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Power of the Triad—Effectively Manage Xref and Xref Layer Property Overrides in AutoCAD

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Learning Objectives

- Learn how to manage external references smartly in AutoCAD
- Learn how to quickly fix missing references and do smart configuration
- Learn how to selectively control and manage xref layer property overrides in AutoCAD
- Learn how to quickly visualize xref layer overrides in the Layer Manager and the ability to reset

Description

External reference (xref) is one of the key concepts in AutoCAD. In AutoCAD 2018, we addressed this pain by providing smarter options that help reduce the pain created by broken references—even if you're in a quagmire of missing references, we provide tools that will help you smartly search and fix the broken path. We all love layers—layers are a drafter's best friend—but often the challenge is how to effectively manage xref layer properties in the host drawing and the ability to control the xref layer property overrides without the need of having to change SYSVARs umpteen times. In AutoCAD 2018.1, we introduced a new system variable called VISRETAINMODE—learn how you can effectively use the three system variables—**XREFOVERRIDE**, **VISRETAIN**, and **VISRETAINMODE**—to choose either all xref layer properties to always sync, or selectively choose a few layer properties to sync and reload while preserving the overrides for the other layer properties without the need to change system variable values or open and close your host drawing file.

Speaker(s)

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External References in AutoCAD – A Quick Overview

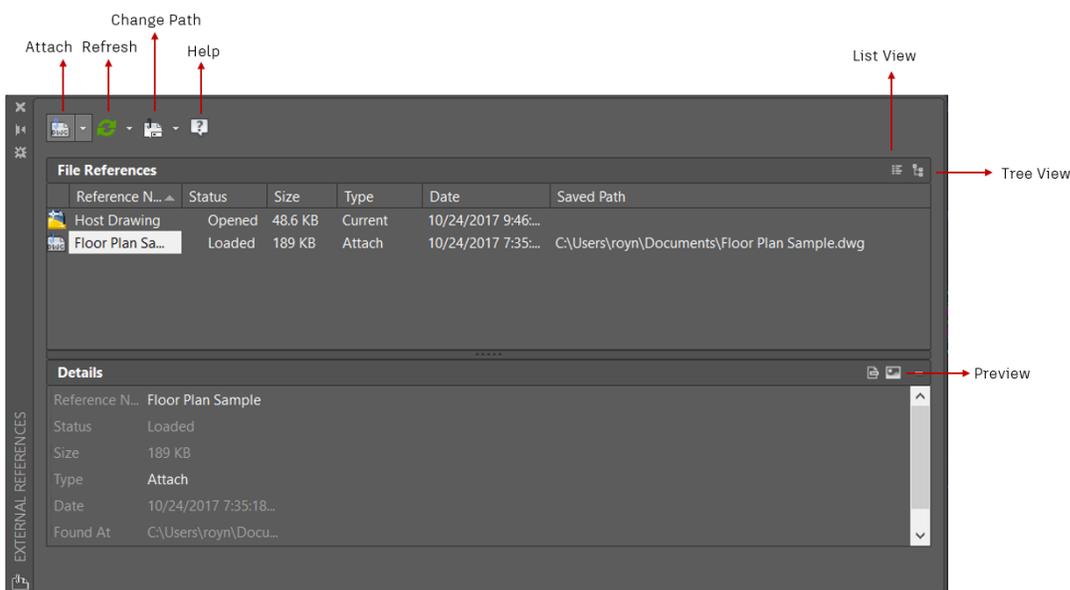
In AutoCAD, you can import drawings in a way that keeps imported drawings independent of host drawings. This type of file is called an external reference or xref. The xref file does not become part of a drawing database and it is loaded simultaneously with other drawings in which it is imported. You can import not only DWG, but also image, DGN, point cloud and PDF files as xref. Since, an xref does not become part of drawing database, it helps in keeping the file size of the host drawing small as well. Attached xrefs are links to the model space of a specified drawing file. Changes made to the referenced drawing are automatically reflected in the host drawing when it's opened or if the xref is reloaded. Attached xrefs do not significantly increase the size of your host drawing.

By using referenced drawings, you can:

- Coordinate your work with the work of others by referencing other drawings in your drawing to keep up with the changes being made by other designers.
- Ensure that the most recent version of the referenced drawing is displayed. When you open your drawing, each referenced drawing is automatically reloaded, so it reflects the latest state of the referenced drawing file.
- Keep the names of layers, dimensioning styles, text styles, and other named elements in your drawing separate from those in referenced drawings.
- Merge (bind) attached referenced drawings permanently with your host drawing when the project is complete and ready to be archived.

External References Palette

The External References palette contains several buttons and is split into two panes. The upper pane, called the File References Pane, can display file references in a list or in a tree structure and the lower pane, called the Details Pane, which displays properties for the selected file references or it can display a thumbnail preview of the selected file reference.



Updating Referenced Drawing

When you open a drawing, all xrefs update automatically. You can also use the Reload option from the External References palette to update xrefs whenever you want to ensure that the most current versions are displayed in your host drawing. Whenever you modify and save an externally referenced drawing in a network environment, other people can access your changes immediately by reloading the xrefs in their open drawings.

To Update an Attached Xref

1. Click Insert menu ► External References.
2. In the External References palette, select the reference name that you want to reload.
3. Right-click, and click Reload.

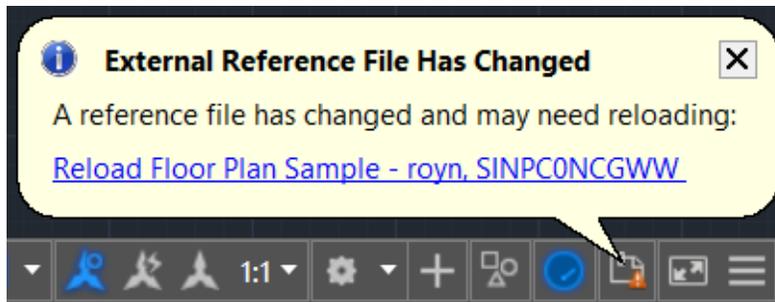


AutoTip:

To reload all xrefs, use *-XREF/Reload/**

To Set Up Your Xref Notifications

When you attach xrefs to a drawing, the program periodically checks whether the referenced files have changed since the last time the xrefs were loaded or reloaded. The XREFNOTIFY system variable controls xref notification. By default, the value is set to 2, which enables xref notification and balloon messages.



To manage your xref notification, do:

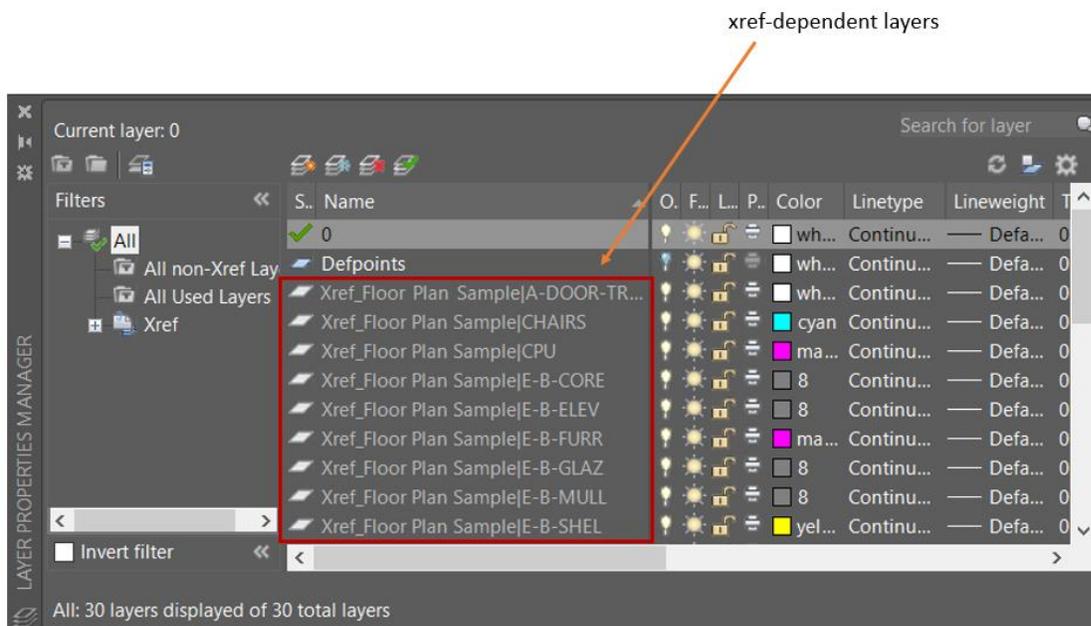
1. In the command line, type XREFNOTIFY.
2. Enter any of the following values:

Value	Description
0	Disables xref notification
1	Enables xref notification. Notifies you that xrefs are attached to the host drawing by displaying the xref icon in the status bar tray. When you open a drawing, alerts you to missing xrefs.
2	Enables xref notification and balloon messages. Displays the xref icon as in 1 above. Also displays balloon messages in the same area when xrefs are modified.

Xref Layer Control

Layers are one of the most commonly used objects in AutoCAD—often the challenge is how to effectively manage xref layer properties in the host (current) drawing and the ability to control the xref layer property overrides.

You can use AutoCAD commands to control the display of xrefs. When a drawing is attached as an xref, its layers appear in the Layer Manager prefixed by the drawing name and a pipe (|). This maintains the xref’s layers as separate entities even if the same name exists in the host drawing.



About Xref Layer Property Overrides

You can override any xref layer property on referenced layers. Depending on how you want to control the display of the xref layer properties—always synchronize and reload the xref layer settings or selectively choose a few layer properties to always synchronize and reload the current xref layer settings and keep the overrides you have applied to the other xref layer properties. Use XREFOVERRIDE, VISRETAIN, and VISRETAINMODE in combination to get the appropriate behavior for your xref layer property overrides.

What are Xref overrides?

An xref override is a change you make to a specific xref layer property (color, linetype, etc.) in the host drawing. You have always been able to make xref overrides in AutoCAD, but you just couldn't tell if a xref layer had an override or not just by simply looking at the layer palette. In AutoCAD 2018.1, xref layers that have overrides are now clearly marked, so you can easily view which xref layers have overrides.

To Work With VISRETAIN System Variable

The VISRETAIN system variable controls visibility, on/off, freeze/thaw, color, linetype, lineweight, and plot styles.

Value	Description
0	The layer table, as stored in the reference drawing (xref), takes precedence. Changes made to xref-dependent layers in the host drawing are valid in the current session only and are not saved with the drawing. When the host drawing is reopened, the layer table is reloaded from the reference drawing, and the host drawing reflects all of those layer property settings.
1	Xref-dependent layer changes made in the host drawing take precedence. Layer settings are saved with the host drawing's layer table and persist from session to session.

By default, the VISRETAIN system variable is set to 1 and saved in the drawing.

To Reload Xref Layer Properties on Drawing Reopen

1. Set the VISRETAIN variable to "0".
2. Save the drawing and reopen. Your xref layer overrides, in your host drawing, are not retained. Your host drawing reloads the xref layer properties.

The VISRETAIN system variable provided AutoCAD customers with some degree of flexibility, but it still lacked the ability to selectively being able to retain a few layer property overrides and reload the others when they change in the source xref drawing file.

When VISRETAIN=1, the xref layer properties are not reloaded. All the existing xref layer properties are stuck with whatever settings they were when the xref was attached.

So, if any changes are made to the xref layer properties (i.e. a xref layer's color or linetype changes after it was attached to other drawings), you won't see those changes in the host drawings.

The VISRETAINMODE setting allows you to choose which xref layer properties you want to automatically reload. For example, you want the color and linetype properties to update when the properties are changed in the xref, but you don't want the on/off or freeze/thaw settings to change for the xref layers in the host drawing.

To Work With XREFOVERRIDE System Variable

Introduced in AutoCAD 2016, the XREFOVERRIDE system variable (saved per drawing) provides you with the ability to force object properties in xrefs to be set to ByLayer. If you've ever had to open all your xref's to manually change object properties to ByLayer, this variable is your savior.

Value	Description
0	When the properties of the objects (such as color, linetype, lineweight, transparency, or plot style) on the external reference drawing are set to ByLayer, any changes to the xref layer properties are displayed in the host drawing
1	When the visual properties of the objects on the external reference drawing are not set to ByLayer, objects on xref layers are treated as if their properties are set to ByLayer and every external reference layer can have its own set of layer overrides

By default, the XREFOVERRIDE system variable is set to 0 (Off) and saved in the drawing.

The XREFOVERRIDE system variable affects display and plotting, and works in conjunction with the VISRETAIN system variable.

Consider these scenarios:

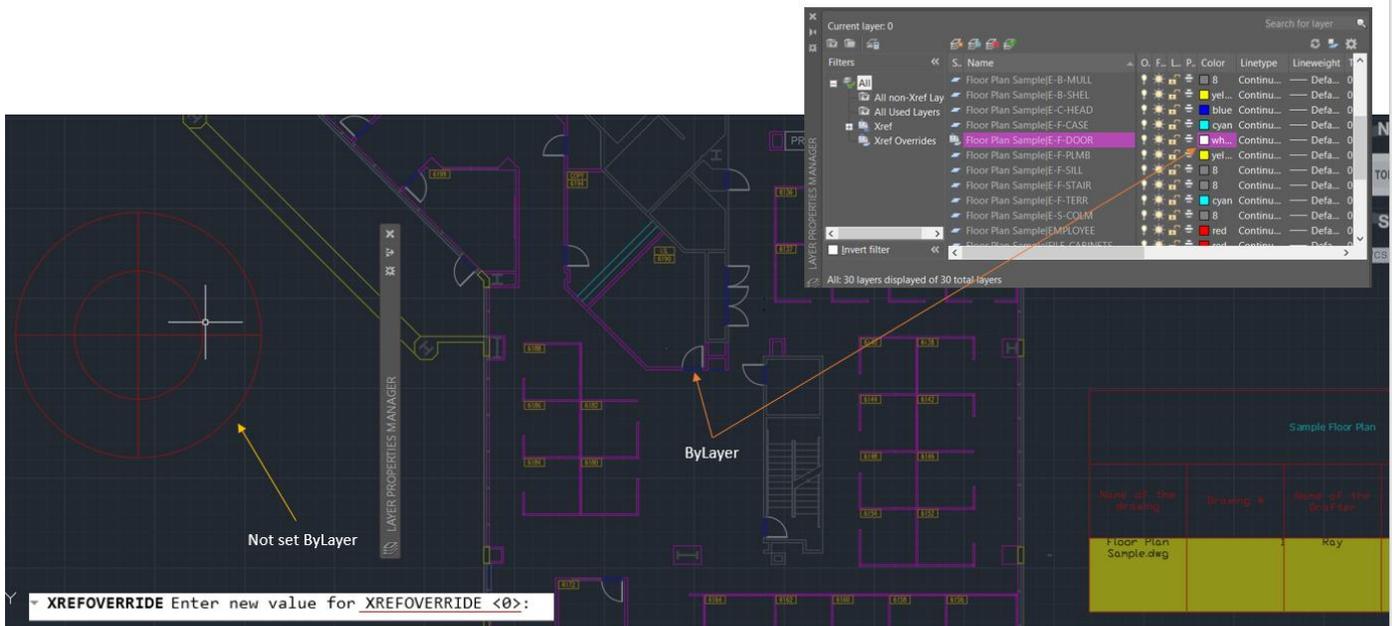
- If you want the xref layers to retain their layer settings, it is recommended to set VISRETAIN and XREFOVERRIDE system variables to 0.
- If you want the xref layers to retain the overrides you made in the host (current) drawing, it is recommended to set VISRETAIN to 1.

This assumes that the visual properties on the external reference objects are set to ByLayer.

- When XREFOVERRIDE is set to 1, objects on xref layers are treated as if their properties are set to ByLayer.
- When XREFOVERRIDE is set to 0, objects on xref layers honor their object property assignments.

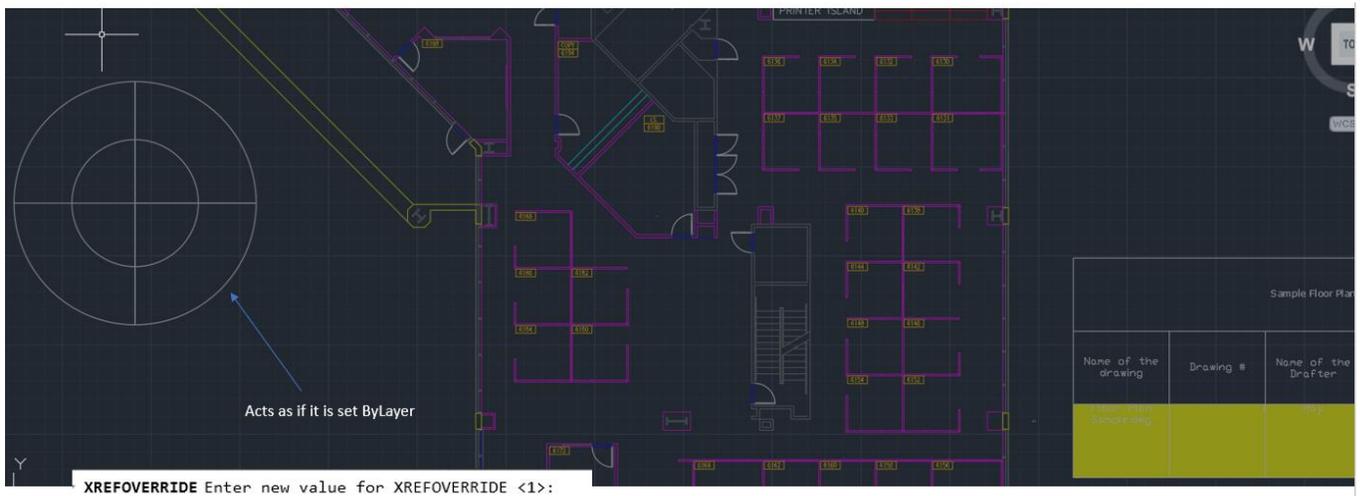
To Change Xref Layer Colors Not Set to ByLayer

- In the Layer Manager, change the color property for *Floor Plan Sample|E-F-DOOR* layer to white. Except for the xref objects that are not set to ByLayer, the color layer property is changed to white in the host/current drawing.



When XREFOVERRIDE is set to 0

- Set the XREFOVERRIDE variable to "1". This adjusts the display of referenced objects as if they were all created with color/linetype/lineweight/transparency set to "ByLayer" without the need to modify the objects in the xref drawing.



When XREFOVERRIDE is set to 1

To Work With VISRETAINMODE System Variable

The VISRETAINMODE system variable provides you with more options on how you want to control and manage your xref layer property overrides in your host current drawing when you have set VISRETAIN to 1. By default, the VISRETAINMODE, a bitcode system variable, is set to 0 to maintain drawing fidelity with previous releases of AutoCAD.

Use this system variable in conjunction with the VISRETAIN and XREFOVERRIDE system variables to control which xref layer property overrides that you want to automatically sync on reload.

To specify more than one layer properties that you want to automatically synchronize, enter the sum of their values (refer to the table below). Alternatively, you can also use the xref layer settings checkboxes in the Layer Settings dialog to specify which layer properties you want to synchronize. You can choose any combination for the xref layer properties that you want to reload from the referenced layer settings even when you have set VISRETAIN to 1. But, if you do not want to synchronize xref layer properties, you should keep the default value for VISRETAINMODE (0/Off).

Value	Description
0	No settings are synchronized. You will have the same experience when you set VISRETAIN to 1 in AutoCAD 2017 or earlier.
1	On/Off synchronized.
2	Freeze/Thaw synchronized.
4	Lock/Unlock synchronized.
8	Plot/No Plot synchronized.
16	Color synchronized.
32	Linetype synchronized.
64	Lineweight synchronized.
128	Transparency synchronized.
256	Plot style synchronized.
512	New VP Freeze synchronized.
1024	Description synchronized.

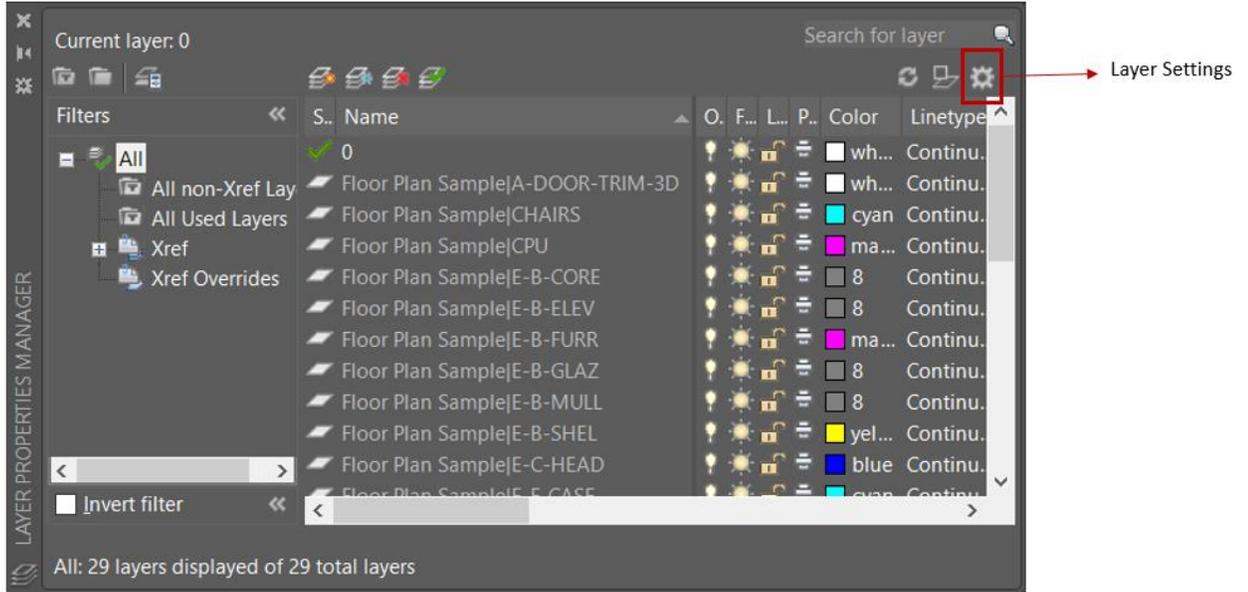
Setting VISRETAINMODE to 2032 means the following properties are reloaded (if they haven't already been overridden- or changed since the xref was attached):

Color, Linetype, Lineweight, Transparency, Plot Style, New VP Freeze, and Description.

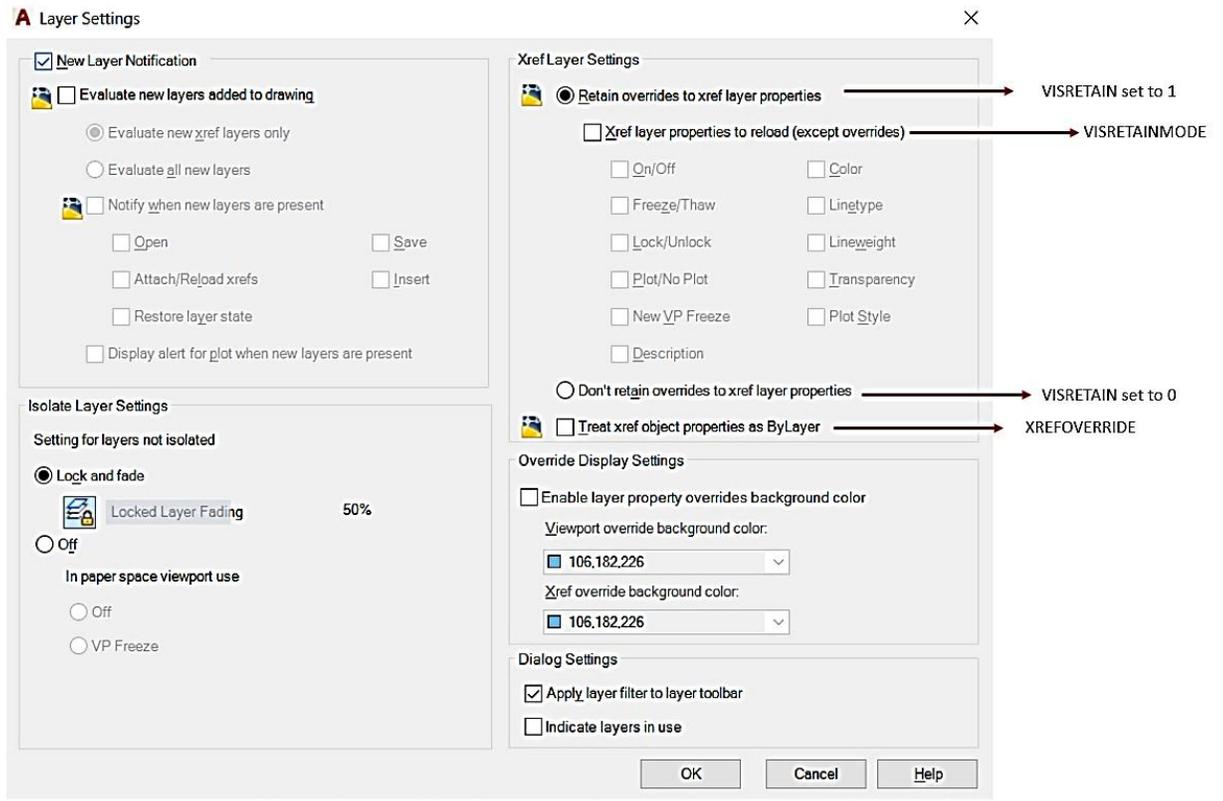
The following properties are not reloaded: On/Off, Freeze/Thaw, Lock/Unlock, Plot/No Plot

To Selectively Retain Xref Layer Property Overrides

1. In the Layer Properties Manager, click Layer Settings



2. In the Layer Settings dialog, select 'Xref layer properties to reload (except overrides)' in the Xref Layer Settings group.



3. Select the xref layer properties that you want to reload from the xref (source) drawing. In this example, let us select color, linetype, and lineweight.
Note: *If any of the layer properties that you have selected has an override in the host drawing, it won't be reloaded from the xref (source) drawing.*
4. In the host drawing, change the following xref layer properties for Floor Plan Sample|E-F-DOOR layer:
 - Color = *Red/1*
 - Linetype = *ACAD_ISO03W100*
 - Lineweight = *0.50 mm*
5. In your xref drawing, change the following layer properties:
 - Color = *Green*
 - Linetype = *ACAD_ISO03W100*
 - Lineweight = *0.13 mm*
 - Transparency = *50*
6. In your host drawing, reload your attached xref. Notice that the color and lineweight overrides were not reloaded from the xref layer properties, but other properties were reloaded from the xref file.

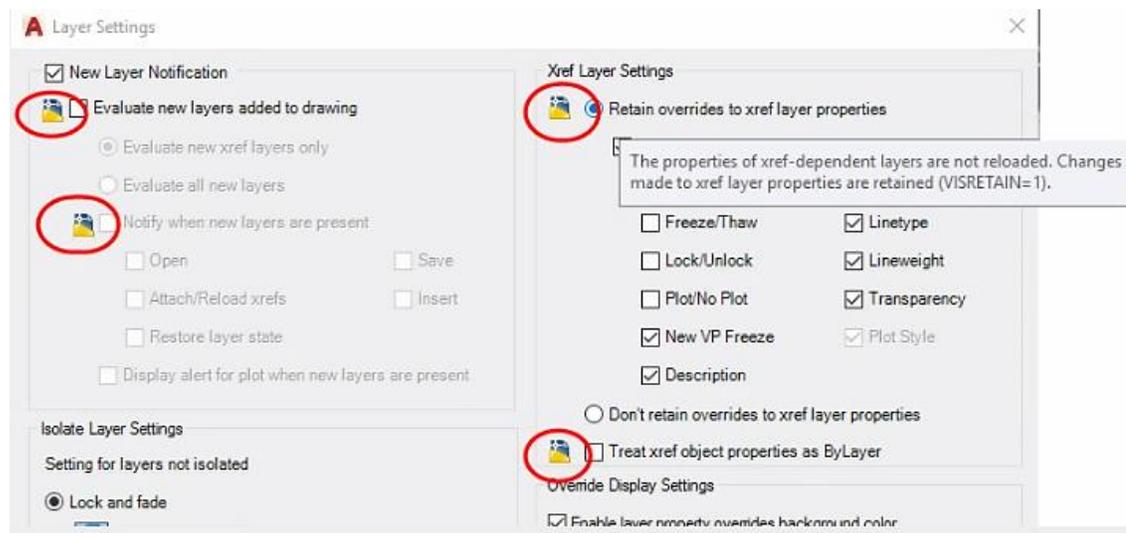
Note: The VISRETAIN setting is saved per drawing. The VISRETAINMODE setting is saved in the registry. If you like the VISRETAINMODE setting (Xref layer properties to reload) setting, you can turn it on once (choosing which xref layer properties you want to reload), and it will affect all your drawings that have xrefs.

This feature is a little hard to explain, but for anyone who's made a change to a xref layer property (for example, linetype), and want that change propagated to all the host drawings that reference that xref, this feature is for you!



AutoTip:

Layer Settings that are saved in the drawing have a little DWG icon in front of them. The Options dialog also denotes settings that are saved in the drawing with the DWG icon as well.

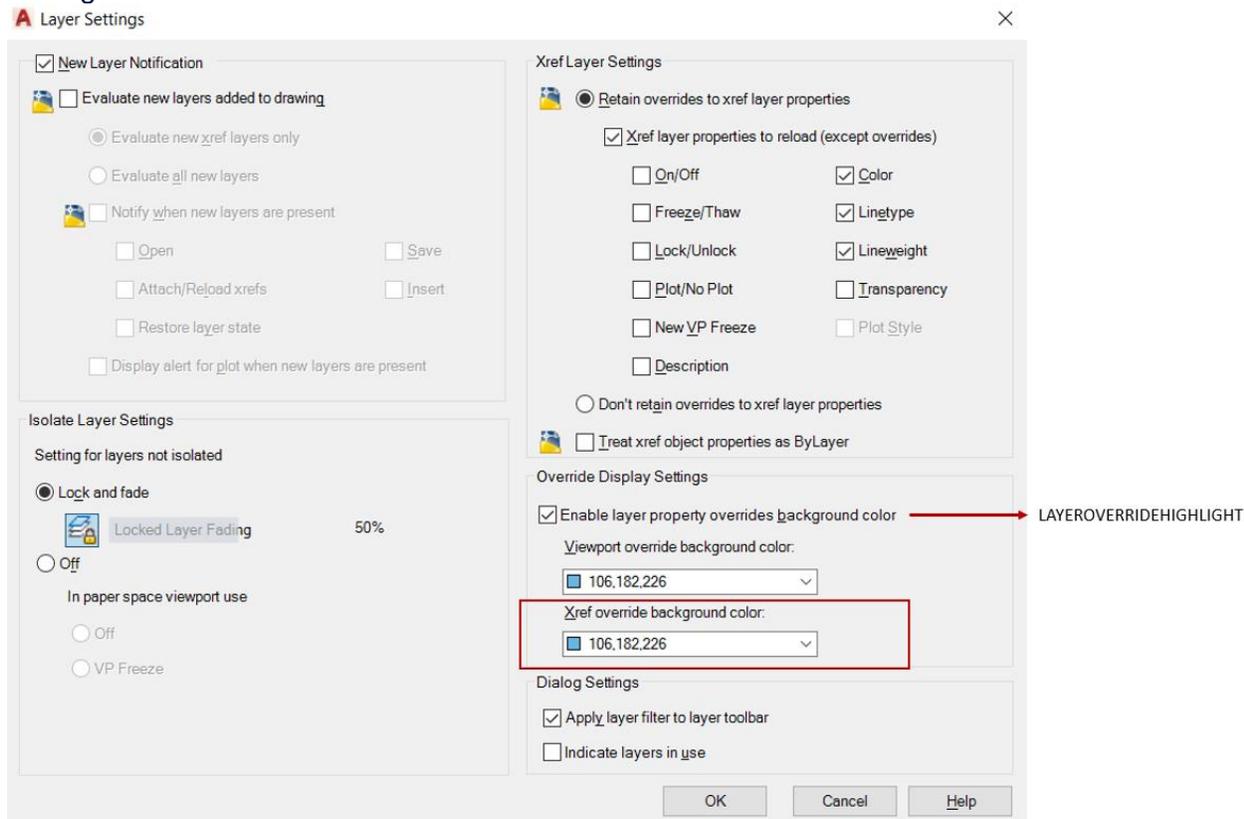


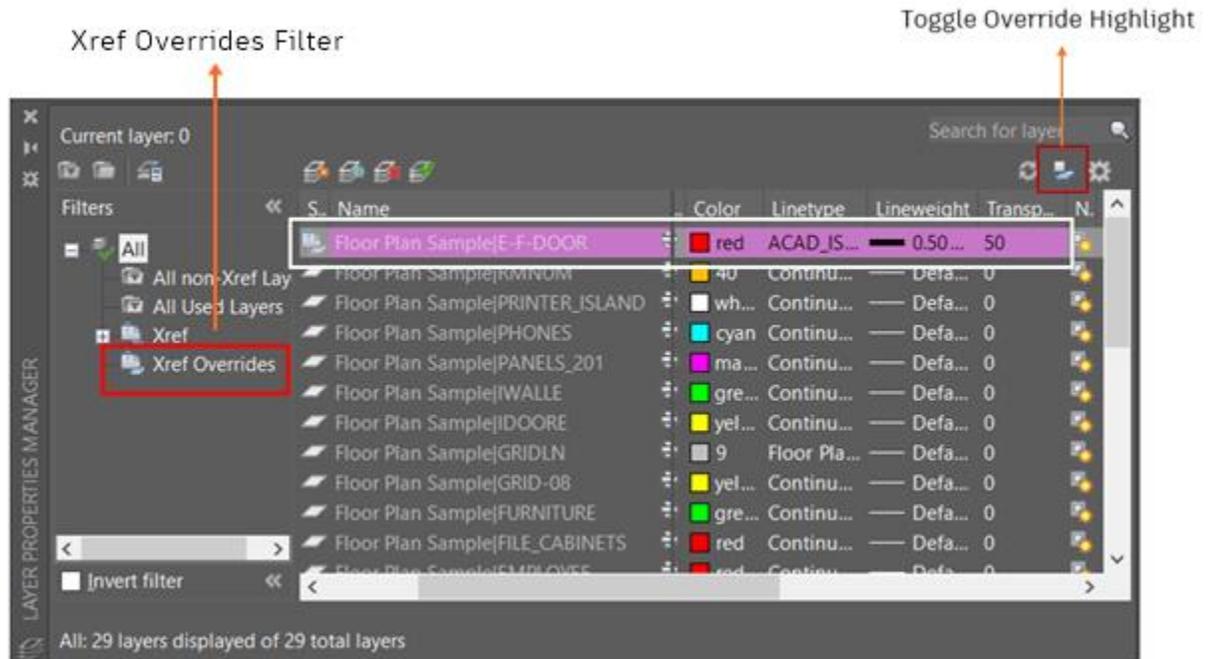
To Reset Xref Layer Property Overrides

1. In the Layer Properties Manager, right-click and select 'Reset Xref Layer Properties for'
2. Click a layer property you want to reset for either all layers or a particular layer.

To Set Xref Layer Property Overrides Background Color

1. In the Layer Properties Manager, click Layer Settings.
2. Select the background color to highlight xref override in the Layer Properties Manager.





3. In the Filters pane, you can select the xref overrides filter to quickly view xref overrides.

Note: Layer override highlighting also applies to layer property overrides per viewport (not just xref layer property overrides).

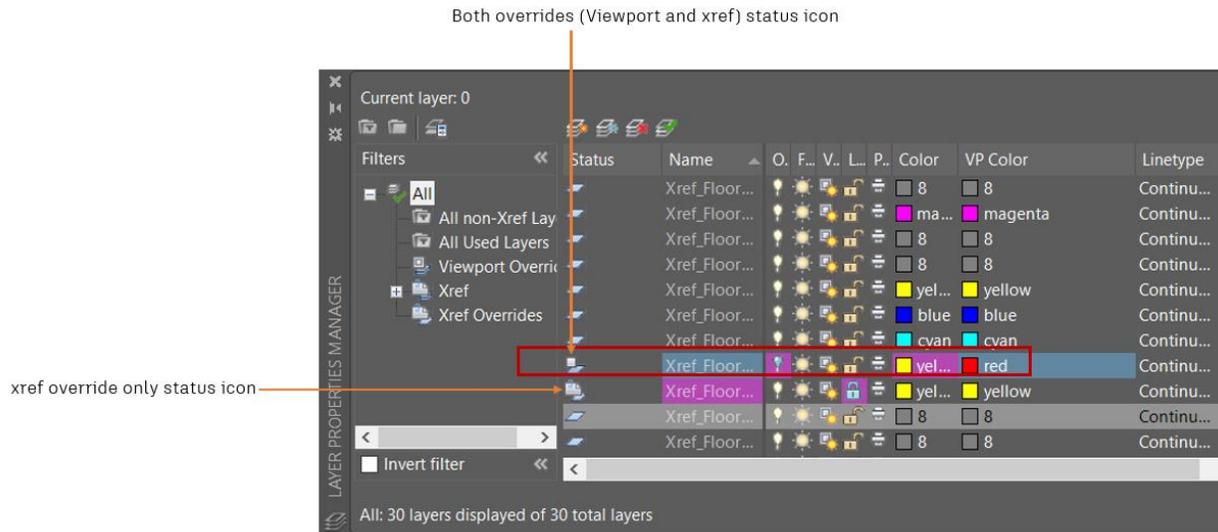


AutoTip:

By default, layer override highlighting is off. While the highlighting is very useful to see which specific layers or layer properties have overrides, it can be a little distracting. When the highlighting is toggled off, you can still see which layers have overrides from the status icons and status tooltip. You can also use the 'Toggle Override Highlight' button besides the 'Refresh' icon to quickly switch on or off background highlighting.

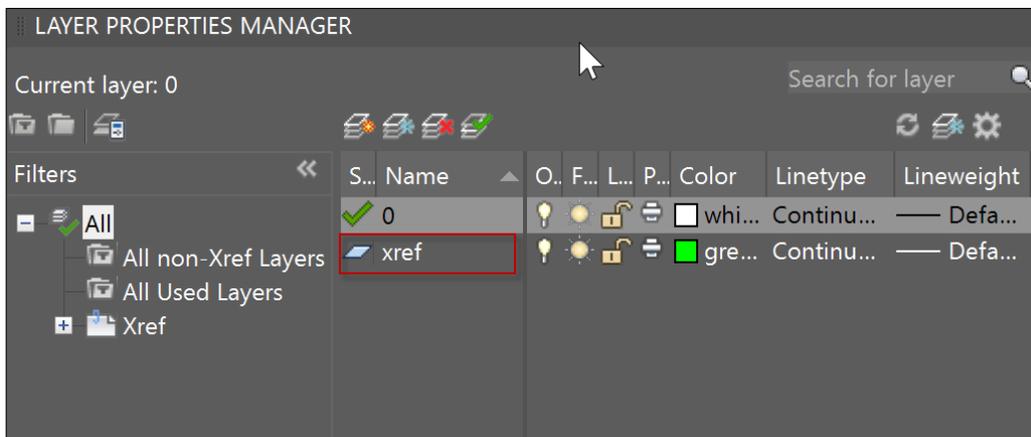
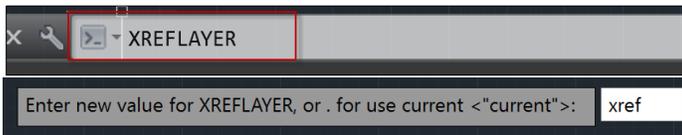
New Status Icons to Easily Understand the Type of Overrides

AutoCAD has always had a different status icon for layers with viewport overrides. In 2018, now xref layers with overrides have different status icons. There is even a different icon when a layer has both xref and viewport overrides.



New Default Xref Insertion Layer

Use the new system variable XREFLAYER, introduced in AutoCAD 2018.1, to specify a default layer for a new xref.



Secret Revealed: Why VISRETAINMODE Benefits You?

VISRETAIN system variable controls how xref layers are loaded/reloaded into the drawing:

- 0/off - Always reloads all xref layers; Doesn't retain any xref layer setting changes made in the host drawing.
- 1/on - Doesn't reload existing xref layers (only new layers). All the existing xref layer properties are stuck with whatever settings they were when the xref was attached.

The VISRETAIN setting is saved per drawing. Most people seem to prefer VISRETAIN set to 1, but also want a way to reset individual xref layers to what their properties are in the source xref file. Before VISRETAINMODE was introduced, the only way to do that was to turn VISRETAIN to 0 and reload, but it affects the entire xref, not individual layers. And you would lose any xref layer override changes you had made including On/Off, Freeze/Thaw settings.

VISRETAINMODE gives the ability to automatically sync selective xref layer properties in the host drawing with changes made in the xref file.

With *VISRETAINMODE* = >0, the behavior of the *VISRETAIN* =1 setting is changed, so that when you open the host drawing (or reload an xref), the properties of the xref layers are updated, unless you had specifically made changes (known as overrides) to the xref layers.

The VISRETAINMODE system variable is saved in the registry (default of 0).

- 0/off - Legacy behavior for VISRETAIN=1
- >0/on - New behavior for VISRETAIN =1; only reloads xref layer properties that haven't changed (or been overridden) in the host drawing

The benefit of having a VISRETAINMODE setting saved in the registry, is that you don't need to edit your existing drawings to get the new behavior. Xref layer settings will just reload automatically (unless you had explicitly already overridden them). You only need to turn on VISRETAINMODE once. Or you can leave VISRETAINMODE off (if you really prefer the legacy behavior).

Recommendation for VISRETAIN, XREFOVERRIDE, & VISRETAINMODE

System Variable	Value	Saved In?	Remarks
VISRETAIN	1 (default)	Saved in drawing	
VISRETAINMODE	2032 (different from the AutoCAD default setting)	Saved in registry	<p>The following properties are reloaded or synced (if they haven't already been overridden):</p> <p>Color, Linetype, Lineweight, Transparency, Plot Style, New VP Freeze, and Description.</p> <p>The following properties are not reloaded (synced):</p> <p>On/Off, Freeze/Thaw, Lock/Unlock, Plot/No Plot</p>
XREFOVERRIDE	1 (different from the AutoCAD default setting)	Saved in drawing	

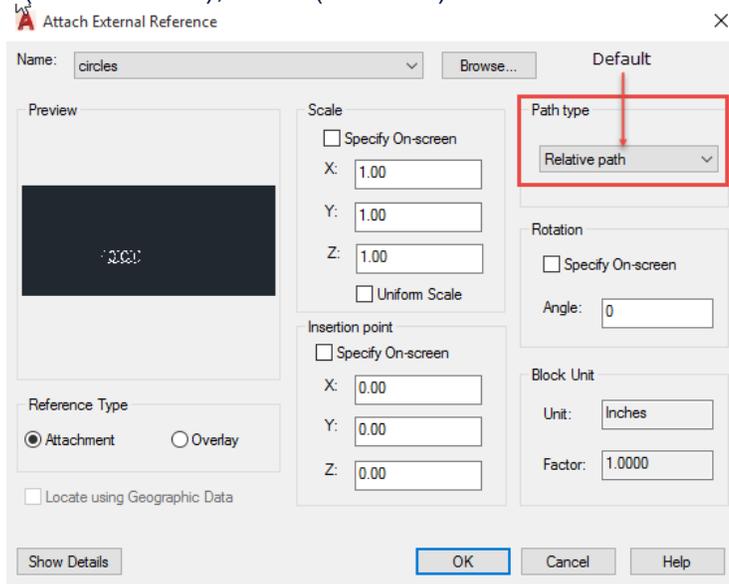
There is Something More About External References!

External References Just Got Smarter

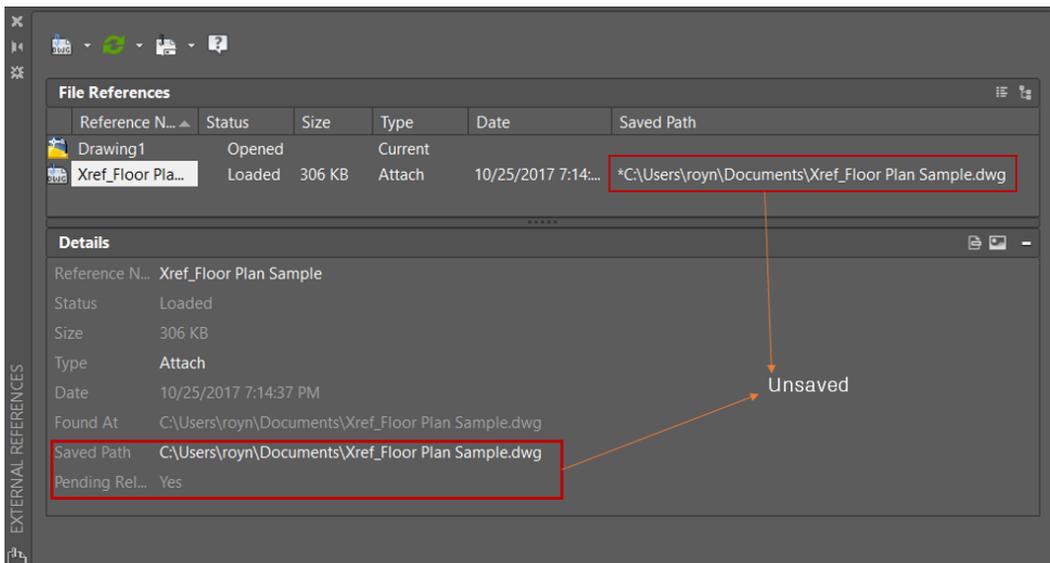
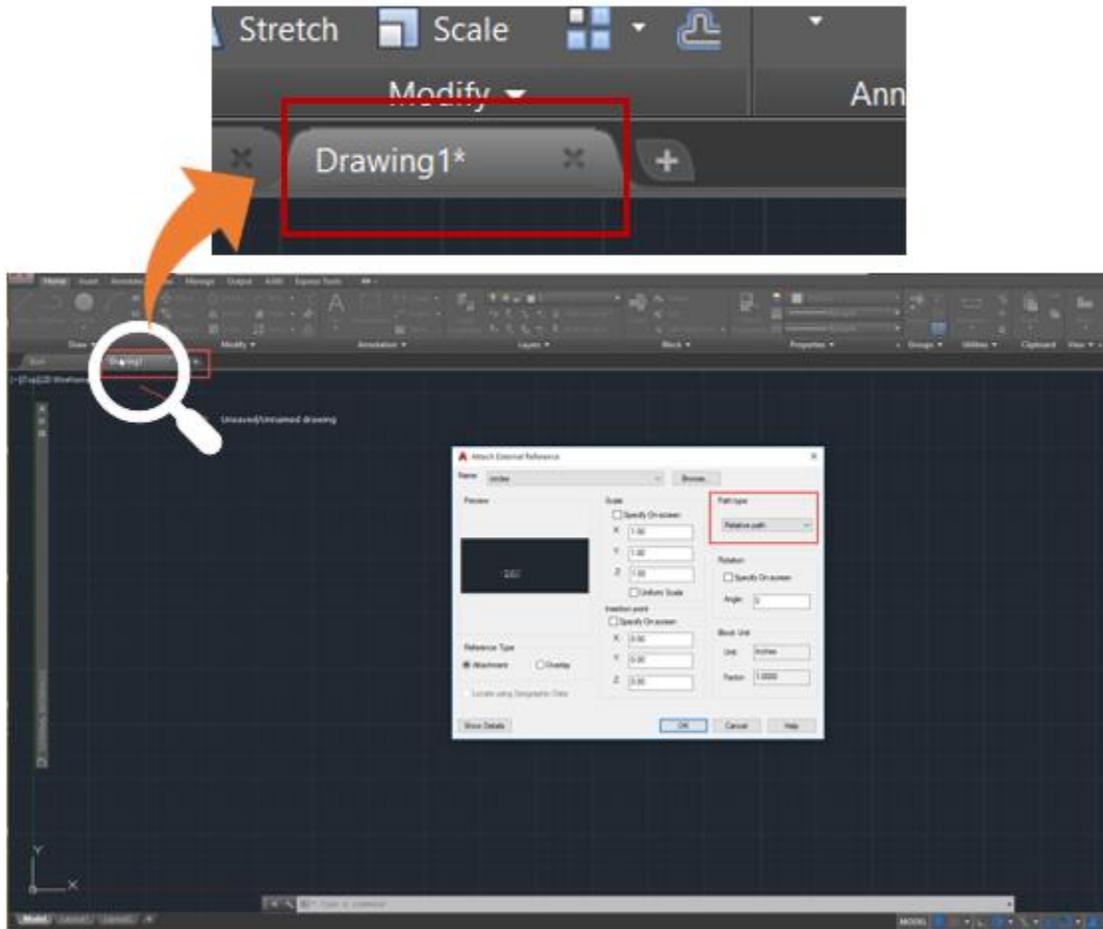
In AutoCAD 2018, the default path type when creating new references is now relative. You are now able to apply relative path even when your host drawing is not saved/unnamed—AutoCAD simply figures out the relative path when you save the drawing. And that is not all; AutoCAD now prompts you to update reference paths if you save you drawing to a new location. With these improvements, AutoCAD can do smart management of your external references and help boost your productivity.

Have You Tried These Features, Yet?

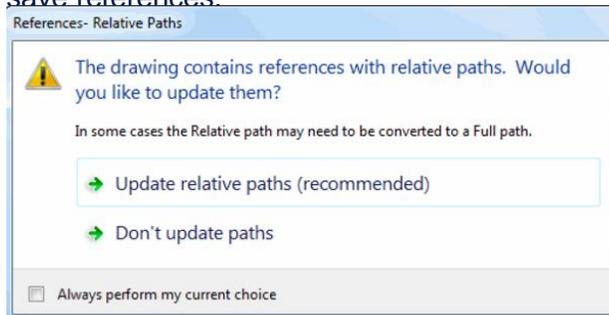
- Use the new system variable REFPATHTYPE to modify the default path type settings for referenced drawings. REFPATHTYPE has three values: 0 (No Path), 1 (Relative Path), and 2 (Full Path).



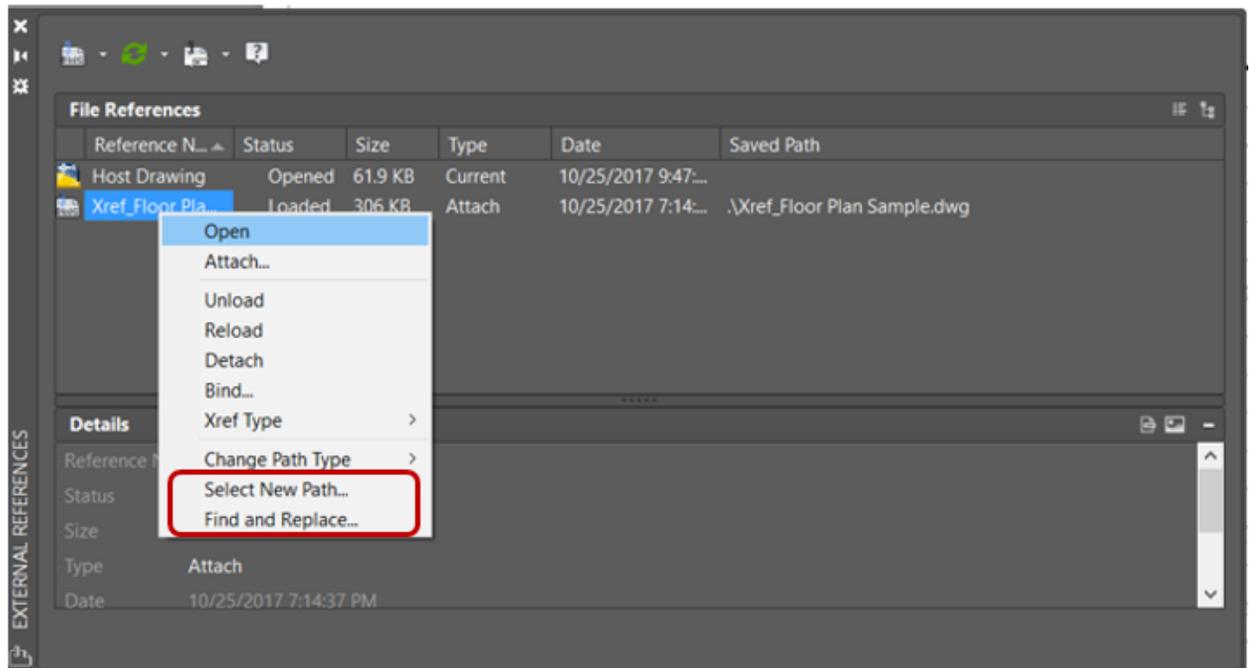
- Apply relative path to an xref even when the host drawing is unnamed/unsaved. The full path will temporarily be shown in the Saved Path column, with a preceding "*" and, in the Details section, the Pending Relative Path property will show as "Yes". Once the file is saved, any pending relative paths will be resolved.



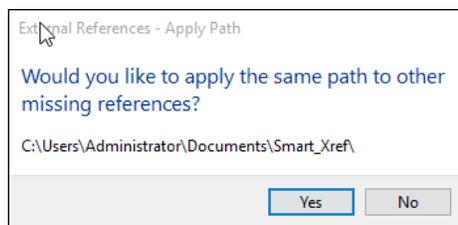
- Save a file with relative references in a different location- you will get prompted to re-save references.



- There are two new right-click contextual menu choices when dealing with an externally referenced file that is "not found".

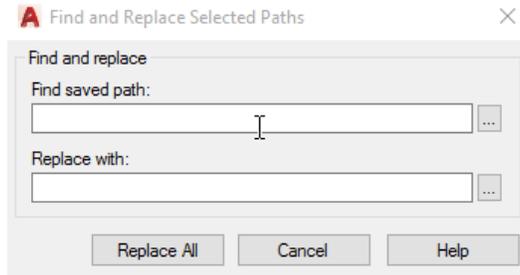


- Use the updated 'Select New Path' option to fix one 'not found' external reference— AutoCAD provides you with a choice to fix other missing references automatically by applying the same path.



- Use the 'Find and Replace...' right-click menu option in the external references palette to locate all references that used a specified path, which you had selected

earlier and replace all occurrences of that path with a specified new path in the dialog box.



- External references status terminology is better explained in the user interface. For example, the status of “Unreferenced” nested xrefs are changed to “Orphaned” in the palette. This matches with the command line notification.
- You can now rename an unloaded reference in the xref palette, the reference is not automatically loaded.
- In AutoCAD 2018, External references status terminology is better explained in the user interface. For example, the status of “Unreferenced” nested xrefs are changed to “Orphaned” in the palette. This matches with the command line notification. This is helpful because if you have references that are not found, it’s better to locate the parent xrefs, not the children (nested) xrefs.
- You can now rename an unloaded reference in the xref palette, the reference is not automatically loaded.

Terminology

Term	Explanation
Host drawing	The host drawing is also called your current or active drawing that you attach an external reference file.
Sysvar	Used for system variable in AutoCAD.
Xref	A DWG external reference file.
ByLayer setting	Setting that controls whether color, line weight, and line style are set for each level (layer).
Layers	Organizational structure used to control the appearance of objects in a drawing.