CES323893

Complex Selection in AutoCAD Made Easy: The Filter Command

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Learning Objectives

- Review common object selection methods in AutoCAD, such as Fence and QSelect
- Learn how to build both simple and complex object selection filters by filtering multiple existing object properties
- Learn how to build a complex selection filter using Boolean tools (and, or, not, xor)
- Learn how to save a named filter and reuse it

Description

This class is a close-up look at the Filter command, and we'll explore its features and uses. We'll demonstrate the power and variety of Filter, how to filter out multiple object properties (including Boolean operators), and how to save and reuse named filters, and we'll illustrate techniques for users to become more effective and efficient with object selection. This class is for all AutoCAD users, from novice to expert.

Speaker

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Introduction

Object selection is one of the most common and sometimes tedious tasks for AutoCAD users; it is required with every modify command. Most users are familiar with the more common object selection methods: Pick, Window, Last, Previous, QSelect, etc.; but there is a command that often goes unnoticed, unknown, and unused: FILTER.

FILTER is a powerful AutoCAD tool that allows for the creation of selection sets from object properties. FILTER allows the building of a selection set by: selecting an object, by adding an individual property, by adding multiple properties, or all of the above! As an Object Selection Filter list is being defined, the dialog is populated with all criteria that define it. Once a selection criteria is defined, users click Apply, and once again select objects. The filter is applied to the objects selected, and the filtered selection becomes active. Filter allows for simple or complex selection criteria. Filter lists can be saved and re-used later in the same drawing, or in a different drawing.

Learning Objective 1: Common Object Selection Methods

Whenever we issue an edit command, AutoCAD prompts us to select objects. There are many ways to select objects to create a selection set; let's take a look at some common, and not-so-common ways of selecting objects.

Manual Selection Methods – Picks and Clicks

(Pick, Window, Crossing, Window Polygon, Crossing Polygon, Fence, Lasso, Lasso cycling)

Pick   Simply allows you to click the object to select it.

Window, W   Clicking any two points on the screen will define a window selection. If your starting point is left of the second point, the selection box will be shaded light blue with a solid border: this is a window selection. A windowed selection will select everything <u>completely inside</u> the rectangular box.

Crossing, C   Clicking any two points on the screen can also define a crossing selection. If your starting window pick point is to the right of the second point, the selection box will be shaded light green with a dashed border: this is a crossing selection. A crossing selection will select <u>everything completely inside the box, and everything it touches</u>!

Window Polygon, WP   For even more finesse, users can type **WP** to create a window polygon, or **CP** to create a crossing polygon. The resulting shape will perform in the same way as the rectangular method: **Window Polygon** will select everything it encloses, **Crossing Polygon** will select everything it encloses, and everything it touches.

Fence, F　　　Fence option prompts for the user to define a multi segmented line by picking points. When complete, the selection will contain every object the fence line touches. Users can also press and drag to define a fence; everything touched by the dragged fence is added to the selection set.

Lasso　　　Pressing and holding the left mouse button and dragging activates drag mode; dragging to the right emulates a window polygon, dragging to the left emulates a crossing polygon.

Lasso Cycling　　　You can press the space bar during lasso selection to toggle through window, crossing, and fence drag selection modes.

The Works - All

All, All　　　All option selects everything in the current space that is not locked or frozen (including objects in OFF layers!).

Haven't I Picked you Before?
(Previous, Last, Group)

Previous, P　　　Adds the previous selection set from the active session to the current selection set.

Last, **L**　　　Adds the most recently created or drawn object to the selection set.

Group, G　　　Adds a named group to the selection set. Type G to activate the group option; AutoCAD prompts for a group name to be entered. Once entered, the group is added to the selection set.

Touching items - Fastsel
Fastsel,

Fastsel, FS　　　An Express Tool that prompts for users to pick an individual object, and everything the object touches is added to the selection set. Fastsel can also be invoked transparently, 'FS or 'FASTSEL.

The drawing variable **FSMODE** controls the behaviour of Fastsel: When **FSMODE** is **OFF**, the selection set is comprised of the selected object and everything it touches. When **FSMODE** is **ON**, the selection set is comprised of the selected object, everything it touches, AND everything those objects touch, too.

Based on Object Properties – Quick Select, etc.
Qselect, Select Similar, SSX, Filter

Qselect – Quick Select

Qselect   Quick Select creates a selection set by filtering an object type and a single property. Qselect is found on the top of the properties palette (CTRL + 1 to toggle on/off)
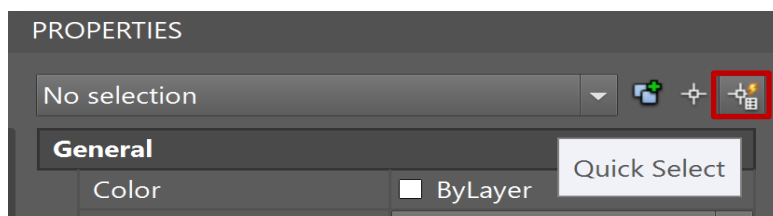

The Quick Select icon on the Properties Palette

Clicking Qselect launches the Quick Select window. Here you will find several areas.

Apply to: Allows you to apply your selection to the entire drawing, or a selection that you can define.

Object type: This box lists every category of object in the current drawing. Selecting any one of the object types will populate the selectable properties in the windowed area below it.

Properties: Along with the 8 general properties available to every object, the Properties window will also display all of the properties associated with the selected item.
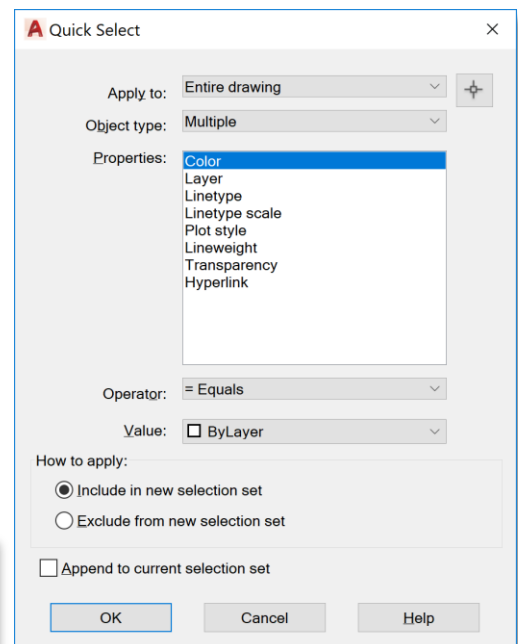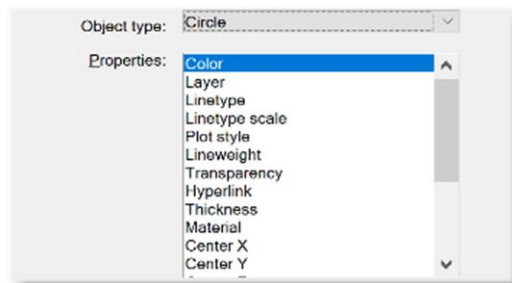
Operator: Lists the options for the selected property. <u>Equals</u> will select all objects that match the property value, <u>Not Equal</u> selects all objects that are not equal to the property value, and <u>Select All</u> selects all objects of that object type.
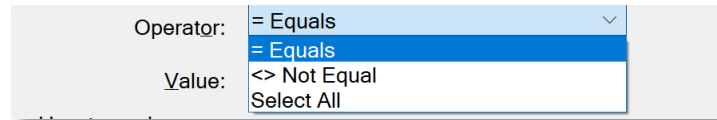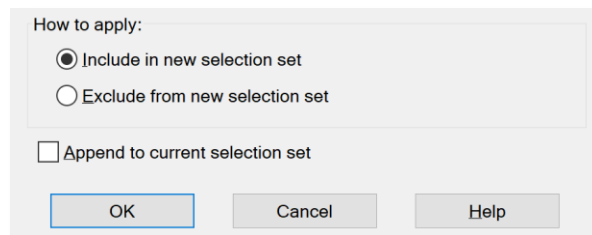

Operator options on the Properties Palette

Value: Prompts you to select or input a specific value for the selected property. For properties like color or layer, users can select from a drop down list; for properties with numeric values such as radius, users can input the value.
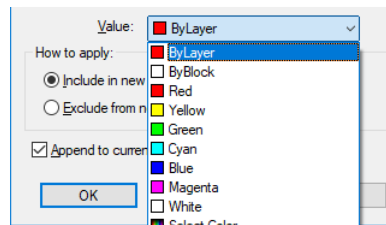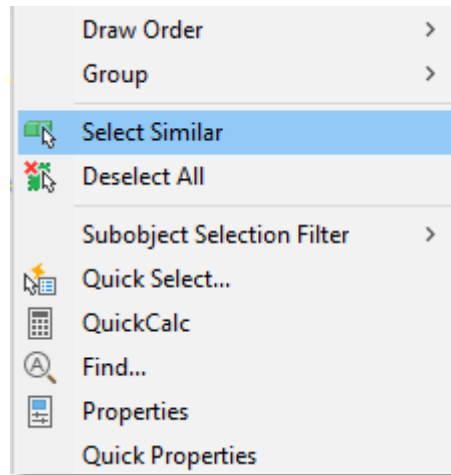

Value: options on the Properties Palette

How to Apply: This area dictates whether you are adding or excluding the items from the selection set, or appending to an existing selection set.
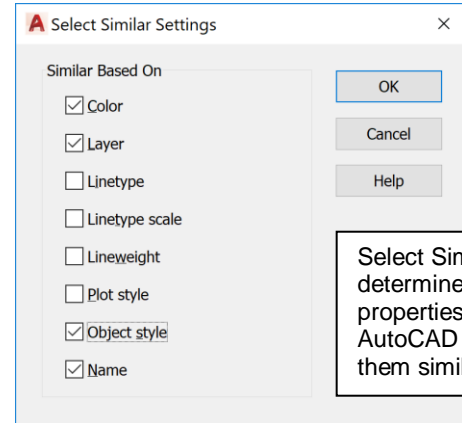

How to apply: options on the Properties Palette

Select Similar   Available as a right-click option after an object is selected. Objects of the same type with properties matching the select similar settings are added to the selection set.

Select Similar pop-up menu

SSX   SSX creates a selection set that contains objects that are either exactly like the selected "template" object or, if you adjust the filter list, very similar to that object. You can enter SSX either at the Command prompt to create a selection set, which can be accessed with the Previous option, or you can enter (SSX) in at any Select Objects prompt.

Filter   Filter will be discussed in detail in the next Learning objective.

Don't want it? - Remove
Remove

Remove, R   Type R to enter remove mode, where any selected object is removed from the active selection set. Holding the SHIFT key while selecting objects has the same effect. To return to normal mode, type A to Add selected items to the selection set

Learning Objective 2: Using Filter

Similar to Quick Select, but far more robust, Filter is a powerful AutoCAD tool that allows for the creation of selection sets from object properties. Filter allows the building of a selection set by selecting an object, by adding an individual property, by adding multiple properties, or all of the above! Once a selection criteria is defined, users click Apply, and once again select objects. The filter is applied to the objects selected, and the filtered selection becomes active.

As an Object Selection Filter list is being defined, the filter properties window in the upper area of the filter dialog is populated with the definition criteria.

Parts of the Object Selection Filters Dialog

1. Filter properties window

2. Select filter options

3. Edit item, Delete, Clear List buttons

4. Named filters

5. Apply, Cancel, Help buttons
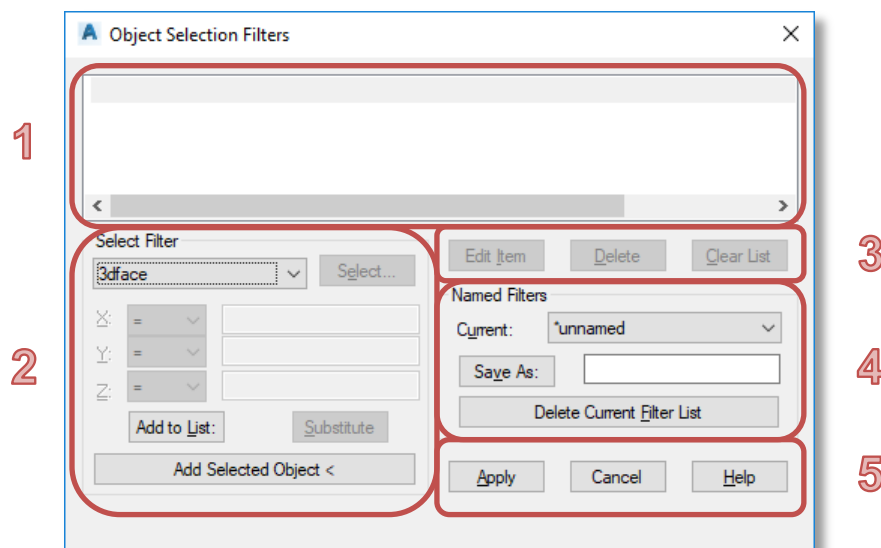
Parts of the FILTER Dialog Box

Building a Selection list

Add Selected Object
A simple way to build a filter definition is to use the Add Selected Object: button. To use this method, first launch the Filter dialog. Click Add Selected Object. The dialog disappears and AutoCAD prompts you to pick an object. Once an object is picked, the Filter dialog reappears, and the properties of the selected object are now in the upper Filter properties window.
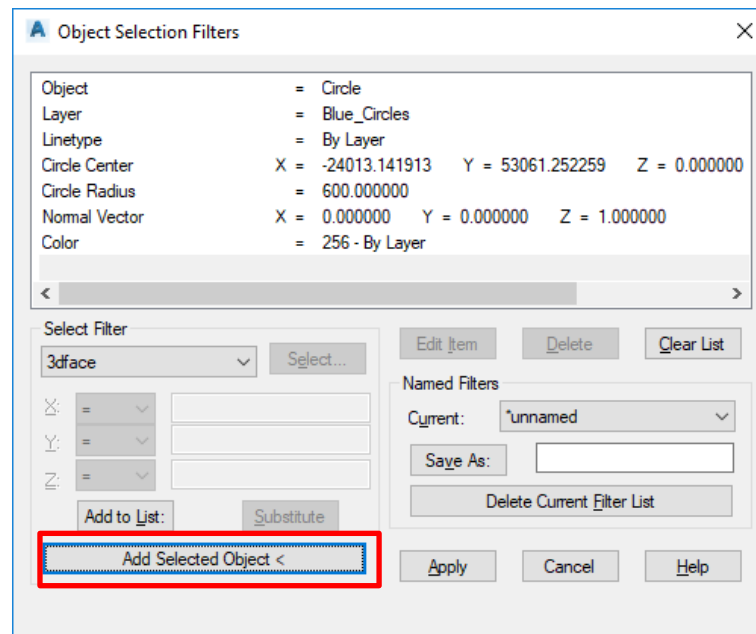
Adding a selected object to the filter list

The properties displayed will vary depending on the type of object selected, but all selected objects will display the object type, layer, color, and linetype. More properties will also appear, depending on the type of object selected. For example, text items will also include position, value, style, height, and rotation angle.

Selecting a single item creates a selection criteria that includes the center or insertion point. This means the filter selection set will have only one object: the object you picked (since only one object is at that specific location). In order to have a more inclusive selection, we need to edit the selection filters using the features of the Filter dialog box: Edit item, Delete, Add to List, and Substitute.

Refining the Selection

Delete a Criteria

The simplest way to edit a filter criteria is <u>Delete</u>: it allows you to remove any criteria in the Filter list. Simply select the criteria you want deleted (such as circle center position), and click the <u>Delete</u> button in the Filter dialog. The item is deleted! Clicking <u>Apply</u> and then selecting All will now create a new selection set. In this instance, the selection set will include more circles (since the circle center value limited the selection to circles at a specific position). The new selection set now ignores the center position value, and applies to all circles of the same layer, linetype, radius, and color.
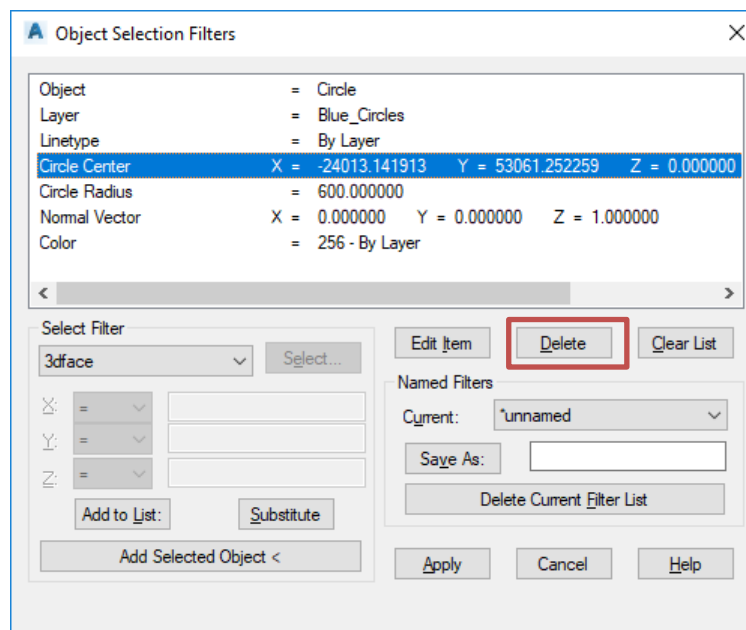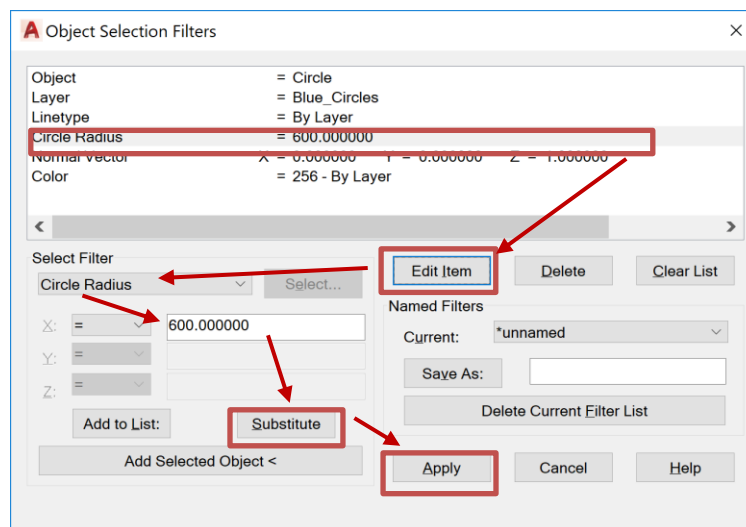

Deleting a filter criteria

Edit Item

You can modify any criteria by selecting it and then clicking Edit Item. The item type will appear in the Select Filter area of the dialog, with a selectable/editable field below it. You can change the value in the editable field in the Select Filter area. You may also change the relational operator value (see table to the right). ⟹

Click the Substitute button, and the revised settings will replace the original settings.

Relational Operator	Description
=	Equal to
!=	Not equal to
<	Less than
<=	Less than or equal to
>	Greater than
>=	Greater than or equal to
*	Equal to any value

In the following example, we will change the Circle Radius value from 600 to 400.

- Start by picking the Circle Radius item in the list.
- Next, click Edit Item.
- In the Select filter area, change the radius value from 600 to 400.
- Click Substitute.
- Click Apply, then select All.
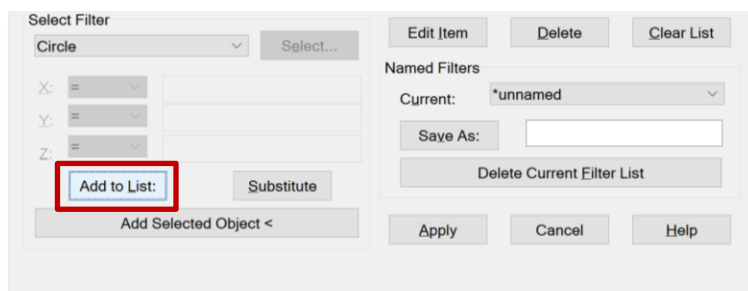

Deleting a filter criteria

Build Your Own Filter Selection

Let's build a criteria set from the selectable properties. Start by clicking <u>Clear List</u> to remove all the current criteria.
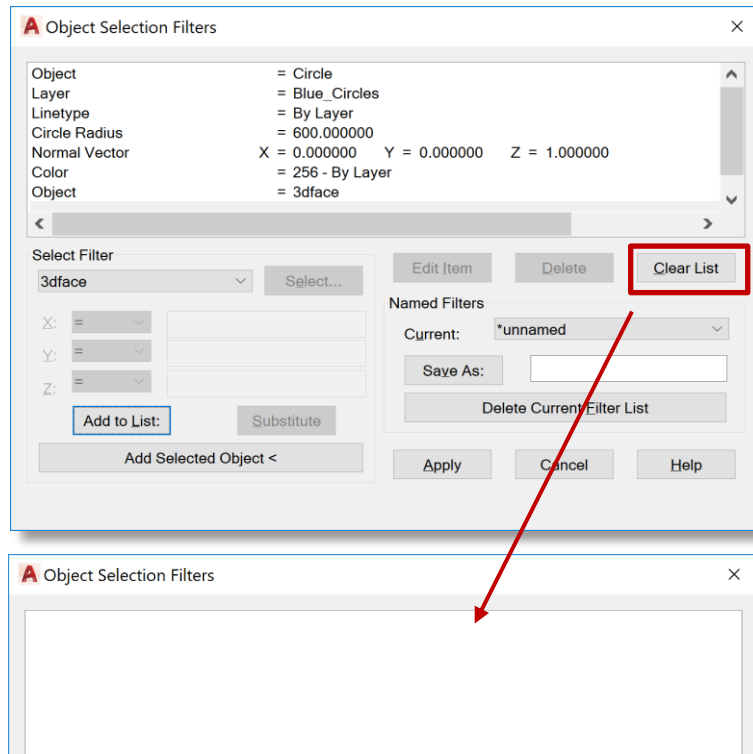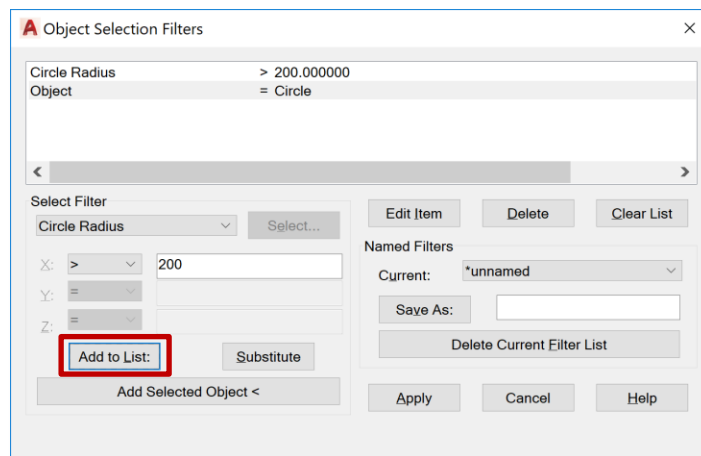

Clearing the filter list

Expand the Selection filter list, choose Circle, and click <u>Add to List</u>

Adding a filter criteria

Expand the Selection filter list again, choose Circle Radius. In the X field, choose the >
relational operator. In the field to the right, enter 200. Click Add to List. There are now
two criteria in the filter properties list.

Building a filter criteria

Once again, from the expanded list, choose Layer. Click Select, and select the
Red_Circles layer.
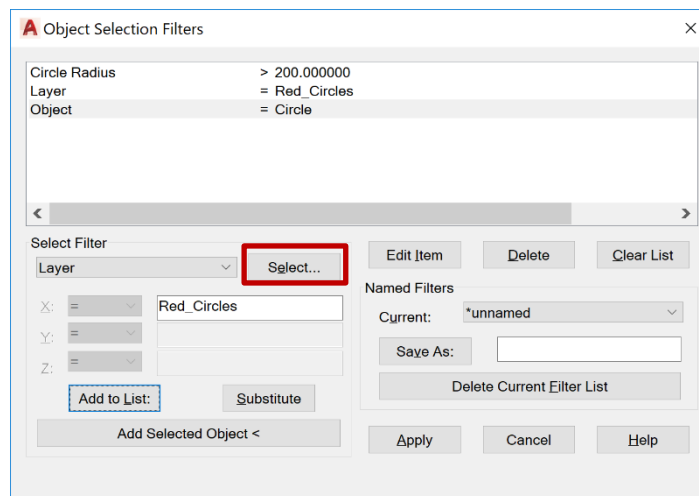
Building a filter criteria

Click Apply, and select All. The new selection set are all circles with a radius larger than
200 on layer Red_Circles.

As you can see, Filter allows for broad or fine tuning; it's completely up to you if you
want a detailed or generic selection.

Learning Objective 3: Logical Operators (and, or, not xor)

By using <u>Add Selected Object</u>, and simple object properties, there is a limitation: the selection set will only include items that meet every criteria. What if we wanted for example, a selection of only circles and lines, and no other object type? Having two objects (i.e. circle and line) in the list will mean that NO OBJECTS get selected, since there is no object that is both a circle AND a line. How can we build a selection set of multiple object types with different properties? Fortunately there is a way to achieve this in AutoCAD with logical operators.

A Most Logical Approach - Fascinating

Building a selection set of different types of objects can be achieved by implementing logical operators in our selection set criteria. The AutoCAD Filter command has 4 logical operators to help refine an object selection set. Each logical operator requires a Begin marker and End marker. Every criteria enclosed between the begin marker and end marker is applied to the logical operator. The available operators are AND, OR, NOT, XOR.

Operator	# of Operands	Objects Selected
AND	one or more	All Object that meet **every** criteria
OR	one or more	All objects that meet **any** criteria
NOT	one	All Objects **not** meeting the criteria
XOR	two	All objects meeting on or the other criteria, but **not both**

Logical Operator Description Table

Starting operator	Ending operator
**Begin AND	**End AND
**Begin OR	**End OR
**Begin NOT	**End NOT
**Begin XOR	**End XOR

Logical Operator Begin and End markers

AND

As you add filter criteria, AutoCAD defaults to the AND operator. The AND operator may have
any number of operands inside the BEGIN and END markers; EVERY criteria in the list needs
to be met for every object in the selection.
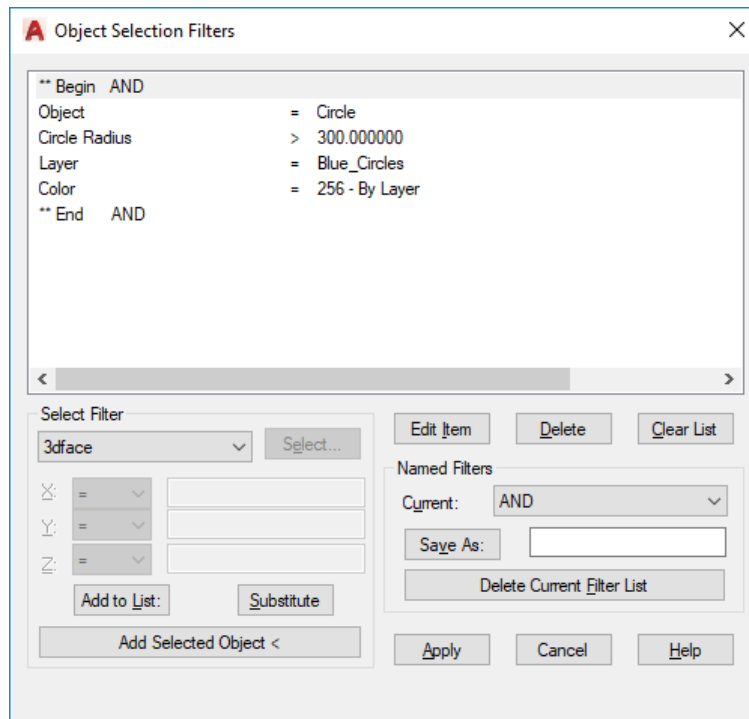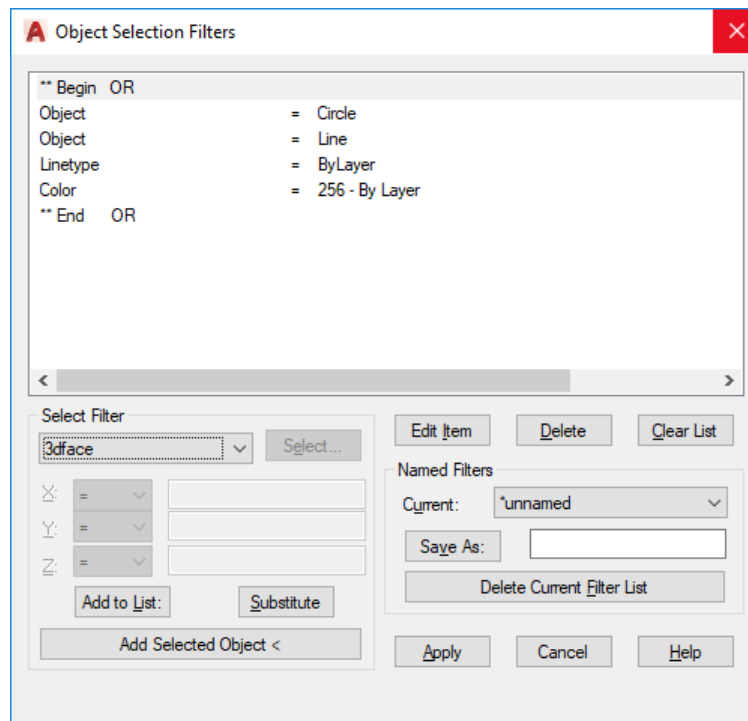

AND example filter criteria

The objects selected in this example:
- Only circles that are
- On Layer Blue_Circles, AND
- With Radius > 300, AND
- Object color 256 (BYLAYER)

Logical operator AND requires every object to meet all criteria to be selected.

OR

OR will add objects that meet <u>any</u> of the criteria between the **Begin OR and **End OR markers.
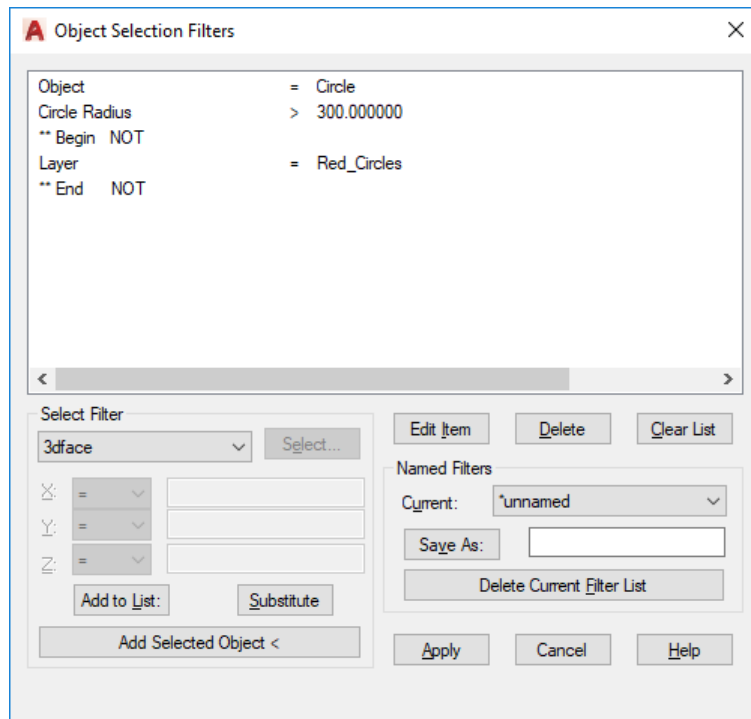

OR example filter criteria

The objects selected in this example:
- Every circle,
- Every line,
- Every object color 256 (BYLAYER), and
- Every object with linetype BYLAYER

Logical operator OR selects every object that meets <u>any</u> of the criteria.

NOT

NOT defines an exception to the selection filter list. Only one value is enclosed between the **Begin NOT and **End NOT markers.

Object Selection Filters dialog showing:

```
Object                = Circle
Circle Radius         > 300.000000
** Begin  NOT
Layer                 = Red_Circles
** End    NOT
```
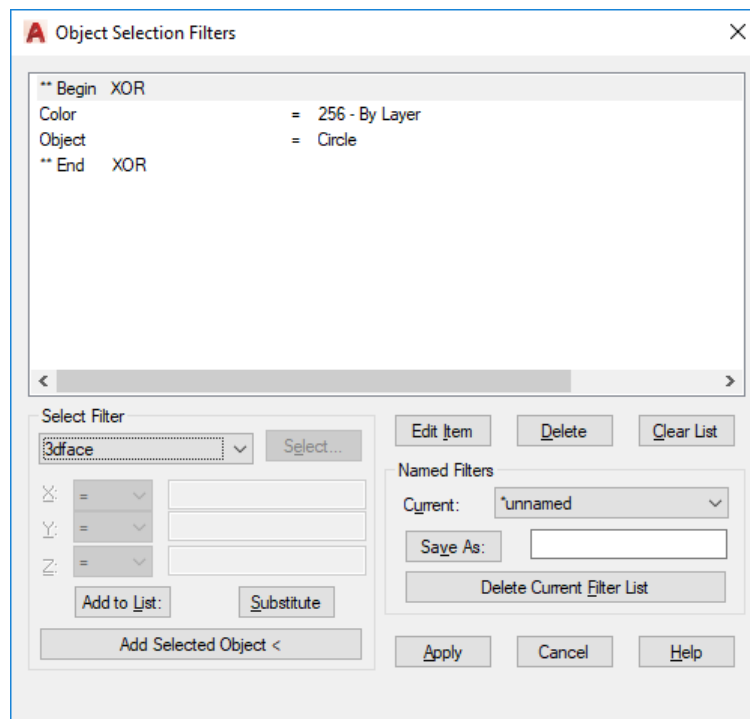
NOT example filter criteria

The objects selected in this example:
- Every circle of radius = 300
- EXCEPT - Every object on layer Red_Circles

Logical operator NOT excludes every object that meets the criteria in its definition.

XOR

XOR encloses two items. The selection created will be composed of anything that either of the criteria meet, but not both. Items that have both properties defined in the XOR markers are not selected. (You can think of XOR as NOT OR). There must be precisely two items enclosed between the **Begin XOR and **End XOR markers.
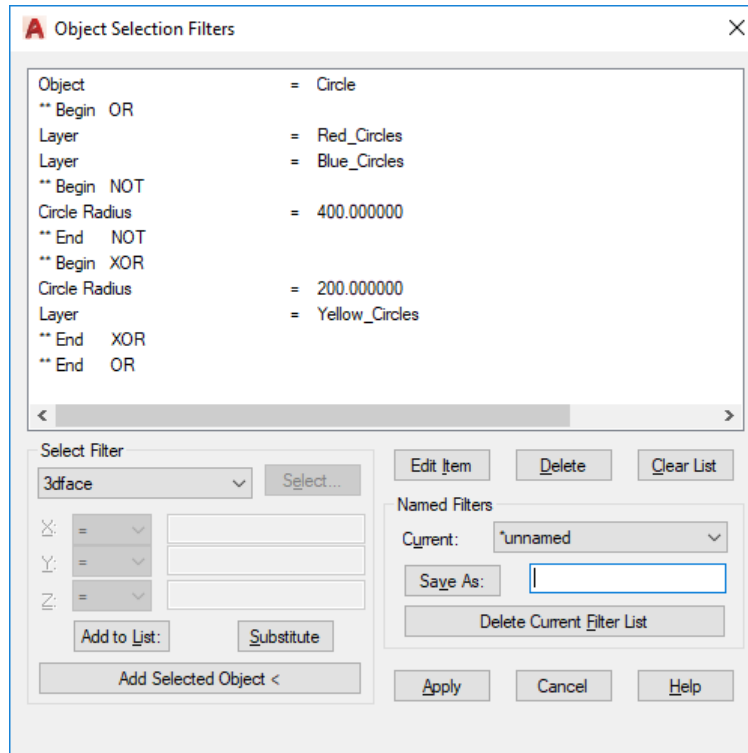

XOR example filter criteria

The objects selected in this example:
- Every circle , AND
- Every object color BYLAYER
- EXCEPT - Every circle with color BYLAYER

Logical operator XOR excludes every object that meets both criteria in it's definition.

Putting it Together – A complex selection filter

Let's take a look at an even more complex selection, using several logical operations within the same filter definition.

Complex selection filter criteria example

The objects selected in this example:
- Every circle   (AND)
- On layer Red_Circles   (OR)
- On layer Blue_Circles   (OR)
- EXCEPT circle radius = 400   (NOT)
- All with circle radius = 200, and All on layer Yellow_Circles (XOR)
- EXCEPT objects with radius 200 on layer Yellow_Circles   (XOR)

We can see Filter is a powerful tool that can be used to build very complex selection sets.

Learning Objective 4: Saving a Named Filter and re-using it

Sometimes a selection filter may be needed more than once. Fortunately, the Filter command allows for filter definitions to be saved, allowing for re-use. Naming, saving, and selecting of saved filters all happens in the Named Filters area of the Filter dialog.

Parts of the Named Filters Dialog

1. Current Named Filter drop-down list

2. Filter Name Edit box

3. Delete current filter list button

4. Save As: button
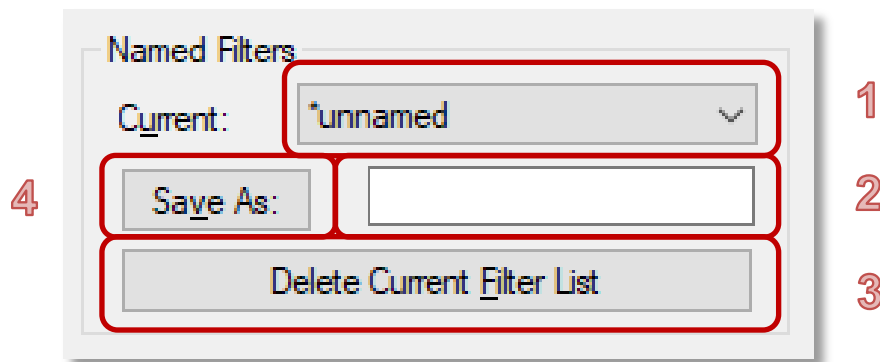
Named Filters area of the Filter Dialog

Saving up

To Create a Named filter, simply type in the edit box the name of the filter you wish to create, and click the Save As button. The criteria list in the filter properties window will be saved with the name you assigned, and can be picked from the drop down named filters list. Filter names can be up to 18 characters long.

Current Filter

To see the list of saved filters, click the drop down to the right of the Current: button; a list of all saved filters will appear. Pick any saved filter from the list, and that filter will become active, and all of the properties for that saved filter will appear in the filter properties list.

Deleting a Named Filter

Deleting a Named Filter is just as straightforward: select the named filter you wish to delete from the drop down list, and click the Delete Current Filter List button; the named filter is deleted!

Re-using a named filter

Named filters are saved in an external file, filter.nfl. Because of this, the saved filter list is available in all drawings, not only the current drawing. The filter.nfl file is typically saved in the default support file folder: C:\Users\<LOGINNAME>\AppData\Roaming\Autodesk\<product version>\enu\Support\filter.nfl

> *It is possible to have more than one filter.nfl file, but be aware: AutoCAD will load the first instance of filter.nfl it finds, based on the support filter search path in OPTIONS. Knowing this, you may copy/move filter.nfl to another location. Make sure the filter.nfl file folder is located at the top of the support files folder path list.*

The Named filters list will always be read by AutoCAD, regardless of what drawing you have open, so it is easy to use your filters in multiple drawings!

Summary

Object selection is a critical part of editing AutoCAD drawings. Knowing the available selection tools and their functions is a powerful benefit for all AutoCAD users, regardless of experience level, or field of discipline. Filter is a powerful and beneficial tool to help AutoCAD users become more effective at editing drawings. Be sure to use Filter as part of your object selection repertoire.