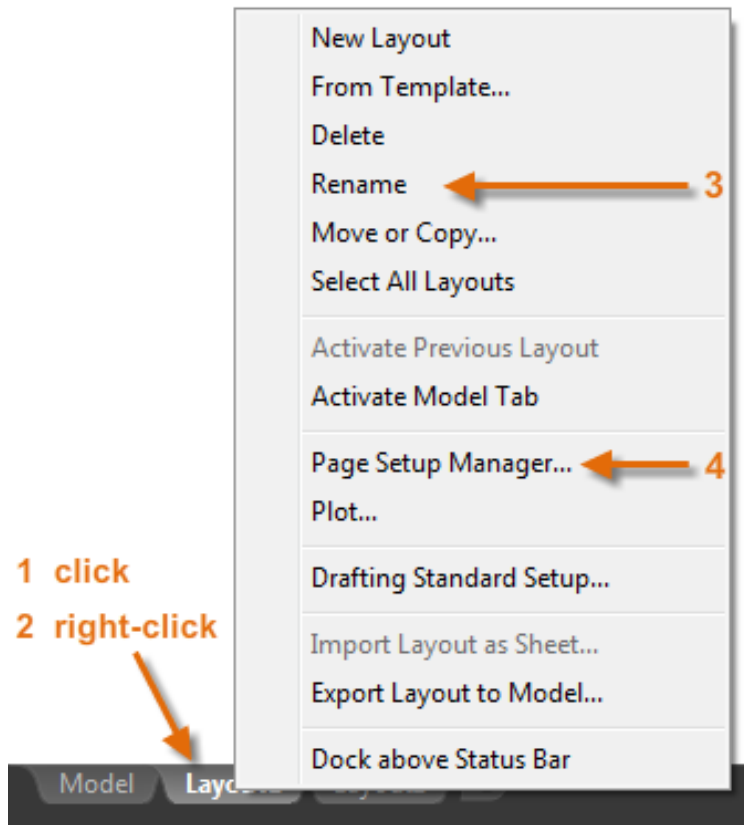
Talk to other AutoCAD users in your discipline about these four methods and why they chose the method that they use.
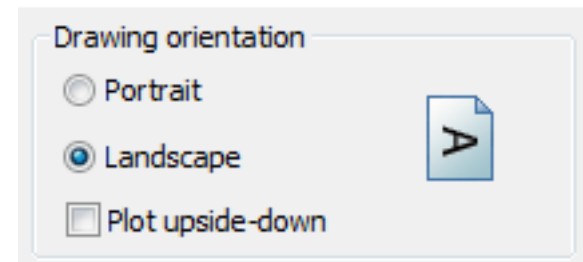
Specifying the Paper Size of a Layout

The first thing you should do when you access a layout tab (1) is right-click the tab (2) and rename it (3) to something more specific than Layout 1. For a D-size layout, ARCH D or ANSI D might be good choices.

Next, open the Page Setup Manager (4) to change the paper size displayed in the layout tab.

Paper size

Letter (8.50 x 11.00 Inches)
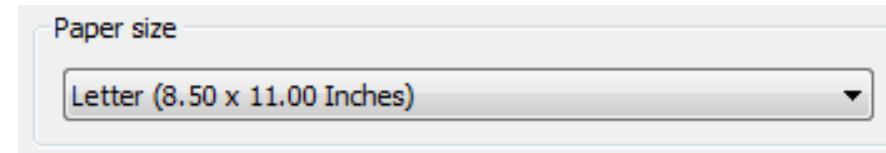
NOTE: You might be wondering why there are two entries in the list for every sheet size. This is because some printers and plotters do not recognize the drawing orientation setting.

New Layout

From Template...

Delete

Rename ← **3**

Move or Copy...

Select All Layouts

Activate Previous Layout

Activate Model Tab

Page Setup Manager... ← **4**

Plot...

Drafting Standard Setup...

Import Layout as Sheet...

Export Layout to Model...

Dock above Status Bar

1 click

2 right-click

Model   Layout

Drawing orientation

○ Portrait

◉ Landscape

☐ Plot upside-down

Layout Viewports

A layout viewport is an object that is created in paper space to display a scaled view of model space. You can think of it as a closed-circuit TV monitor that displays part of model space. In the illustration, model space is active and accessible from within the current layout viewport.
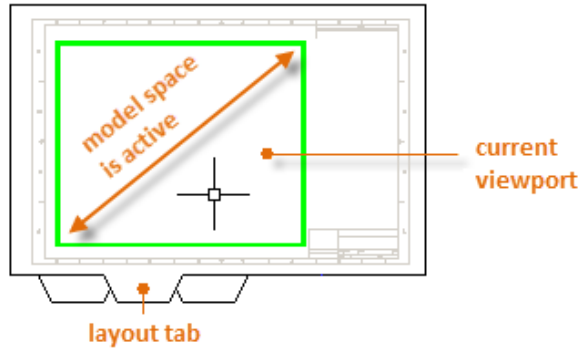
In a layout, when model space is active, you can pan and zoom, and anything else that you could do on the Model tab. For example, let's say that you created a backyard deck design in model space, and now you want to lay out and print your design from a layout tab.
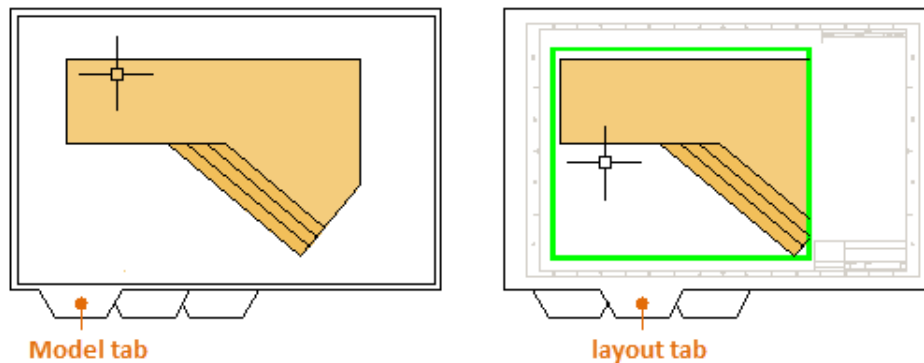
The view in the layout viewport is not yet set to the correct scale.

Important:

You can switch between paper space and model space by double-clicking inside or outside the layout viewport.

*NOTE: You can use the **MVIEW** (make view) command to create additional layout viewports in paper space. With several layout viewports, you can display several views of model space at the same or at different scales.*
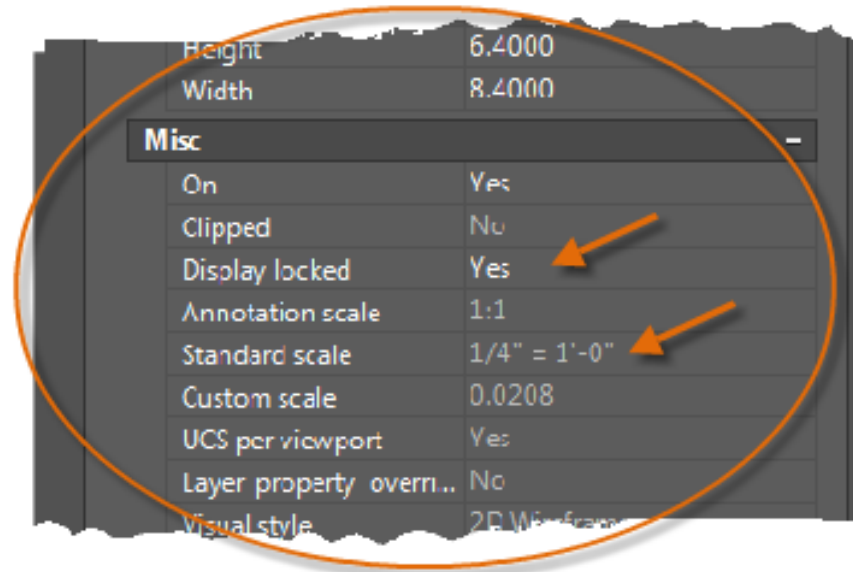
Scaling Views and Trans-Spatial Annotation

Here are the steps to follow if you use the trans-spatial method of annotating your drawing:

1. Click the layout tab. If you started the drawing with your own custom drawing template file, several tasks might already have been completed: the layout might already be set to D-size, and the title block might already have been inserted in the layout.

2. By default, paper space is active, so double-click within the layout viewport to make the model space active. Notice that the edge of the layout viewport becomes thicker as a result of switching to model space.

3. Zoom out and center the model space view by panning. Note that the displayed view will not yet be set to the correct scale.

4. Double-click outside the layout viewport to make paper space active again.

5. Open the Properties palette and then click to select the edge of the layout viewport.
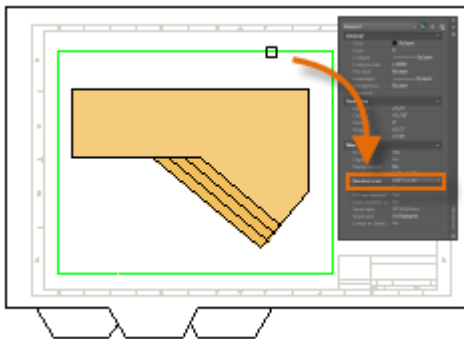
6. In the Properties palette, specify a standard scale of 1/4" = 1'-0" from the drop-down list. This action scales your view of model space precisely to the D-size drawing. You should also set the Display Locked property from No to Yes, which will prevent any unintentional display changes to the view.

NOTE: *By default, the dashes and spaces in a non-continuous linetype appear the same length regardless of the scale of the layout viewport.*

Scaling Views and Trans-Spatial Annotation (continued)

7. Move the layout viewport as needed, and adjust its edges using grips.

8. Create notes, labels, and dimensions directly in paper space. They will automatically appear at the correct size.

9. Turn off the layer on which you created the layout viewport object. This hides the edges of the layout viewport as shown below.
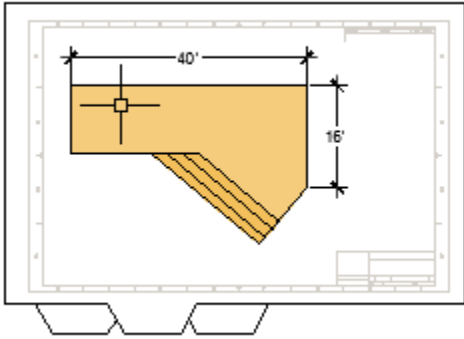

10. Print the drawing to paper or as a DWF or PDF file.

NOTE: After you have finished dimensioning, you can use the EXPORTLAYOUT command to merge everything in model and paper space into the model space of a separate drawing file. This operation creates a drawing file that conforms to the original method of creating the model and all annotations in model space.

Notes and Labels

Create notes, labels, bubbles, and callouts. Save and restore style settings by name.

You can create general notes using the **MTEXT** command (or enter **MT** in the Command window), which stands for *multiline text*. The multiline text tool is available on the Annotation panel.
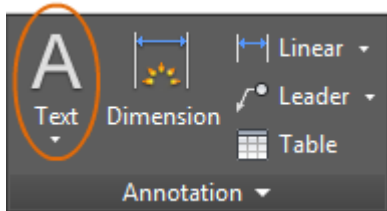
After you start the **MTEXT** command, you are prompted to create a "text box" with two diagonal clicks.
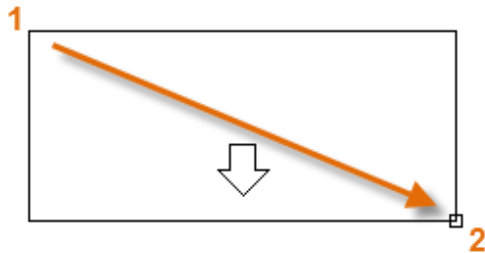
The exact size of the text box is not that important. After you specify the text box, the In-Place Editor is displayed and you can easily change the length and width of the note before, during, or after typing the text.
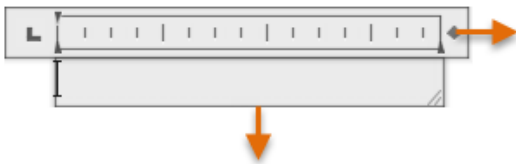
All the usual controls are available in the In-Place Editor, including tabs, indents, and columns. Also notice that when you start the **MTEXT** command, the ribbon temporarily changes, displaying many options such as text styles, columns, spell checking, and so on.

- To exit the text editor after you finish entering the text, click anywhere outside it.

- To edit a note, simply double-click it to open the text editor.
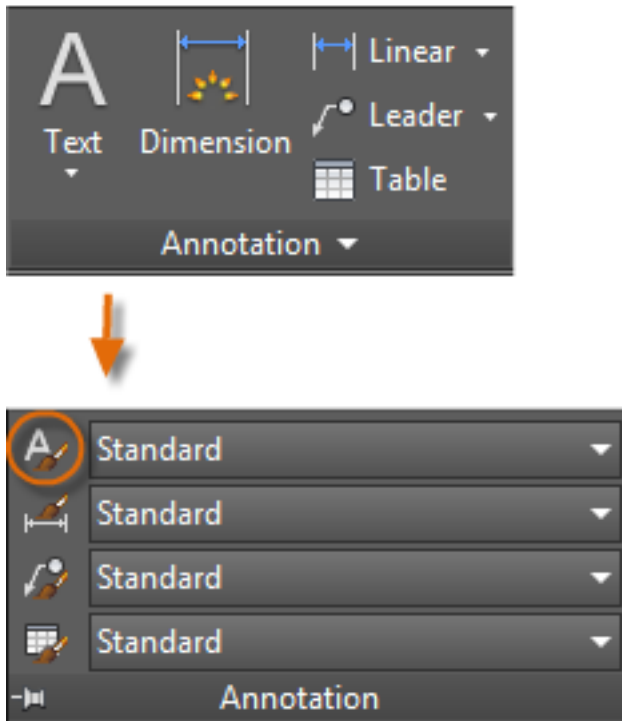
Here's a Tip:

You can use the Properties palette to control the text style used for one or more selected multiline text objects. For example, after selecting five notes that use different styles, click the Style column and choose a style from the list.
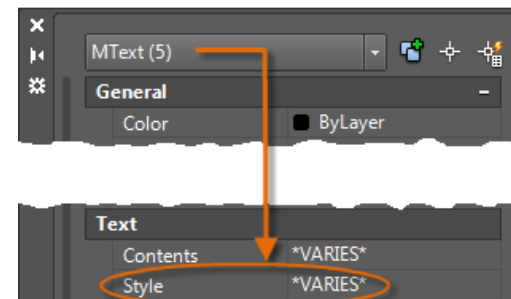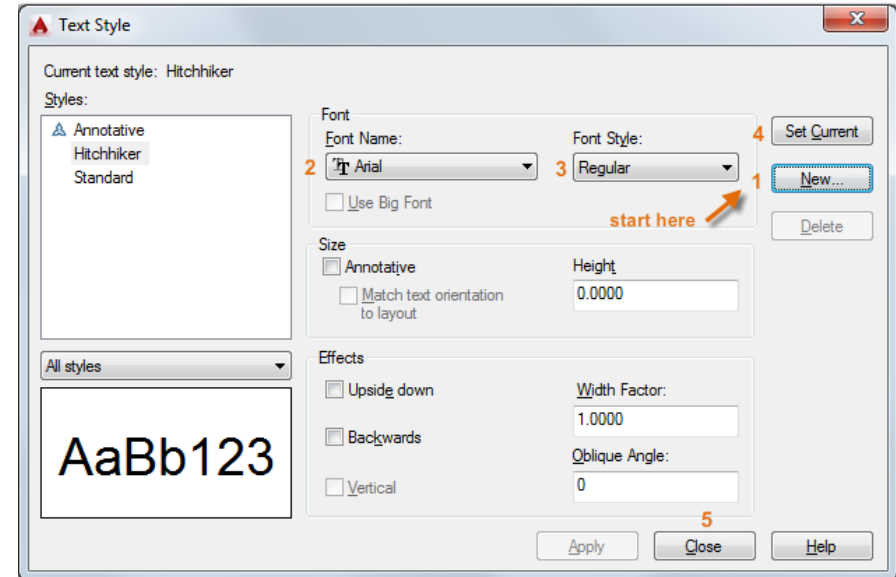
Create a Text Style

As with several other annotation features, multiline text provides a lot of settings. You can save these settings as a *text style* using the **STYLE** command, and then you can access the text styles you've saved by clicking the drop-down arrow on the Annotation panel. The current text style is displayed at the top of the drop-down list.

To create a new text style, click the Text Style control as shown.

When you create a new text style, you will give it a name and then choose a font and a font style. The order in which you click the buttons is shown below:
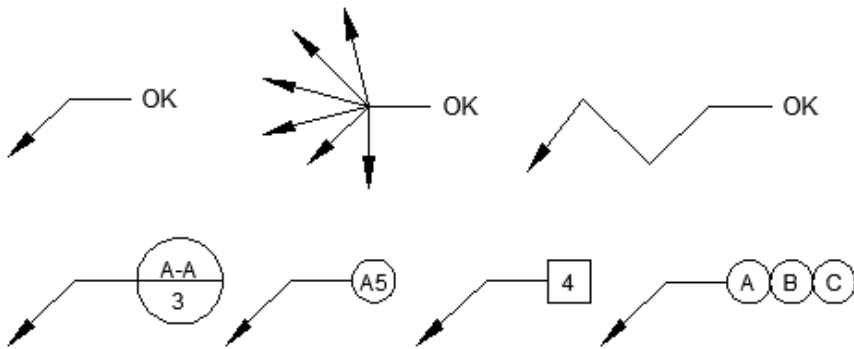
Here's a Tip:

Save any new or changed text styles in your drawing template files. This will save you time by making them available in all new drawings.
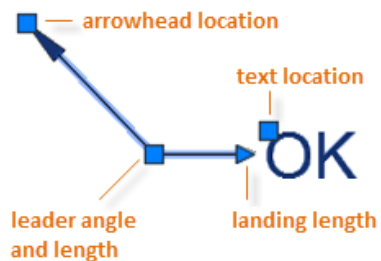
Multileaders

Multileader objects are used to create text with leader lines such as general labels, reference labels, bubbles, and callouts.
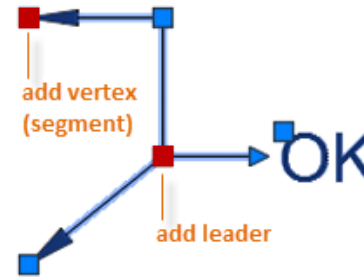

Create a Multileader

To create a multileader, use the **MLEADER** command. Click the Multileader tool in the Annotation panel or enter **MLD** in the Command window. Follow the prompts and options in the Command window. Feel free to experiment.

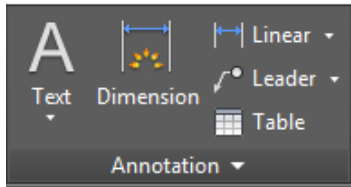After you create a multileader, select it and then modify it by clicking and moving its grips.

Grip menus appear when you hover over arrowhead and leader grips. From these menus, you can add leader segments or additional leaders.
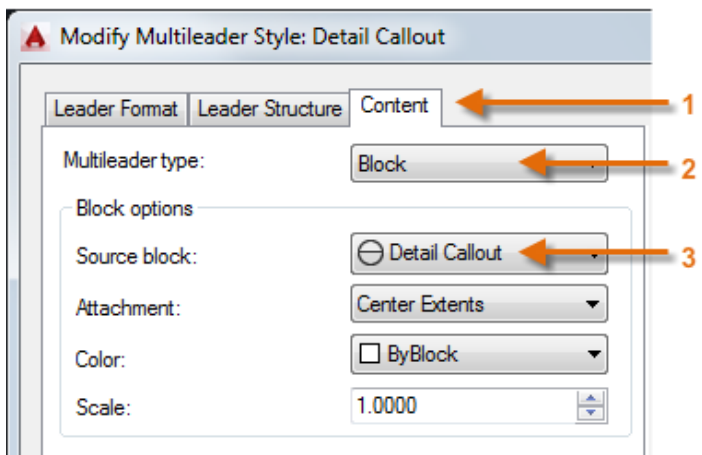

You can edit the text in a multileader by double-clicking it.

Create a Multileader Style

You can create your own multileader styles from the drop-down list in the expanded Annotation panel, or by entering **MLEADERSTYLE** in the Command window.

NOTE: As with text styles, once you create one or more multileader styles, save them in your drawing template files.

For example, to create a "detail callout" style, start the **MLEADERSTYLE** command. In the Multileader Styles Manager, click New and choose a descriptive name for the new multileader style. Click the Content tab, choose Block, and then Detail Callout as shown.

Dimensions

Create several types of dimensions and save dimension settings by name.

Here is an example of several types of dimensions using an architectural dimension style with imperial units.