AUTODESK UNIVERSITY 2013

Autodesk® Revit® MEP Parameters: Much More Than Flexible Families

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MP3231 Parameters and the valuable data they contain make up one of the more powerful functions at the core of Building Information Modeling (BIM) and Autodesk Revit-based software products. In this class, we cover parameters and their many uses in Revit in detail. This information is of special interest to MEP engineers and users who will learn how working with parameters in Revit MEP affects project workflow, construction documentation, and the transfer of valuable data.

Learning Objectives

At the end of this class, you will be able to:

- List the various types of Revit parameters and explain how they affect your documents, workflow, and time
- Effectively use parameters in the family and project environment
- Create, organize, and manage a shared parameters file
- Use parameters in all types of schedules

About the Speakers

Jarrod is currently the BIM Manager for Tilden-Coil Constructors, Inc. He is tasked with improving accuracy, communication and coordination of the construction process through the use of Building Information Modeling tools focusing primarily on the Autodesk® Revit® and Navisworks® software suites. Jarrod has extensive experience in creating custom content, and over 18 years MEP design and building experience in the AEC industry.
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Don has been working in the AEC industry for 17 years, beginning as a CAD technician and working his way up to Electrical designer. He has been influential in his company's Revit implementation and currently manages their BIM standards and processes. Don works directly with his IT department, which enables him to bridge the gap between the end users and the hardware/software administrators. One of his chief responsibilities is to create custom MEP content for his firm. He worked for 2 years as an Application Specialist for a local Autodesk Reseller and is also a co-author of the Mastering Autodesk Revit MEP 2011, 2012, 2013 and 2014 editions.
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Joel is one of the co-authors of "Mastering Revit MEP 2012" and is currently the BIM manager for ACH Mechanical, an HVAC contractor. He has been an independent training and implementation consultant specializing in Autodesk® Revit® MEP, and has many years' experience with leading mechanical and plumbing design, and supporting electrical design for a wide range of projects. He has also worked with several major HVAC equipment manufacturers to develop their Revit content for distribution.
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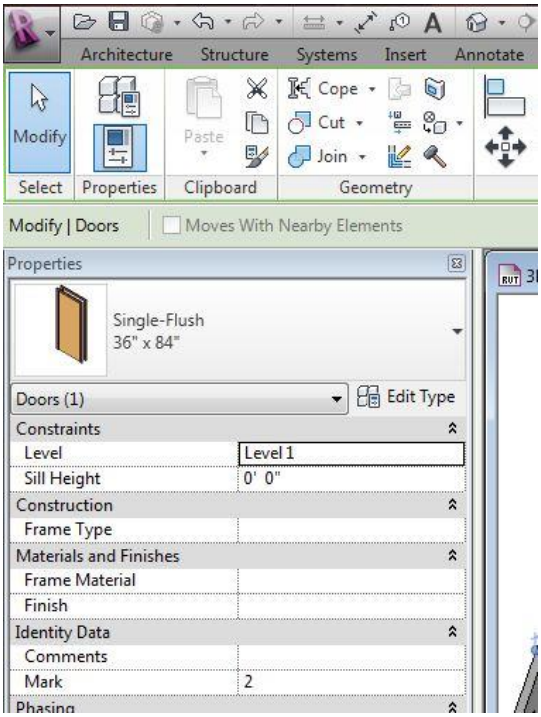
Definition of Revit Parameters

Revit provides a general mechanism for giving each element a set of parameters that you can edit.

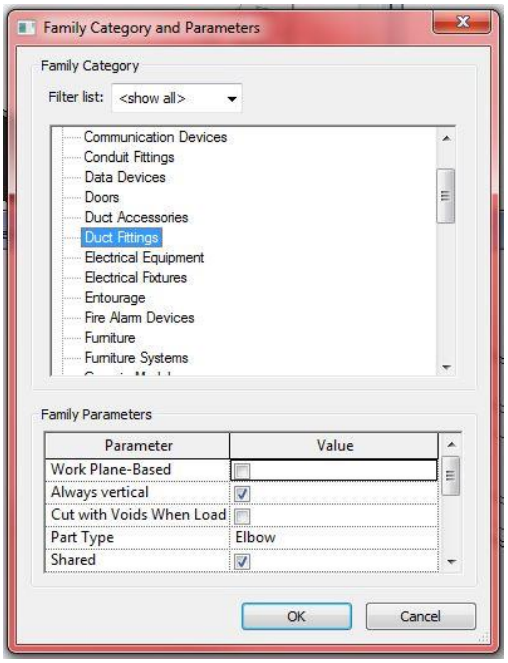


To begin this discussion it's simplest to state that Revit has two major and three minor types of parameters. Each of these can be shared or non-shared:

1. **Family**
   - Family Parameters *(hard coded)*
   - Family **Type** parameter
     - *Shared*
     - *Non-shared*
   - Family **Instance** parameter
     - *Shared*
     - *Non-shared*
2. **Project**
   - Project **Type** parameter
     - *Shared*
     - *Non-shared*
   - Project **Instance** parameter
     - *Shared*
     - *Non-shared*

Family Parameters – Hard coded by Category

The *Family Category and Parameters* tool assigns the properties of a predefined family category to the component you are creating. This tool is only available within the Family Editor.



Family parameters define behaviors or Identity Data that apply across all types in that family. Different categories have different family parameters based on how Revit expects the component to be used. Some common examples of family parameters that control how the family behaves include:

Always vertical: When selected, the family always appears vertical at 90 degrees, even if it is on a sloping host, such as a floor.

Work Plane-Based: When selected, the family is

hosted by the active work plane. You can make any non-hosted family a work plane-based family.

Shared: This parameter is only relevant when the family is nested into another family and loaded into a project. If the nested family is shared, you can select, tag, and schedule the nested family separately from the host family. If the nested family is not shared, then components created by the host family and nested family act as a single unit.

Identity Data parameters include Omniclass Number and Omniclass Title which are based on the Omniclass Table 23 product classification.

Family Type or Instance Parameters

You can create new **type** or **instance** parameters for any family type. By adding new parameters, you have more control over the information contained in each family instance or type. You can create dynamic (parametric) family types for increased flexibility within the model.

How do you choose which variation of parameter to use?

Family Instance parameters – Create instance parameters for an element value that you want to be able to change for just the selected object. This provides a high level of flexibility for that particular parameter value however; it will only apply to elements selected at the time. If you desire a value to be updated in all types of that family you must use a type parameter.

Family Type parameters – Create type parameters for an element value that you want to change for every instance of the family type within a project. This allows for creating fixed variations or "types" within the family (.rfa) file.

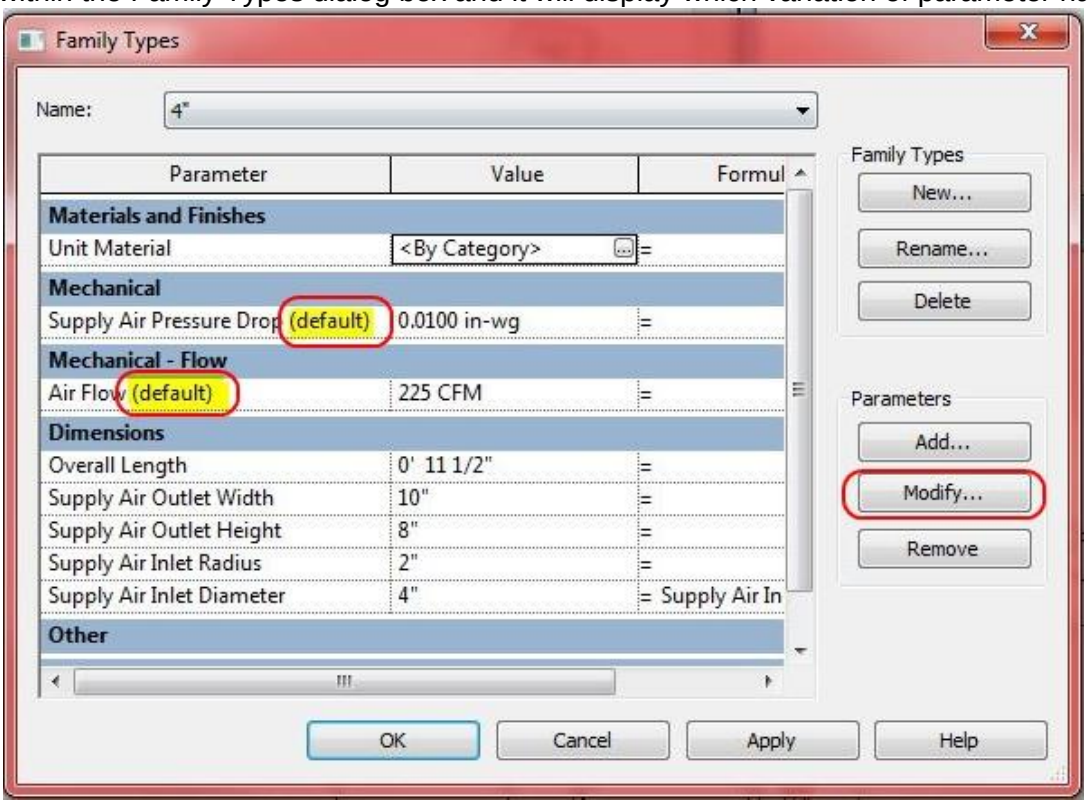
> ***Tip**: As MEP engineers when creating content based on a manufacturers product that will be used by your firm repeatedly, you will find that most parameters you create will be "Type" parameters. However, when adding your shared parameters to downloaded manufacturer content for a one time use, you may want to add them as "Instance" parameters.*

How do you identify parameter variations in existing families?

Project Environment - Within a project, simply selecting a family will display its instance parameters in the properties palate immediately. If several families are selected, only the instance parameters they have in common will display.

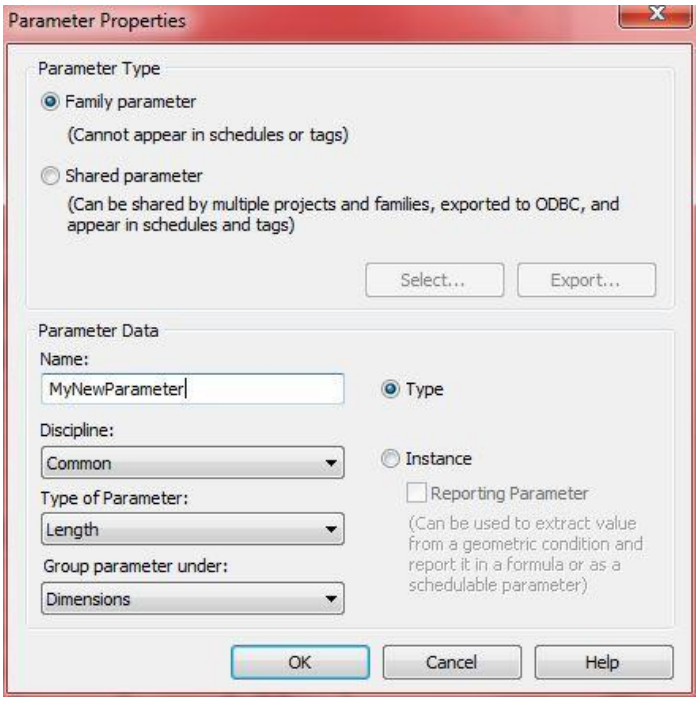
Family Editor – When customizing content within the *Family Editor* tool, choosing the *Family Types* button will display all of the instance and type parameters for that family. It is simple to identify Instance parameters as they will display with the word "(default)" in parenthesis after the parameter name. "Default" indicates the initial value for the parameter that can later be changed for any copy of the family in the project environment. Also you can select the Modify button

within the Family Types dialog box and it will display which variation of parameter has been chosen.



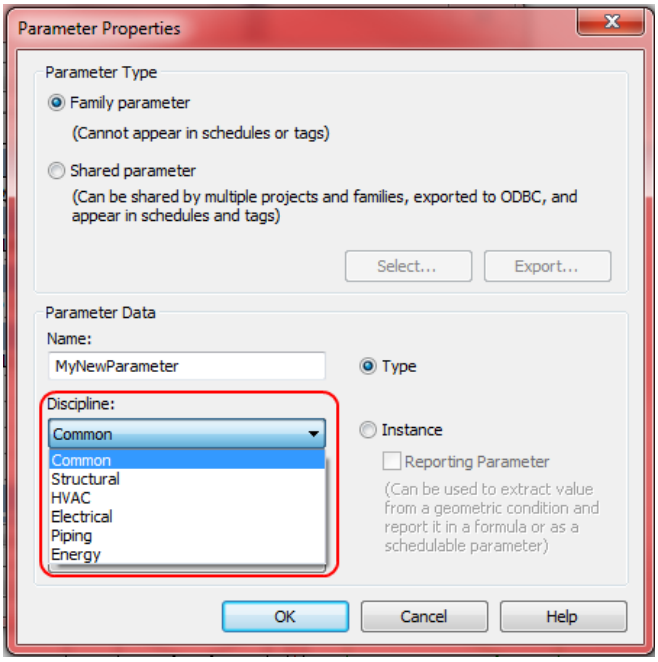
How do you create new custom parameters within a family?

Again, using the Family Types dialog box, select "Add" which will display the Parameter Properties dialog. From here you have a number of choices to make in order to create your custom parameter.



1. The reasons to choose either Family or Shared parameter are explained clearly within the dialog box.
2. Name your Parameter.
    a. ***Tip**: Keeping parameter names simple and using no spaces makes referencing the parameter within formulas much simpler down the road. Also refrain from using any characters that are also mathematical operators such as "-" which*

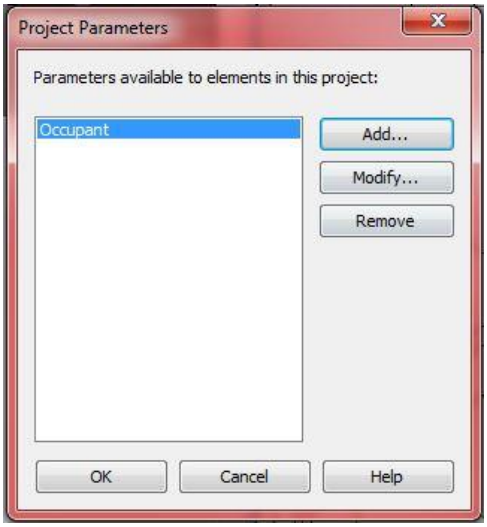
will be viewed as minus in a formula.



3. Discipline: Each discipline is simply a category of unit types. For example "Electrical Potential" (Voltage) will only be found under the "Electrical" discipline. This is important for defining the measurement units that your parameter will have. For generic values such as "Text" you will find these listed under the "Common" discipline.
4. Type of Parameter: After choosing your discipline, select from the available hard-coded types of parameters.
5. Group Parameter Under: Choose from the available hard-coded groups for your new parameter. This option is for visual organization only. This will affect where you find your new parameter; within the family editor the groups appear in the Family Types dialog box, within the project environment they appear in the Properties palate and the Type Properties dialog box.
6. Type or Instance: See explanation at the beginning of this section above.
7. Instance ***Reporting*** Parameter: These are for acquiring a value so that it can be used in formulas, or for information only. For example: A Reporting parameter called "Length" which measures the length of geometry in a family without driving it parametrically.

Project Parameters

Any piece of data in a project environment could be considered a Project parameter. For this discussion we will be focused on the Project Parameter dialog box.

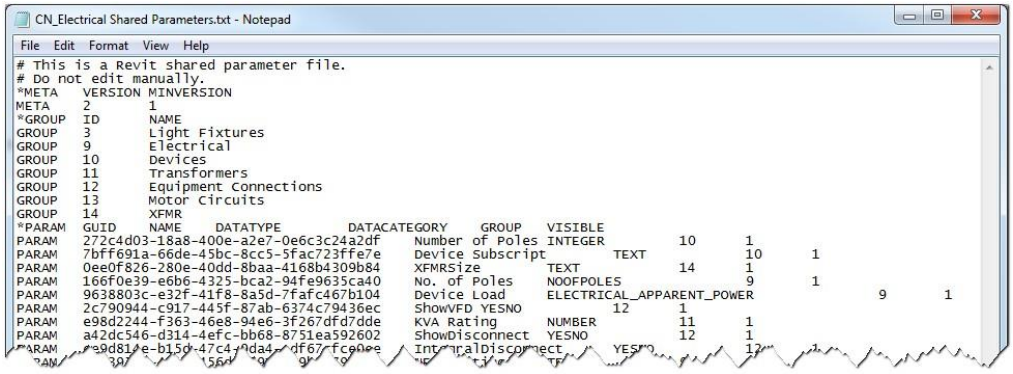


As you will notice it is similar to the Parameter Properties dialog in the Family Editor. One of the unique components of a project parameter is that it applies to every family or element of the selected Category. Another very useful aspect is that project parameters can be applied to "System Families" such as Electrical Circuits, HVAC Zones and Piping Systems to name a few.

***Tip**: Project parameters only apply to elements within that project. Revit will not embed a custom project parameter into your family .rfa file. However, if you copy and paste elements from one project to another and these elements already have custom project parameters <u>with data</u> associated, Revit will transfer these project parameters.*

Shared Parameters

Shared parameters are parameters of a pre-defined type and unit of measure. These parameters can be used in either the family environment or in a project. They are stored in a text file that can be accessed and edited in Revit. In fact, the only way you should edit a shared parameters file is through the Revit interface.



Sample Shared Parameters File Viewed in a Text Editor

Establishing a Library of Parameters

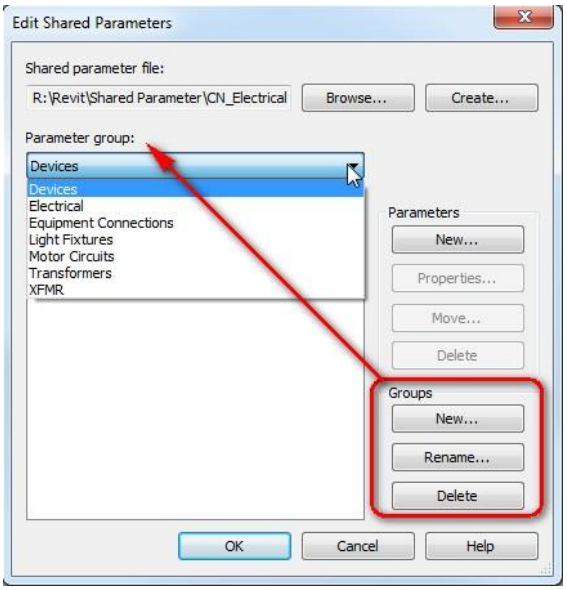
Many of the components used in MEP design share common properties. In order to maintain consistency among your Revit families it is important to establish a shared parameters file. shared parameters file acts as a “library” of parameters from which you can apply parameters to your content as needed.

By creating a shared parameters file (or files) you reduce the potential for duplication of work. For example: one user may create a family and create a parameter for voltage called “Voltage”, while another user creates a similar family using a parameter called “Equipment Volts”. Now you have two families with two separate shared parameters that are intended to communicate the same information. This can lead to problems when scheduling your components.

With a shared parameters file you have a library of parameters that can be applied to any content. Your shared parameters file(s) should be in a location that is accessible by any user responsible for content creation or editing. In the above example, each of the users could then access the shared parameters file and use the same “voltage” parameter.

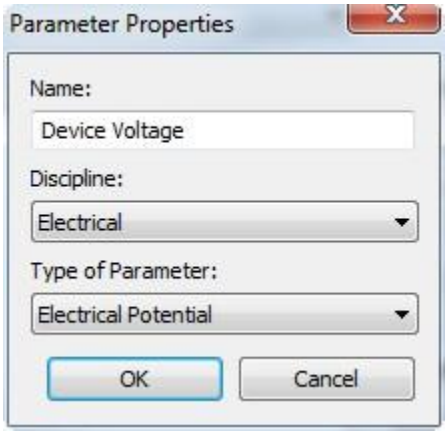
Creating a shared parameters file is done through the Revit interface. Select the Shared Parameters tool on the Manage tab to create/modify a shared parameters file. Once you have

established the file name and location you can create the parameters. Parameters can be grouped together for easy management of the shared parameters file.



Sample Groups in a Shared Parameters File

You can create parameters in the groups by clicking the New button under Parameters on the right side of the dialog box. In the Parameter Properties dialog box, give your parameter a name, choose the discipline and parameter type.



Example of a parameter created for the voltage of an electrical device. The parameter type is defined as Electrical Potential, so the value for this parameter will be in Volts. This means that only appropriate values can be used for the parameter, in other words: you cannot input text for the value of this parameter.

Once you have established the parameters in a shared parameters file you should save the file to an easily accessible location. You may choose to create more than one shared parameters file, to keep parameters organized and to more easily manage them. Perhaps you would have a file for all of your shared parameters for electrical families, and one for mechanical. This does not mean you cannot use parameters from both files in any family; it is simply for management and organization.

> ***Tip**: Carefully manage your shared parameter files: Organization is needed because of the fact that the shared parameter name we see is not what Revit uses to identify these parameters internally. The .txt file above has a column labeled **GUID**. This stands for Globally Unique Identification which is how Revit identifies shared parameters. It is possible to create shared parameters in different .txt files that have identical "names" but different GUID's. In the project environment, the GUID is not shown to the user and therefore a user will not be able to determine which parameter is being used.*

Another useful practice is to keep a record of your shared parameters and their intended use. One way to do this is to create a spreadsheet that lists the shared parameters in a file, along with any information about the parameters (such as how they are to be used in families).

Here is an example of a spreadsheet showing the shared parameters used for air handling unit families. The spreadsheet shows where the parameter should be grouped in the family, and whether it is an Instance or Type parameter. Other information is given that is helpful for knowing how the parameter will be used in the family.

	A	B	C	D	E	F	G	H	I
1	MECHANICAL Shared Parameters								
2									
3									
4	Revit Category	Parameter Name	Group Under	Discipline-Units	Shared Parmeter Group	Instance	Type	Project Parameter	Family Parameter
5	Mechanical Equipment	Schedule Type	Identity Data	Common - Text	Mechanical Equipment		X	X	X
6	Mechanical Equipment	Location	Identity Data	Common - Text	Mechanical Equipment	X		X	
7									
8	Mechanical Equipment	AHU Supply Max CFM	Mechanical - Airflow	HVAC - Air Flow	Air Handling Units	X			
9	Mechanical Equipment	AHU Supply Min CFM	Mechanical - Airflow	HVAC - Air Flow	Air Handling Units	X			
10	Mechanical Equipment	AHU Supply OA CFM	Mechanical - Airflow	HVAC - Air Flow	Air Handling Units	X			
11	Mechanical Equipment	AHU Supply ESP	Mechanical	HVAC - Pressure	Air Handling Units	X			
12	Mechanical Equipment	AHU Supply Fan HP	Electrical	Text	Air Handling Units	X			
13									
14	Mechanical Equipment	AHU Return CFM	Mechanical - Airflow	HVAC - Air Flow	Air Handling Units	X			
15	Mechanical Equipment	AHU Return ESP	Mechanical	HVAC - Pressure	Air Handling Units	X			
16	Mechanical Equipment	AHU Return Fan HP	Electrical	Text	Air Handling Units	X			
17									
18	Mechanical Equipment	Cooling ENT Air DB Temp	Mechanical - Airflow	HVAC - Temperature	Mechanical Equipment	X			
19	Mechanical Equipment	Cooling ENT Air WB Temp	Mechanical - Airflow	HVAC - Temperature	Mechanical Equipment	X			
20	Mechanical Equipment	Cooling LVG Air DB Temp	Mechanical - Airflow	HVAC - Temperature	Mechanical Equipment	X			
21	Mechanical Equipment	Cooling LVG Air WB Temp	Mechanical - Airflow	HVAC - Temperature	Mechanical Equipment	X			
22	Mechanical Equipment	Cooling ENT Water Temp	Mechanical	HVAC - Temperature	Mechanical Equipment	X			
23	Mechanical Equipment	Cooling LVG Water Temp	Mechanical	HVAC - Temperature	Mechanical Equipment	X			
24	Mechanical Equipment	Cooling Max GPM	Mechanical	Piping - Flow	Mechanical Equipment	X			
25	Mechanical Equipment	Cooling Max Coil PD	Mechanical	Piping - Pressure	Mechanical Equipment	X			
26	Mechanical Equipment	Cooling Max Air PD	Mechanical	HVAC - Pressure	Mechanical Equipment	X			
27	Mechanical Equipment	Cooling Control Valve	Mechanical	Common - Number	Mechanical Equipment	X			
28									
29	Mechanical Equipment	Heating ENT Air Temp	Mechanical - Airflow	HVAC - Temperature	Mechanical Equipment	X			
30	Mechanical Equipment	Heating LVG Air Temp	Mechanical - Airflow	HVAC - Temperature	Mechanical Equipment	X			
31	Mechanical Equipment	Heating ENT Water Temp	Mechanical	HVAC - Temperature	Mechanical Equipment	X			
32	Mechanical Equipment	Heating LVG Water Temp	Mechanical	HVAC - Temperature	Mechanical Equipment	X			

Air Terminals | Duct Heaters | Fans | Boilers | Chillers | VAVs | FCUs | **AHUs** | Heat Pumps | Pumps | Unit Heaters | Tube Heaters | Dehumidification Unit | DXs | CTs

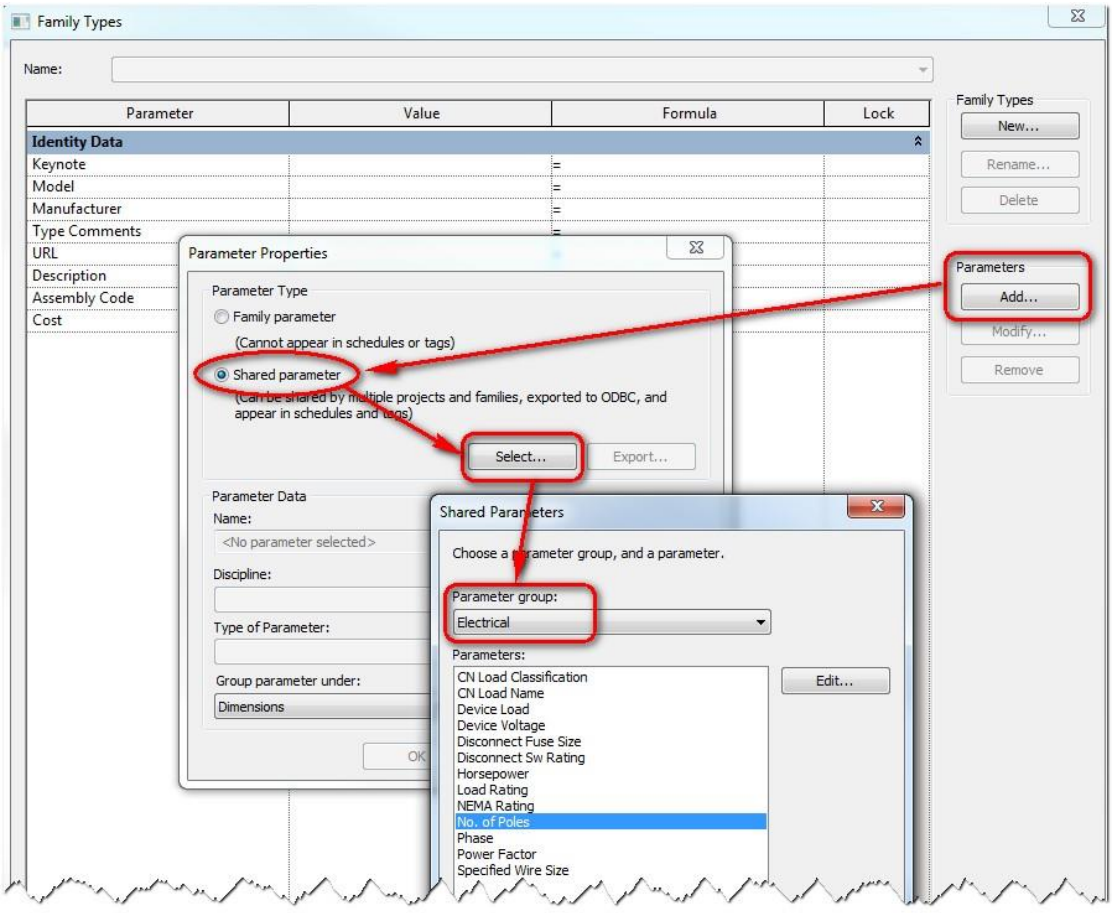
Keeping a well-organized and documented library of shared parameters is a great way to maintain consistency and increase productivity in your Revit projects and workflow.

Using Shared Parameters in Revit

Shared parameters can be used in Revit in the same way as other parameter types. However there are some slight differences in how they are created and added to content and projects. Once added, they also have additional capabilities that make them more appropriate for some specific applications.

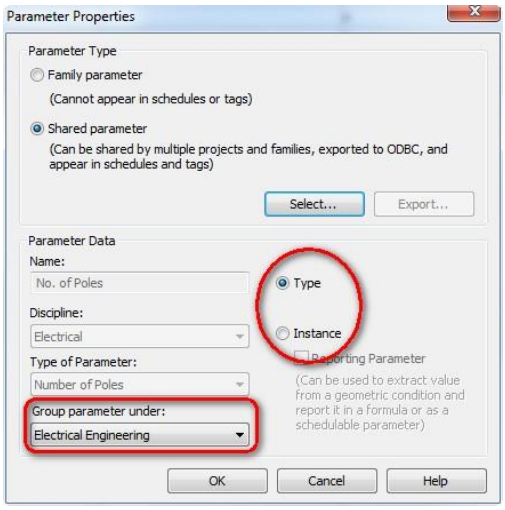
Shared Parameters in the Family Editor Environment

When you are working in the Family Editor, the process of adding a shared parameter is the same as adding a family parameter, except that the parameter is already defined so all you have to do is select the desired parameter and choose where to list it in the properties of the family.



The Edit button on the Shared Parameters dialog box allows you to choose a different shared parameters file, or to make changes to the current file being accessed. So, you could create a shared parameter “on the fly” if necessary.

When you select the desired parameter the Name, Discipline and Type are already defined. All you have to do is decide whether to make it an Instance or Type parameter, and which Group to place the parameter in.



Note: Revit will "suggest" a Group option based on the discipline and unit of measure of the parameter.

Project Environment

When working in a project, shared parameters can be added to categories of families by creating a Project Parameter. This is useful for parameters that you wouldn't normally want in your families, but are required for a specific project.

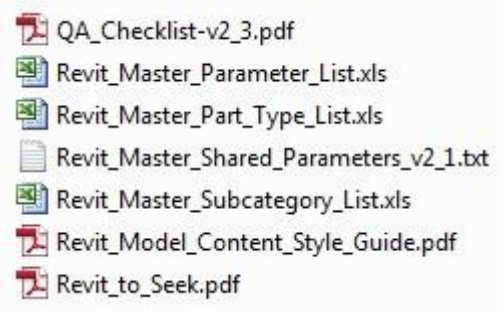
Industry Standard

With the ever increasing amount of content out there users have been asking the question "Wouldn't it be nice to have a 'standard' for shared parameters?" The idea of standardizing shared parameters stems from their importance when it comes to scheduling. If there could somehow be a universal shared parameters file then everyone creating content and schedules could use them in their projects.

If everyone creating content, from manufacturers to BIM managers and modelers, used a standard set of shared parameters it would allow for interoperability at the highest level. Imagine being able to schedule content from any manufacturer without having to add your own parameters to the already information rich families!

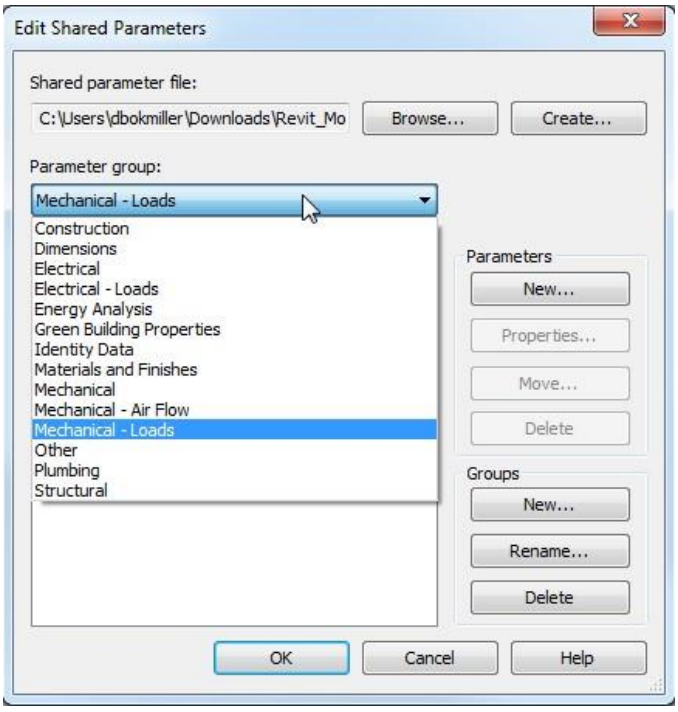
Unfortunately, the market is so saturated it would be extremely difficult (if not impossible) to get **everyone** together to agree on a standard list of parameters. Then there is also the task of modifying any existing content and schedules to the standard.

However, if you are new to content creation, or if you are looking for an established list of shared parameters you can download the Revit Model Content Style Guide from Autodesk® Seek®**.** (http://seek.autodesk.com/revit.htm)



This guide comes with documents explaining best practices for creating content, especially for submittal to the Seek website, along with a shared parameters file.

The file contains groups of parameters for various disciplines and family category types.



Workflow Example: Applying Shared Parameters to Downloaded Content

Wherever your shared parameters come from, with good documentation and an understanding of their use, it is easy to add them to your families or projects. There are even tools available that allow you to add multiple shared parameters to a family in one step.

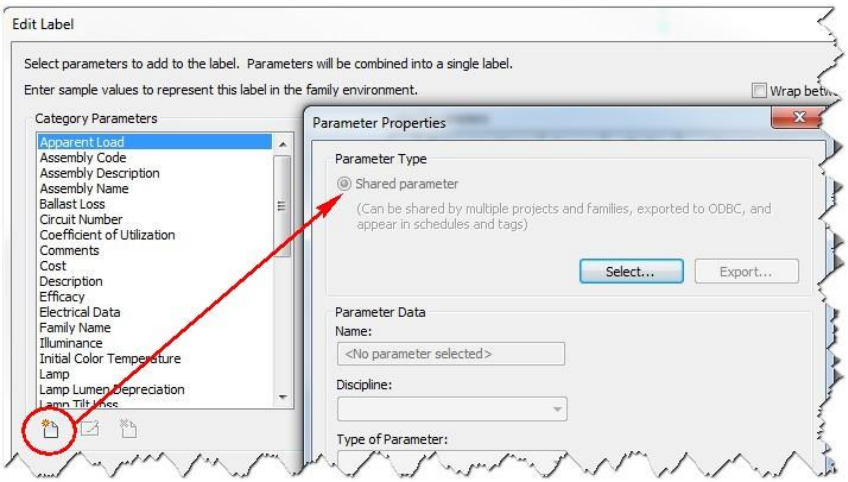
Parameters – Schedules and Tags

Revit schedules simply report the values of the parameters within the category being scheduled. Because of this, it is important to be consistent with the parameters you use in your content and projects. This is facilitated by the use of shared parameters.

Revit and Shared Parameters Can Appear in Schedules and Tags

When you are creating your schedules, remember that the parameters you create directly in families cannot appear in your schedules. In order for a parameter to be schedulable, it must be either a shared parameter (directly in the family or as a project parameter) or one of the parameters hard coded into Revit. *(Note: Project parameters that are not shared parameters can also be scheduled.)*

One key attribute of shared parameters is their ability to be used in tags. This enables you to create custom tags, reporting any information you want from a family. If you add a shared parameter to a family, you can create a tag family with a label using that same shared parameter.

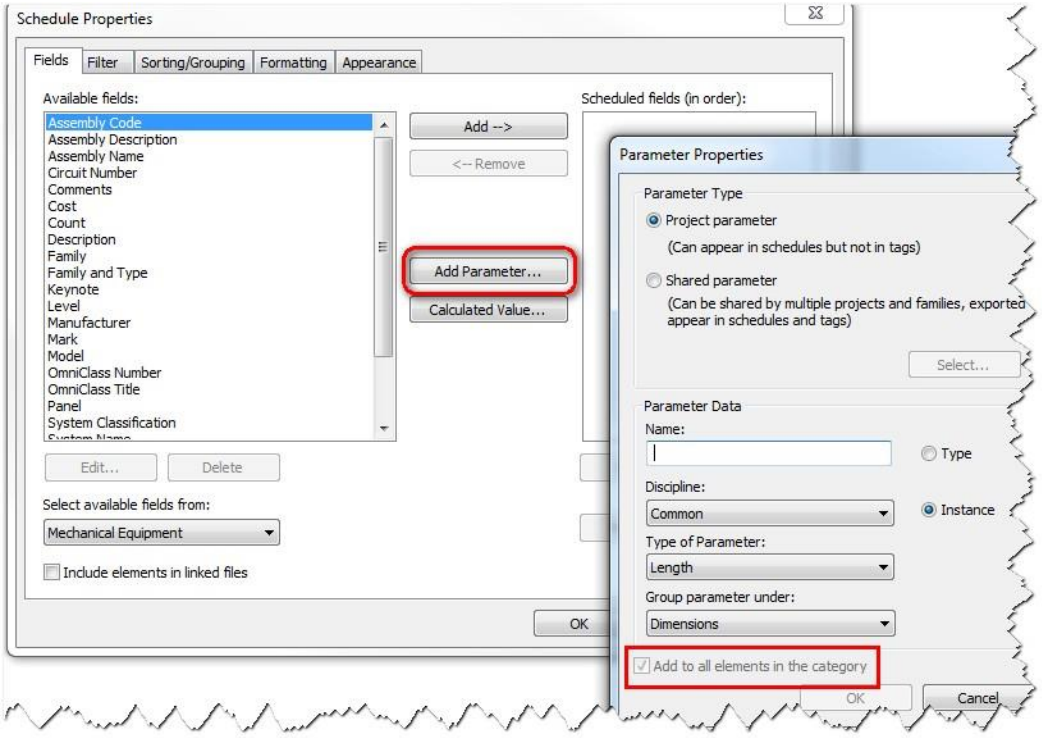


Notice that when you are adding a Label to a tag family and you choose the option to create a new parameter, Revit only gives you the option to use a shared parameter.

Project Parameters (Schedules Only)

As mentioned earlier, project parameters can be scheduled regardless of whether they are shared parameters or not. The main difference is that you cannot use a “non-shared” project parameter in a tag family.

When you are creating/modifying a schedule, you have the option to create a parameter. The parameter you create will be added to every family in the category which you are scheduling.



This can be a bit of a nuisance, especially in broad categories such as Mechanical Equipment. Let's say you are creating a schedule for VAV boxes and you have a parameter that you want to use that is specific to VAVs. If you add it as a project parameter then it will be applied to all mechanical equipment families in the project. A recommended practice for these types of parameters is to add them directly to the families (in the Family Editor) as shared parameters.

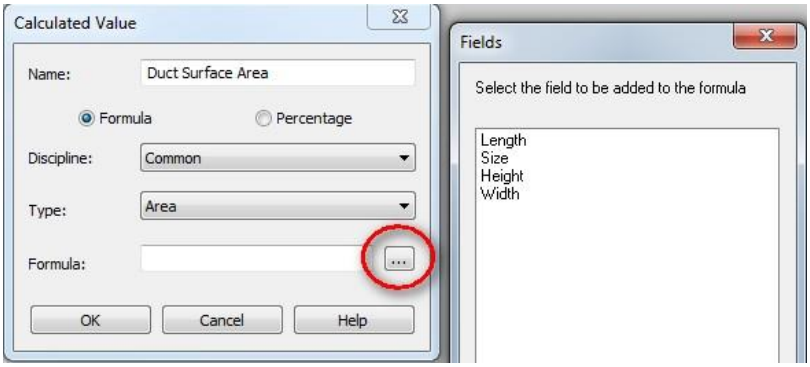
Because some parameters report similar information, at a minimum you should name the parameters to indicate their specific purpose when using project parameters. For example: you could create a project parameter called *VAVSupplyAir* and one called *AHUSupplyAir* so that even if both exist in all of your project's mechanical families, you will know which ones are appropriate for their respective schedules.

Calculated Values in Schedules

Another kind of parameter is one that exists only in a schedule. A calculated value parameter can be created by creating an equation involving other parameters that exist in the schedule. These 'parameters' do not exist in the properties of the elements being scheduled, only in the schedule itself.

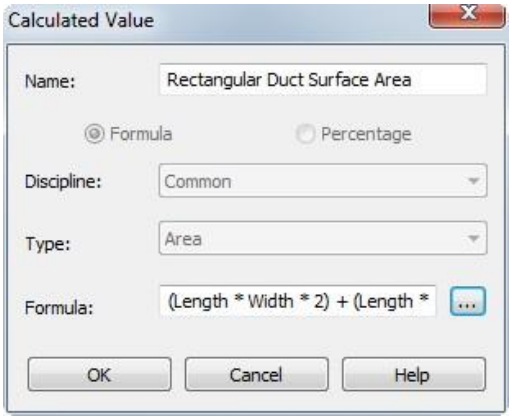
Calculated values are a great way to enhance your schedules and use the data within your Revit models for engineering, estimating or management purposes.

When it comes to using parameter names in calculated values, Revit is case sensitive so it is important to type the parameter names exactly as they appear. In fact, Revit provides a button that lets you choose the parameters from a list, so you don't have to type them at all.



When you create a formula for a calculated value the result must match the units of the Type chosen for the calculated value.

In this example, Length *x* Width, and Length *x* Height (units of length) are multiplied together, resulting in an area, so the Type for the calculated value needs to be Area. *(Revit will warn you if your units are "inconsistent")*



Duct Schedule

Family and Type	Size	Length	Height	Width	Rectangular Duct Surface Area	Diameter	Round Duct Surface Area
Rectangular Duct: Radius Elbows / Tee	12"x12"	11' - 0"	12"	12"	44 SF		
Rectangular Duct: Radius Elbows / Tee	12"x12"	5' - 0"	12"	12"	20 SF		
Rectangular Duct: Radius Elbows / Tee	12"x12"	9' - 0"	12"	12"	36 SF		
Rectangular Duct: Radius Elbows / Tee	24"x18"	15' - 0"	18"	24"	105 SF		
Rectangular Duct: Radius Elbows / Tee	24"x18"	8' - 0"	18"	24"	56 SF		
Rectangular Duct: Radius Elbows / Tee	24"x18"	14' - 0"	18"	24"	98 SF		
Round Duct: Taps / Short Radius	8"ø	24' - 8"				8"	52 SF
Round Duct: Taps / Short Radius	8"ø	5' - 4"				8"	11 SF
Round Duct: Taps / Short Radius	8"ø	22' - 4"				8"	47 SF
Round Duct: Taps / Short Radius	8"ø	4' - 10"				8"	10 SF
Round Duct: Taps / Short Radius	8"ø	22' - 4"				8"	47 SF
Round Duct: Taps / Short Radius	8"ø	6' - 10"				8"	14 SF
Round Duct: Taps / Short Radius	8"ø	23' - 8"				8"	50 SF
					359 SF		230 SF

Sample schedule using calculated values

Tip: You cannot use the Count parameter in formulas for calculated values.
This hinders your ability to do things like cost estimation directly in a schedule.

You can use a calculated value parameter in the formula of another calculated value, so the possibilities are exponential. It all depends on your creativity and the information you want in your schedules.

Workflow Example: Project Parameters Automatically Applied to Loaded Families

On occasion you may see a parameter that is available for scheduling and add it to your schedule, only to find that the value is not editable for all instances of the elements listed. This happens when not all of the loaded families have that parameter.

Key Schedules

Key schedules are a special tool within the project environment used to manipulate and automate some parameter data entry functions. The most common use is to preset a series of requirements and then apply these requirements to model elements.

For example, the air flow requirements for medical spaces are complex and very specific. Mapping these building code requirements to the spaces in your model can be tedious, time consuming, and, probably worst of all, prone to errors if you manually re-typed them for each room in the building. The Key Schedule allows you to type all this once and then apply that pre-defined series of parameter values to the spaces with a single click.

Code requirements to be implemented

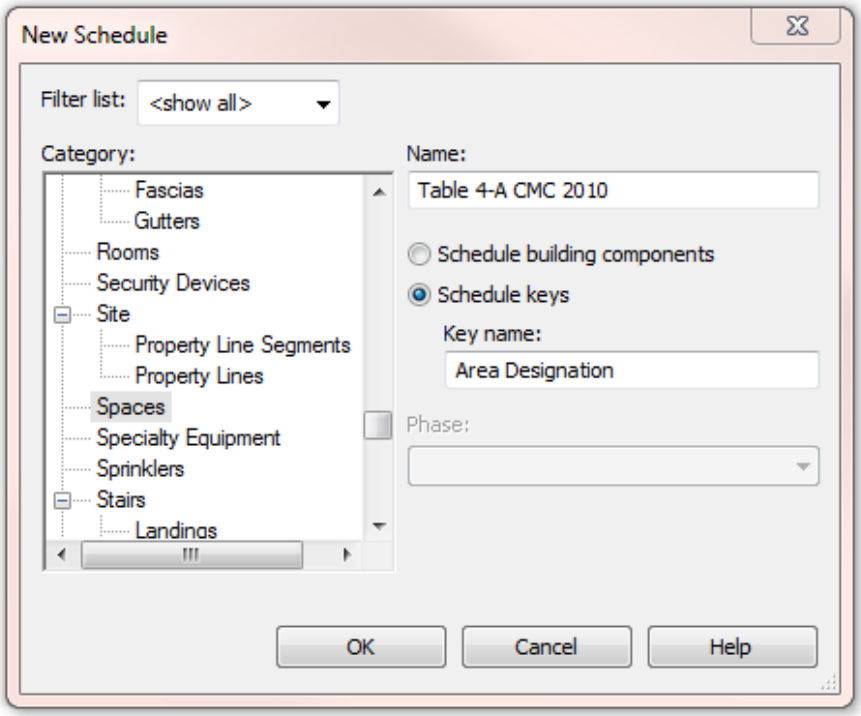
TABLE 4-A
PRESSURE RELATIONSHIP AND VENTILATION REQUIREMENTS FOR GENERAL ACUTE CARE HOSPITALS, SKILLED NURSING FACILITIES, INTERMEDIATE CARE FACILITIES, CORRECTIONAL TREATMENT CENTERS, OUTPATIENT FACILITIES, AND LICENSED CLINICS

A	B	C	D	E	F
			CONDITIONED AIR NOT 100% O.S.A		
AREA DESIGNATION	AIR BALANCE RELATIONSHIP TO ADJACENT AREAS[8]	MINIMUM AIR CHANGES IF 100% O.S.A.	MINIMUM AIR CHANGES OF OUTDOOR AIR PER HOUR	MINIMUM TOTAL AIR CHANGES PER HOUR	ALL AIR EXHAUSTED DIRECTLY TO OUTDOORS
Operating room, cardiac catheterization lab and cystoscopy	P[7]	12	5	20	—
Patient holding preparation[1]	NR	6	2	6	—
Delivery room, cesarean operating room	P	12	5	20	—
Newborn/well baby nursery	P	6	2	6	—
Post anesthesia care unit	NR	6	2	6	Yes
Intensive care service spaces, acute respiratory - care service spaces, burn service spaces, coronary - care service spaces, pediatric intensive - care service spaces[9]	P	6	2	6	—
Newborn intensive care	P	6	2	6	—
Emergency department[1]					
Waiting area	N	12	2	12	Yes[2]
Operating room	P	12	5	20	—

Creating a Key Schedule

Begin your key schedule similar to any other, but once you select your category, instead of building components, select the "Schedule keys" option. Carefully name your schedule in order to make it obvious in the future that it is not a typical schedule.

> ***Tip:*** *For key schedules used to implement code requirements, name the schedule after the code reference*



Make special note of the "Key name:" you use. This is not shown in the finished schedule and will be hard to determine later.

Now click the Add Parameter button to create new Project Parameters for each column of data desired.

Once your parameters/columns are created, you can add rows of data to represent the selectable options for later use. The Key Name, "Area Designation" in this example, will be the selection you make in order to apply the data shown in the rest of the columns.

Table 4-A CMC 2010				
Key Name	Air Balance Relationship	Min Air Chan	Min Air Chan	All Exhaust
Administrative	NR	2	4	☐
Bathroom/Jan/Trash/Soiled	N		10	☑
Blood Draw	NR	2	6	☐
Clean Linen	P	2	2	☐
Corridor	NR	2	4	☐
Dietary Dry Storage	NR		2	☐
Dining	NR	2	10	☐
Dishwashing	N		10	☑
Exterior Space				☐
Food Prep	NR	2	10	☑
Isolation Anteroom - Airborne	P	2	10	☑
Isolation Room - Airborne	N (Min 75CFM)	2	12	☑
Laundry, General	NR	2	10	☑

Applying your Key Schedule

Once the Key Schedule is complete, create a standard building component schedule and add the parameters just created, including the Key name, by selecting them from the list on the left and using the “Add -->” button.

After the building component schedule is done and being edited, the Key name, “Area Designation” in this example, becomes a drop down selector. When the selection is made, the other columns are automatically filled in according to the data you’ve entered in the Key Schedule.

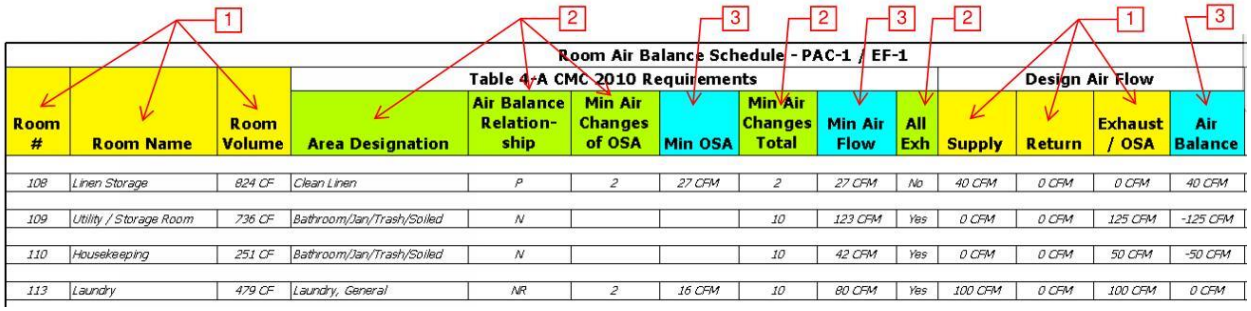
Room Air Balance Schedule - PAC-2 / EF-2 / EF-10

Room #	Room Name	Room Volume	Table 4-A CMC 2010 Requirements: Area Designation	Air Balance Relation- ship	Min Air Changes of OSA	Min OSA	Min Air Change
112	Isolation Anteroom Airborne Infec	474 CF	Isolation Anteroom - Airborne	P	2	16 CFM	10
112	Isolation Room Airborne Infection	1196 CF	Isolation Room - Airborne	N (Min 75CFM)	2	40 CFM	12
112A	Toilet	628 CF	Laundry, General	N			10
116	Patient Room	2198 CF	Operating Room	NR	2	73 CFM	6
116A	Toilet	378 CF	Patient Room	N			10
118	Patient Room	2198 CF	Pharmacy	NR	2	73 CFM	6

End Result

The resulting schedules demonstrate detailed parametric documentation capable of applying the requirements to your project. This can both assist your design and confirm code compliance to the administrative authority. Like any parametric schedule, this will automatically update based on elements in the model, i.e. additional supply air added to a space, or changes to the room sizes.

The finished product is shown below using a combination of building element information (1-Yellow), key schedule data (2-Green) and calculated values (3-Blue).



Room Air Balance Schedule - PAC-1 / EF-1

Room #	Room Name	Room Volume	Table 4-A CMC 2010 Requirements: Area Designation	Air Balance Relation-ship	Min Air Changes of OSA	Min OSA	Min Air Changes Total	Min Air Flow	All Exh	Design Air Flow: Supply	Return	Exhaust / OSA	Air Balance
108	Linen Storage	824 CF	Clean Linen	P	2	27 CFM	2	27 CFM	No	40 CFM	0 CFM	0 CFM	40 CFM
109	Utility / Storage Room	736 CF	Bathroom/Jan/Trash/Soiled	N			10	123 CFM	Yes	0 CFM	0 CFM	125 CFM	-125 CFM
110	Housekeeping	251 CF	Bathroom/Jan/Trash/Soiled	N			10	42 CFM	Yes	0 CFM	0 CFM	50 CFM	-50 CFM
113	Laundry	479 CF	Laundry, General	NR	2	16 CFM	10	80 CFM	Yes	100 CFM	0 CFM	100 CFM	0 CFM