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The Power of Revit Filters

How understanding the mechanics of filters can help you fine-tune your drawings and improve your models

 As with many things in life, appearance can be everything, and Autodesk® Revit® objects are no exception. There are a number of ways to adjust the appearance of objects in Revit, which can provide visual cues so users can easily identify missing or incorrectly defined elements while producing construction documents tailored to design firm needs.

All Revit objects belong to a category, and categories have appearance settings that are applied to all objects in a category. Appearance settings control object characteristics of line color, line weight, and line pattern and can apply to an entire project or to individual views. During design it is often useful to hide some objects within a category while viewing others. Controlling the visibility of individual objects within a category by using filters provides users with a method for quickly and effectively hiding or viewing objects from within the same category. For example, filters can be used to hide mechanical equipment that does not have a power connector on the electrical plans, to change the color of receptacles that are not on a circuit so designers can easily see what is left to be added, and to adjust the object appearance based on which system an object is associated.

THE ANATOMY OF A FILTER

There are a few basic components to filters such as filter names, categories to which the filter applies, and filter rules. The first section of the filter window is “Filters,” which is a list of filters in the project. When creating filters, using a standard naming convention will help maintain communication and workflow with other users. Keep filter names concise, yet descriptive enough to understand what the name relates to. For example, using the discipline the filter applies to at the beginning of the name (e.g., “Elec” for electrical or “Mech” for mechanical) followed by the category to which the filter applies (e.g., “Equipment”) will aid in keeping things organized as you expand your list of filters. A filter named “Mech - Equip w/o Power” would apply to all mechanical equipment that does not contain a power connector (see Figure 1).

The next section of the filter window is “Categories,” which are used to define the categories to which the filter will apply. It is important to choose categories wisely because the available parameters in the filter will be limited to only those parameters common to the selected categories. For example, if “Ducts” and “Mechanical Equipment” categories are selected for the filter, “Panel” or “Circuit Number” parameters will not be available under the “Filter By” list because there is no electrical information

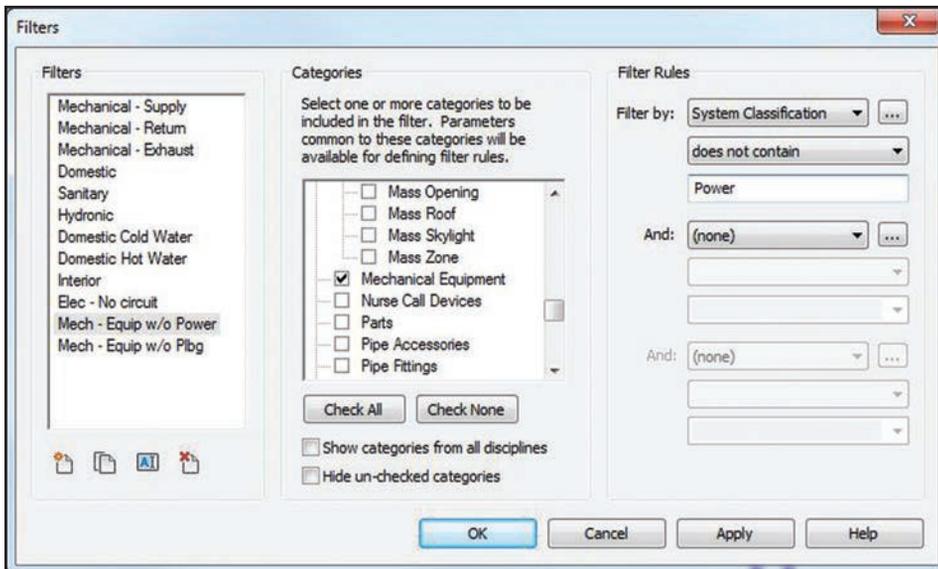


Figure 1: The anatomy of a filter that applies to mechanical equipment without power connectors.

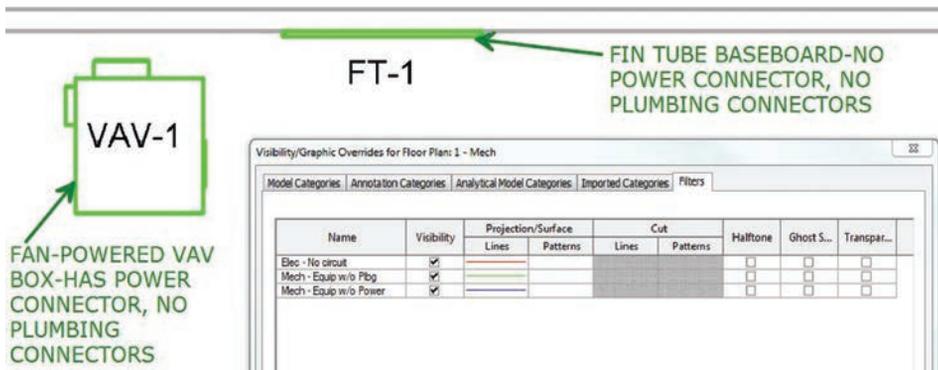


Figure 2: The fin tube (FT-1) has no power connector, yet it is colored green because the “without plumbing” filter takes priority over the “without power” filter.

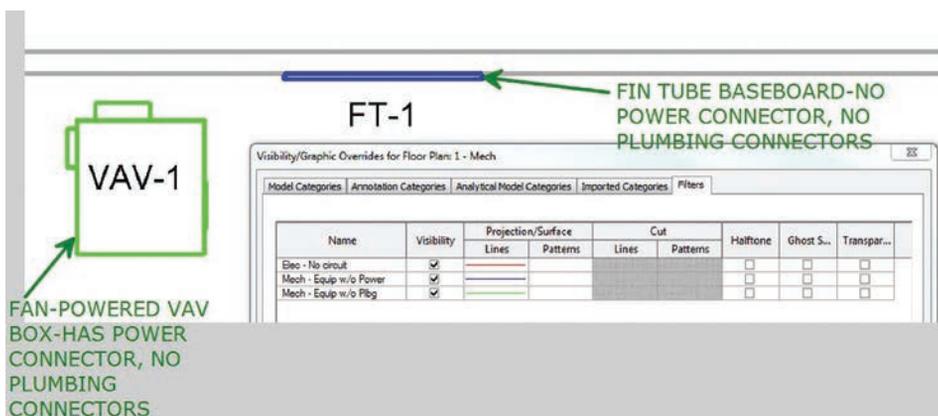


Figure 3: Moving the “without power” filter up in the list changes the priority of the filter that applies.

on ducts. Creating separate filters for categories with uncommon parameters could work around this issue.

The last section of the filter window is “Filter Rules,” which are logic statements that determine to which objects the filter will ap-

ply. Up to three logic statements can be used per filter. Each logic statement is composed of three elements: a parameter to filter by, the logic operator (equals, less than, does not contain, etc.), and the value to look for in the specified parameter. Note that when using multiple logic statements, only the “And” option is available for the query. Why is an “Or” statement not available in Filter Rules? “Or” statements create exceptions to the rules because only one statement must be true. The “And” statement is much clearer since all conditions must be true.

If the intent of a filter is to turn off or half-tone objects to which the filter applies, it is best to use a rule that has inverted logic. Instead of asking Revit to show what should be seen, tell Revit to hide the objects that should not be seen. For example, to show only the mechanical equipment that has plumbing connections, write a rule that applies to mechanical equipment that does not have a plumbing connector and then uncheck the visibility of that filter to hide all objects without plumbing connectors.

The above plumbing filter would then use “System Classification” for all logic statements with all operators set to “does not contain.” One value to filter by would be “Domestic,” which will include the “Domestic Cold Water” and “Domestic Hot Water” connectors. Another value to filter by would be “Sanitary,” which includes a pipe connector with the classification set to “Sanitary.” The last value to filter by would be “Vent,” which includes pipe connectors classified as “Vent.” So if the logic statement is “Show all objects if parameter X contains this or contains that...” then the following is an equal statement: “Hide all objects if parameter X does not contain this and does not contain that...”

EVEN FILTERS HAVE PRIORITIES

Think about more than just having the right logic in filters. Quite possibly, an object can fall into several different filters at the same time. With multiple filters in a view, a system needs to be in place for Revit to prioritize what gets applied first. Luckily, Revit has a way to manage this.

In the Visibility/Graphic Overrides dialog under the Filters tab, arrange the order of filters listed in order of importance. The filter at the top has the highest priority and the filters decrease in pri-

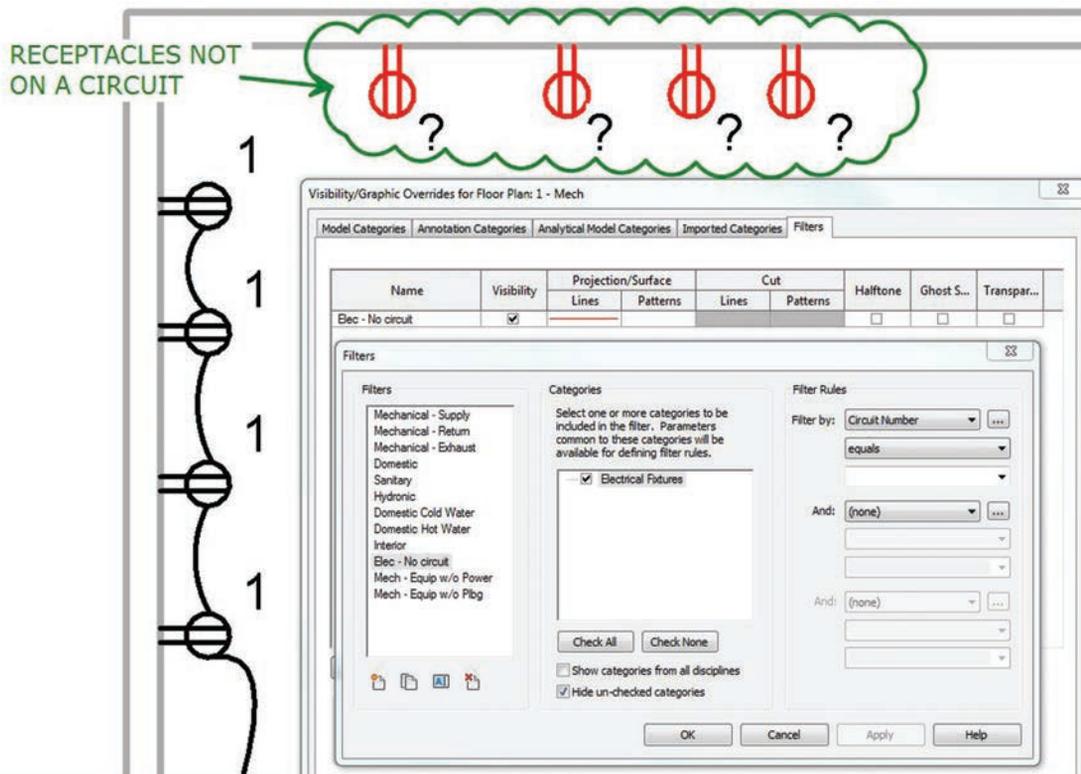


Figure 4: A filter alerts the user to electrical fixtures that need to be added to an electrical circuit.

riority down the list. A filter that overrides the line pattern of all heating water return piping to display as dashed lines, and the next filter down makes all pipes a continuous line pattern, the first filter will take priority and not all piping will be a continuous line pattern. If these filters were flipped around, all pipes would be shown as a continuous line pattern because that filter has a higher priority (see Figures 2 and 3).

Prioritizing multiple filters that apply to the same object is not a concern if each filter is controlling a different graphic setting. For example, if one filter sets the color to “red” and another filter sets the line pattern to “hidden,” both filters will be applied since they are each changing different graphic overrides. The one exception to filter priority is the “Visibility” control. If multiple filters apply to an object and one has the visibility unchecked, the object will not show up in that view regardless of how the filters are prioritized.

GET CREATIVE!

Filters can be used in thousands of different ways. Filters can improve the presentation of your drawings by changing how objects appear, even when in the same category. Filters can identify incorrect or incomplete information by changing the color of objects (e.g., receptacles, diffusers, and plumbing fixtures) that have not been fully connected (see Figure 4). Filters can also help with quality assurance procedures by highlighting objects that might have parameters outside of office design standards such as ducts with high-velocity air or pipes with excessive pressure drop. Advanced users can use filters to automate the control of object visibility with little to no action by the user.

If the Building Information Modeling (BIM) goal is to include all the technical information about a piece of equipment in the Revit model, the families in the Revit model will most likely contain the appropriate connectors for other disciplines to connect to it. The parameters that are associated with each connector can then be used in a filter to control how those objects are displayed.

The key to using filters successfully is to be open minded. Don't be afraid to be creative and try something new. If the filter does not function as intended, remove it and try again. Try to think of ways to use parameters that are already available in the project or project families. Using a parameter that already exists will streamline the filter and prevent redundant information.

Having a good understanding of the mechanics of filters in Revit will allow the fine tuning of drawings when other methods do not work and can save time otherwise spent with tedious micro-management of object appearance. The visual feedback filters provided to users and checkers can open the door to endless possibilities that will ultimately improve design quality in a shorter period of time.



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