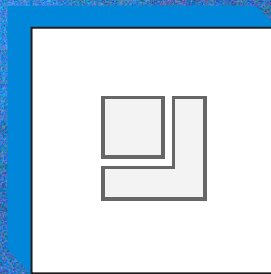


BIMPURE

presents

PAMPHLETS

by: Nicolas Catellier, Architect

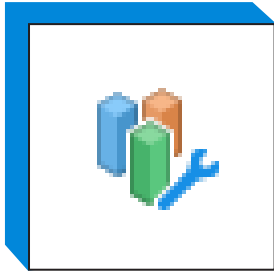


ISSUE #24

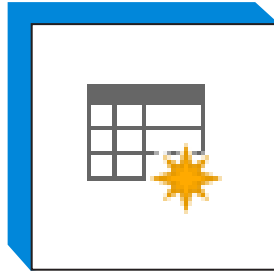
FAMILIES

PAMPHLETS COLLECTION

- BASICS / MODEL
- DESIGN / PRESENT
- ORGANIZE / AUTOMATE
- CULTURE / TECH



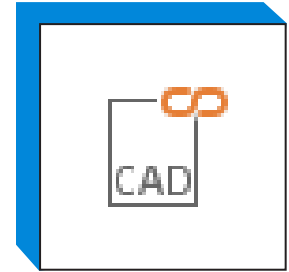
ISSUE #1
WORKSETS



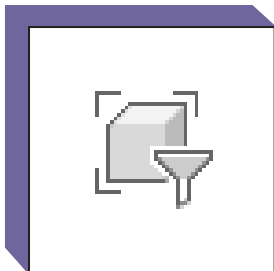
ISSUE #2
SCHEDULE



ISSUE #3
PHASES



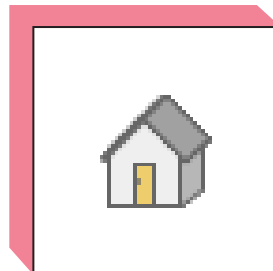
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LINK CAD



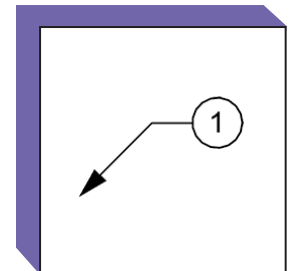
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FILTERS



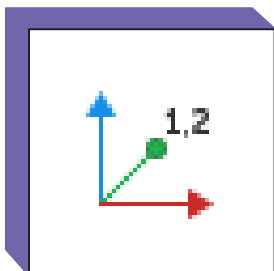
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VIRTUAL REALITY



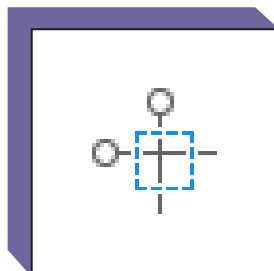
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3D VIEWS



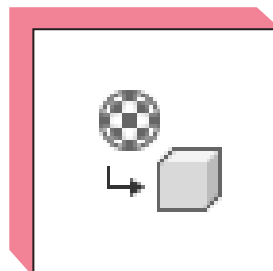
ISSUE #8
PLAN NOTES



ISSUE #9
COORDINATES



ISSUE #10
SCOPE BOXES







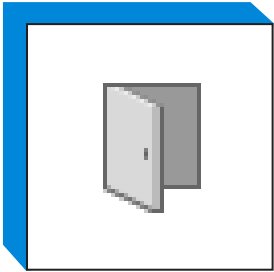
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FINISHES



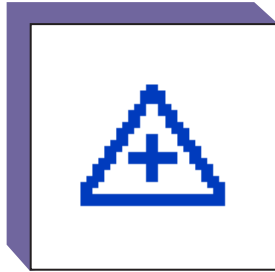
ISSUE #12
LINE WEIGHTS

PAMPHLETS COLLECTION

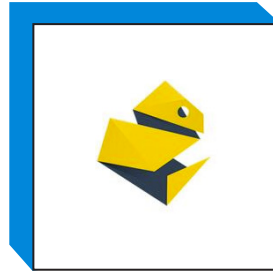
-  BASICS / MODEL
-  DESIGN / PRESENT
-  ORGANIZE / AUTOMATE
-  CULTURE / TECH



ISSUE #13
DOORS



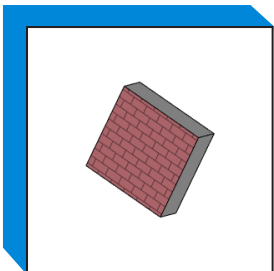
ISSUE #14
SHARED
SITE



ISSUE #15
PYREVIT



ISSUE #16
ADD-INS



ISSUE #17
SLANTED
WALLS



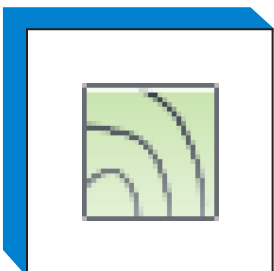
ISSUE #18
RAILINGS
PART 1



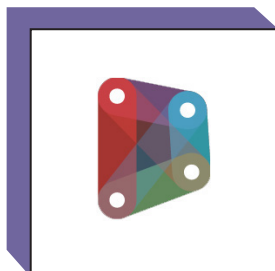
ISSUE #19
RAILINGS
PART 2



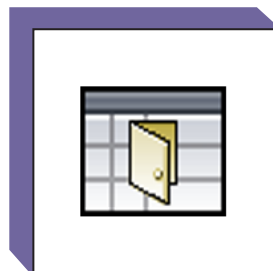
ISSUE #20
PHASES
PART 2



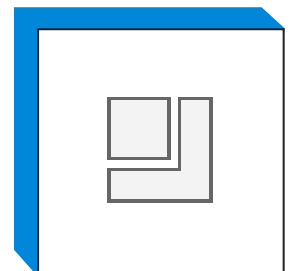
ISSUE #21
LANDSCAPE



ISSUE #22
DYNAMO







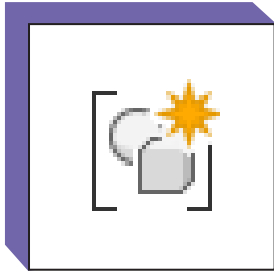
ISSUE #23
DOOR
SCHEDULES



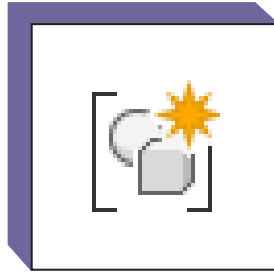
ISSUE #24
FAMILIES

PAMPHLETS COLLECTION

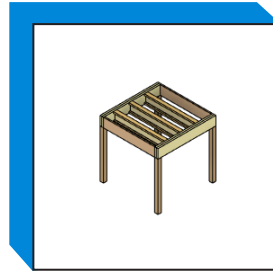
-  BASICS / MODEL
-  DESIGN / PRESENT
-  ORGANIZE / AUTOMATE
-  CULTURE / TECH



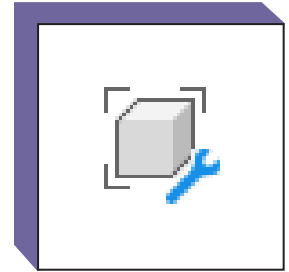
ISSUE #25
**GROUPS
PART 1**



ISSUE #26
**GROUPS
PART 2**



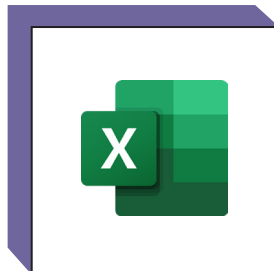
ISSUE #27
**NESTED
STRUCTURE**



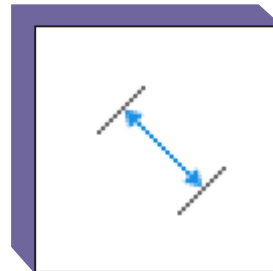
ISSUE #28
**FAMILY
VISIBILITY**



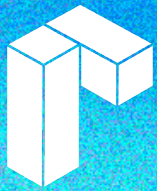
ISSUE #29
**AUTO
NUMBERING**



ISSUE #30
EXCEL



ISSUE #31
**FAMILY
DIMENSIONS**



BIMPURE

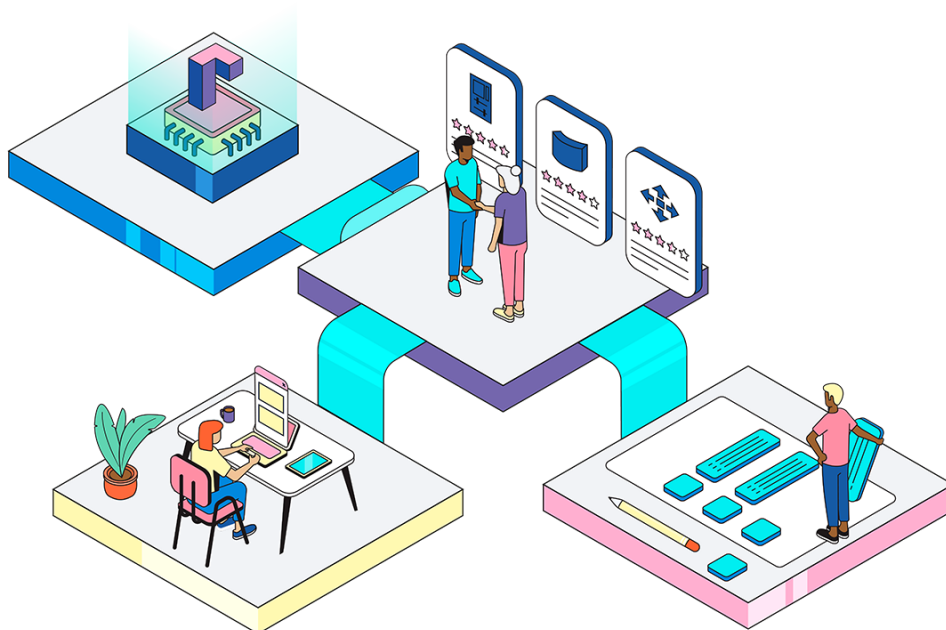
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WHAT IS THIS “PAMPHLET”?

BIM Pure Pamphlets are published 4 times a year by email. Each edition covers a particular Revit theme. We like to pick themes that are complex and confusing. Our job is to make these topics simple for you.

WHY FAMILIES?

The most recent pamphlets have covered intermediate to advanced topics in Revit.

For this edition, we decided to go back to basics.

This pamphlets offer an overview of “families” in Revit. You will learn the different kind of families. You will learn where you can find decent families on the internet and how to manage all your content. Then, you will learn the basic information you need to create your first family.

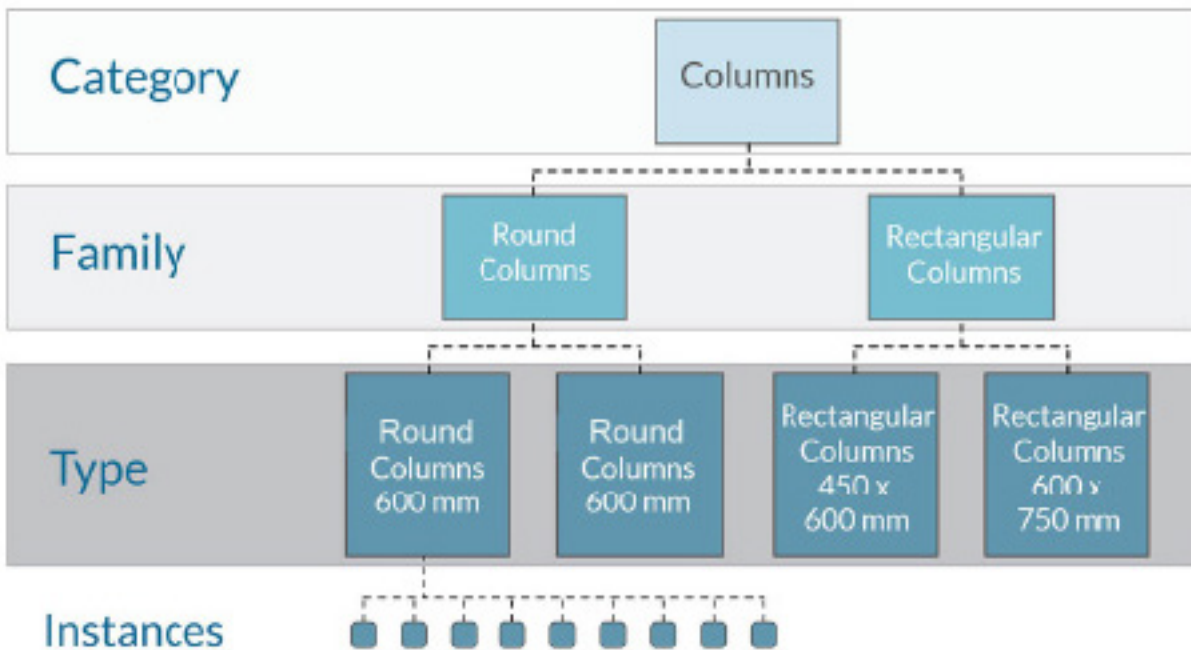
Thanks to Purvi Irwin for her great work documenting good practices with families. Thanks to Gavin Crump for his good summary of why manufacturers families are problematic.

Let’s get started!



13 TIPS TO UNDERSTAND AND ORGANIZE REVIT FAMILIES

1- DIFFERENTIATE CATEGORY, FAMILY, TYPE AND INSTANCE



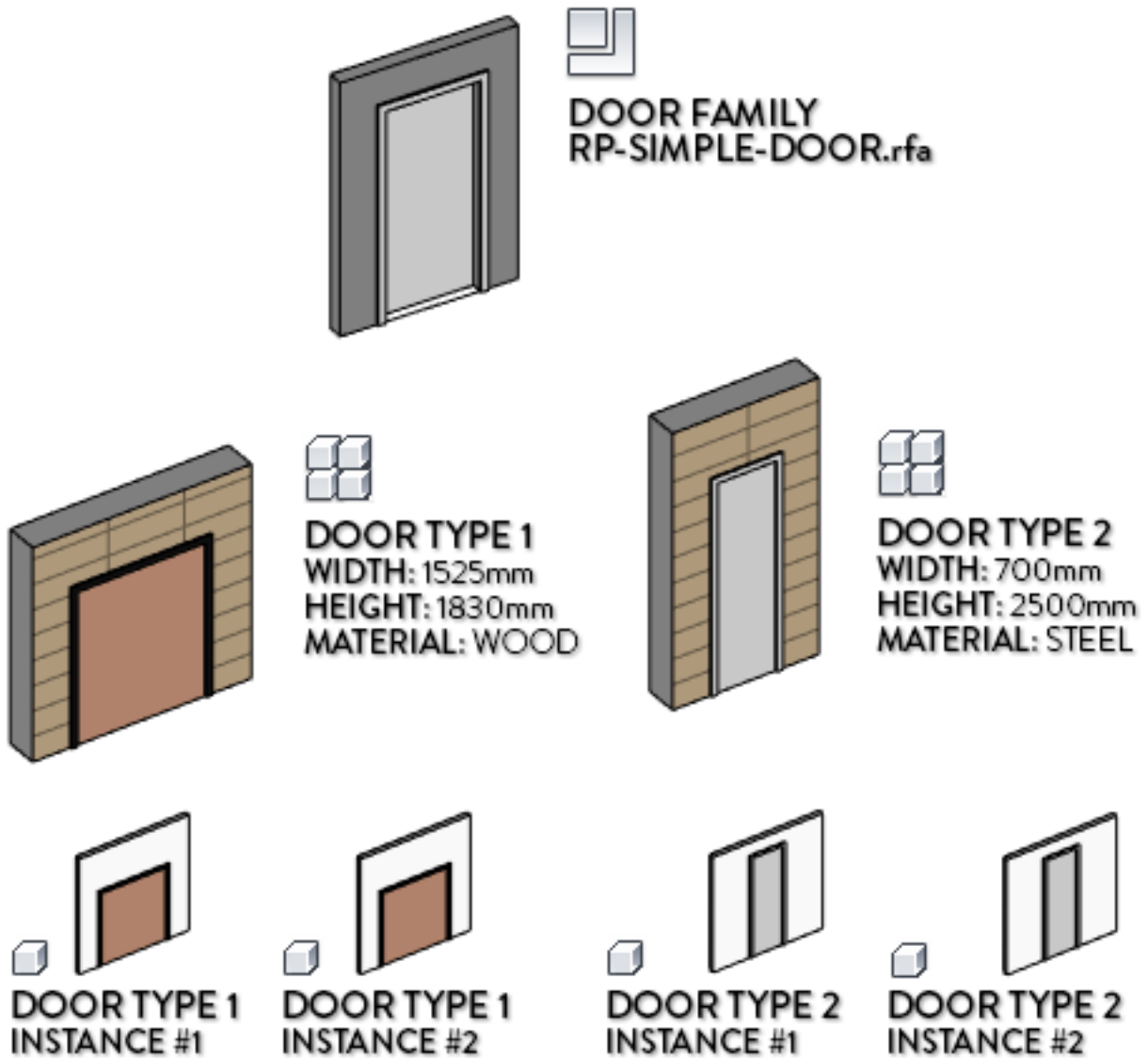
Before even talking about families, it is imperative that you understand the difference between category, family, type and instances. The image above should help you understand.

Categories are built-in Revit and can include either building components (columns, walls, ducts) or symbolic elements (tags, dimensions, regions).



In the image below, you can see an example from the Doors category. We have a loadable .rfa Simple Door family that was created by a user. This family has two different types, each with different dimensions and materials.

Then, each type has multiple unique instances placed in a project.

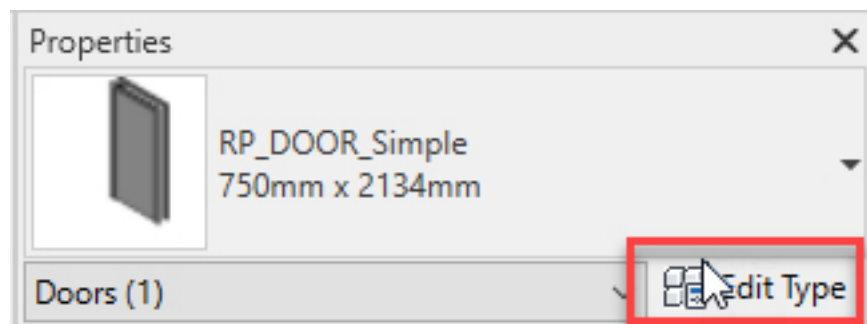




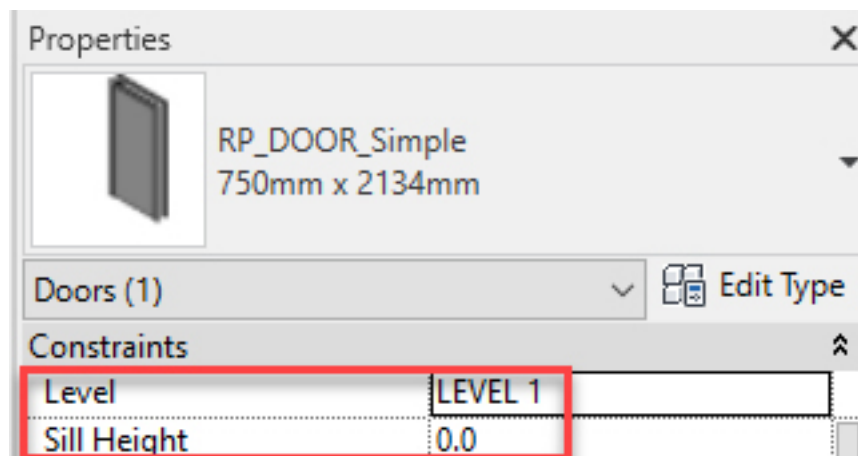
In this example, a door is selected. You can edit the **family**, which will affect all types and all instances.



You can also edit the **type properties**, which will affect all instances of this specific type.



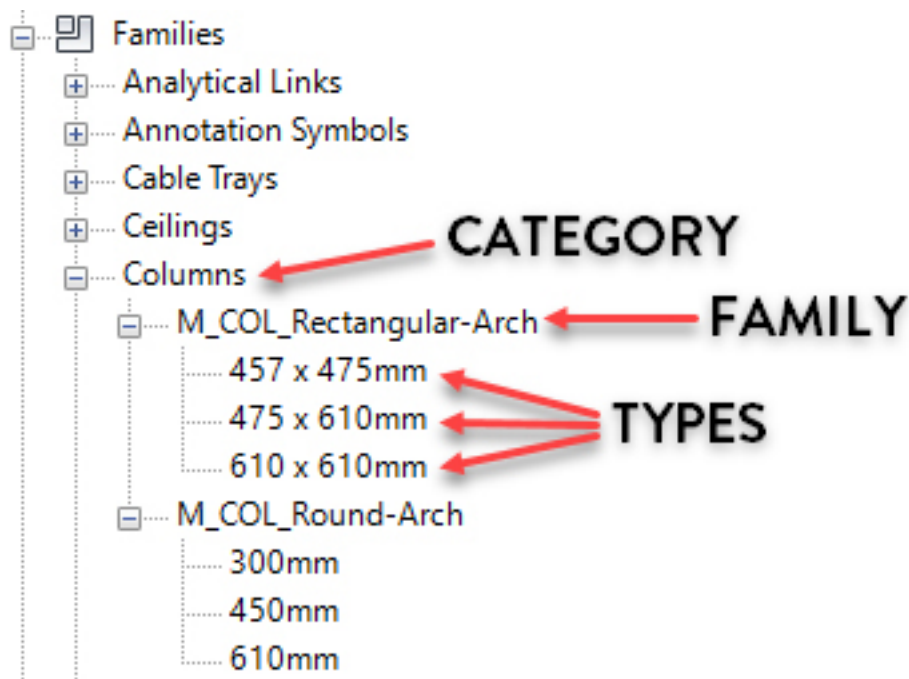
Or you can edit the **instance properties**, which will only affect this specific door.



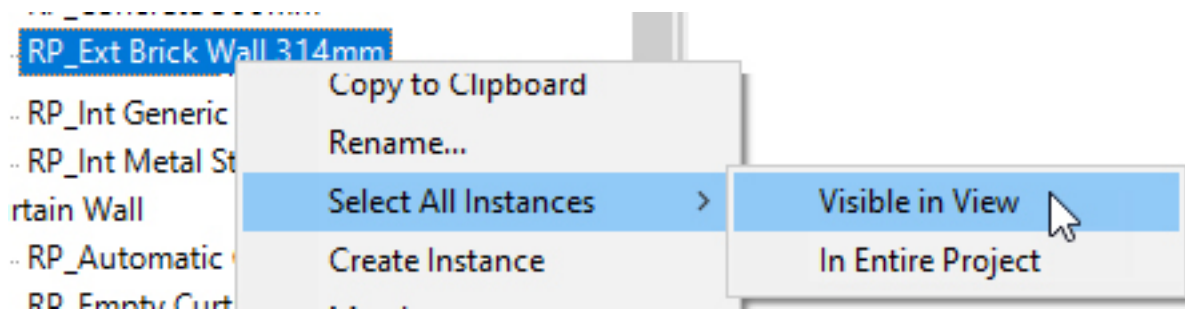


2- FIND FAMILIES IN THE PROJECT BROWSER

In the project browser, you can find all families in the project. In the image below, you can see the first level represent categories. The second level shows the families and the 3rd level shows the types.



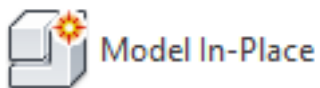
Although the instances never appear in the project browser, it is possible to select all the instances in the view or in the project by right-clicking a type:





3- DIFFERENTIATE 3 KINDS OF FAMILIES

When most users think of a family, then think of a loadable .rfa file they can create or download. There are actually 3 different kinds of families in Revit:



Model In-Place

In-Place Families:

- These families are modeled directly in a Revit project.
- They are difficult to reuse, they are slow and they can cause performance issues.
- Avoid this feature and use loadable families instead.



Loadable Families:

- These are the families that you most commonly create and modify in Revit.
- They are created in a .rfa file and then loaded in a model or template.
- Categories can include windows, furniture, tags and plumbing fixtures.



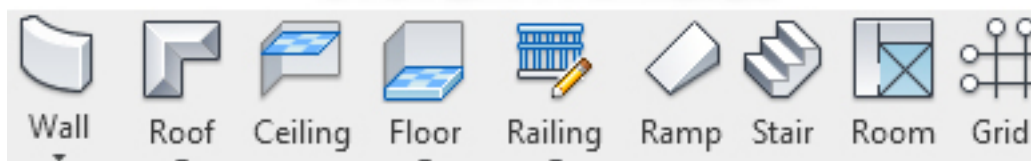
System Families:

- System families are predefined in Revit.
- You do not load them into your projects from external .rfa. They are embedded inside a model or template.
- Categories can include walls, roofs, ducts and dimensions.

4- UNDERSTAND WHICH FAMILIES ARE LOADABLE OR SYSTEM

In the image below, you can see a list of Revit categories, classified by either System or Loadable families. This list is not complete, but it can give you an overview.

SYSTEM FAMILIES

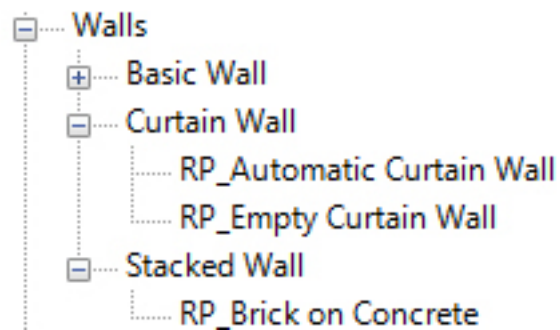


LOADABLE FAMILIES

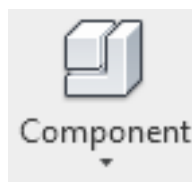




For example, the **wall category** has 3 system families: Basic Walls, Stacked Walls and Curtain Walls. These system families are built-in and can't be modified or deleted. You can create types for each of these system families.



All system families have their own icon in the ribbon. However, not all loadable families have their own icons. That's why you can use the **Component** tool in the Architecture, Systems or Structure tabs. This will contain all additional loadable families like furniture, entourage, parking, casework and many others.

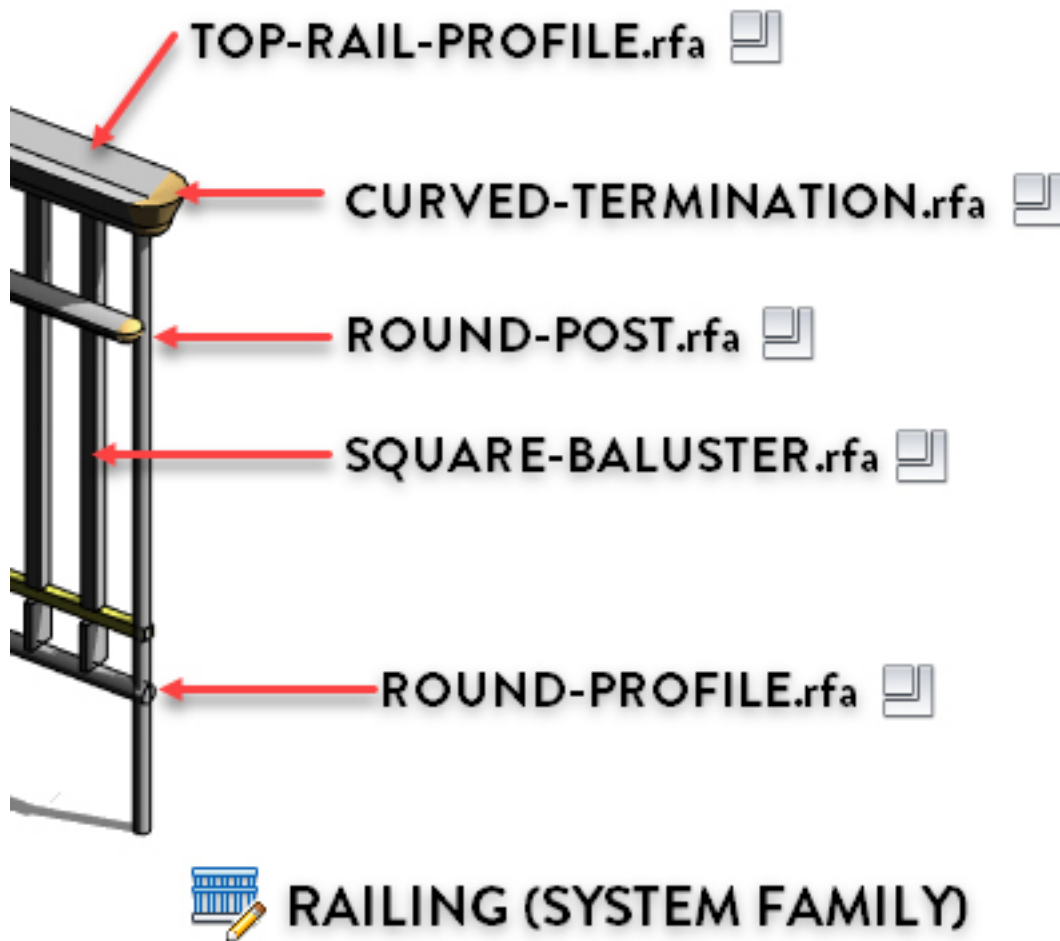




5- SYSTEM FAMILIES CAN INCLUDE EMBEDDED LOADABLE FAMILIES

Here is a concept that might seem contradictory: system families can include loadable families inside of them.

Let's take the example of the railing. The railing is a system family. However, each railing type can contain multiple loadable families of various sub-components like rail profile, baluster, post, support and termination.





6- FOLLOW THIS HIERARCHY OF GOOD FAMILIES

When trying to get families for your project, follow this priority order:

1- Families developed internally

Families made by your team are always the best option. You know they will be matching your firm standards, you can build exactly to match your needs and not be worried.

2- Families made by trusted external collaborators

If you lack the qualified staff to build families or if you don't have enough time, trusted collaborators such as BIM consultants is the next best option. Families shared by architecture/engineering firms you are collaborating with can also be a good option.

3- Default families made by Autodesk

If you can't build your own families or don't have trusted collaborators to build them, the next best option is to look at what Autodesk has available in their default libraries. These families might not match your standards, but they can be a good starting point.

4- Downloaded manufacturers' families from websites such as "BIM Objects" and others.

We are now entering the danger zone. The vast majority of manufacturers families are low-quality. They are over-modeled, they have too many parameters, they are very heavy and will slow down your model. If you really have to use one of them, make sure to verify and clean them before.



5- Downloaded families from Revit community websites such as “Revit City”.

Families found on community websites are almost always terrible. Avoid them at all cost.

Depending on the size of your firm, you might decide what content your users are allowed to acquire. For example, a very large firm will ask users to stick to families created internally. Smaller firms might allow loading some default Autodesk libraries.

You will need some time to figure out what works best for you. You need to find a balance between keeping quality control, but also giving some freedom to users, especially if they don't have quick access to internal content creators.

7- AVOID MOST MANUFACTURERS FAMILIES

The problem with most manufacturers-made families is that they are made to please the manufacturers, not the users. Remember that when something is free, it means you are the product. Quality is rarely the main goal of this content. Here are common issues with these families:

- They are very heavy (more than 1 Mo).
- They contain too many parameters.
- They are too precise and detailed.
- They are modeled with scripts instead of Revit experts.
- They will slow down your model.



You might think that a couple of manufacturers families can't be that bad for your project, right?

In a [video about Revit model health](#), Gavin Crump aka Aussie BIM Guru mentioned a project where printing a set of sheets to PDF went from 5 minutes to 8 hours. For 4 months.

The culprit was a terrible manufacturer chair family that was downloaded on a shady website. The family contained complex imported 3D geometry. Since that chair was placed hundreds of times, it significantly slowed down the computation time to generate PDFs.



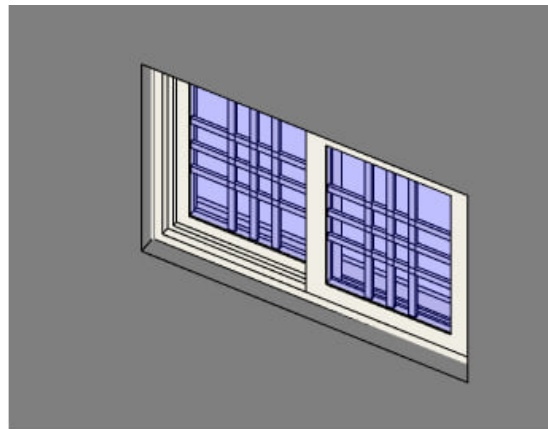
On the next page, you will find an example of a window family you can find on the most popular manufacturers website.

PAMPHLETS



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FAMILIES

This window family weighs 10 MB, contains more than 200 parameters and has insane complexity. Using this kind of sluggish family in your projects would cripple and slow your models.



Parameter		Formula
Other		
TFL	1	= if(Fractional Lights High > 5, 3, if(or(Fractional Lights
TFB	0	= TFL - 1
LWide	2	= if(Enter Pattern Number = 3, 3, if(Enter Pattern Num
Fractional Lights Wide	2	=
Fractional Lights High	3	=
xjamb Visibility (default)	<input checked="" type="checkbox"/>	= and(Extension Jamb, and(Wall Depth > 0' 1 7/8", Exte
xjamb S1 (default)	0' 2 11/16"	= if(Wall Depth > 0' 1 7/8", Wall Depth - 0' 1 7/8", 0' 3"
sill nose1	0' 1 13/16"	= 0' 1 13/16"
sill nose 2	0' 1 15/16"	= 0' 1 15/16"
casingS2	0' 0 3/16"	= if(Enter Exterior Trim Number = 1, 0' 0 3/16", 0' 0 3/1
casingS1	0' 0 3/16"	= if(Enter Exterior Trim Number = 1, 0' 0 7/16", 0' 0 3/1
casing4	0' 4 1/4"	= if(Enter Exterior Trim Number = 1, 0' 1 3/4", if(Enter E
casing3	0' 0 1/2"	= 0' 0 1/2"
casing2	0' 0 7/8"	= 0' 0 7/8"
casing1	0' 0 1/4"	= 0' 0 1/4"
Wall Thickness (report)	0' 8"	=
Void Offset 2	0' 0"	= if(Enter Exterior Trim Number > 0, 0' 1 15/16", 0')
Void Offset 1	0' 0"	= if(Enter Exterior Trim Number > 0, casing4, 0')
Void Depth (default)	0' 4 7/16"	= if(Wall Thickness > Wall Depth, 0' 1" + Wall Thickness
VGB DLO	0' 4 27/256"	= if(Enter Pattern Number = 3, 0' 4", (H DLO - (Between
V Bars	2	= if(LWide > 2, LWide - 1, 2)
TS V DLO	1' 5 13/16"	= Height - HGO - SGO
TS V Bar Length	1' 5 13/16"	= if(or(Enter Pattern Number = 5, Enter Pattern Number
TS SH DLO	1' 0"	= if(or(Enter Pattern Number = 5, Enter Pattern Number
TS S V	<input checked="" type="checkbox"/>	= or(and(LWide = 2, Enter Pattern Number = 1), and(Fra
TS S H Craftsman	<input type="checkbox"/>	= and(Enter Pattern Number = 2, or(Fractional Lights Hi



8- USE THESE WEBSITES FOR DECENT MANUFACTURERS CONTENT

While the biggest manufacturers content websites are generally quite bad, there are some upcoming players that are doing great work. Here are a few of them we can recommend:



BIM Content (<https://bimcontent.com>)

This Australian-based company's priority is to create the best possible families. It has been launched recently, but is starting to accumulate an interesting library and include showrooms and 3D previews.



BIMSmith (<https://bimsmith.com>)

BIMSmith manufacturers content is entirely developed internally with the highest standards. In addition to loadable families, they also offer container files for system families such as railings.



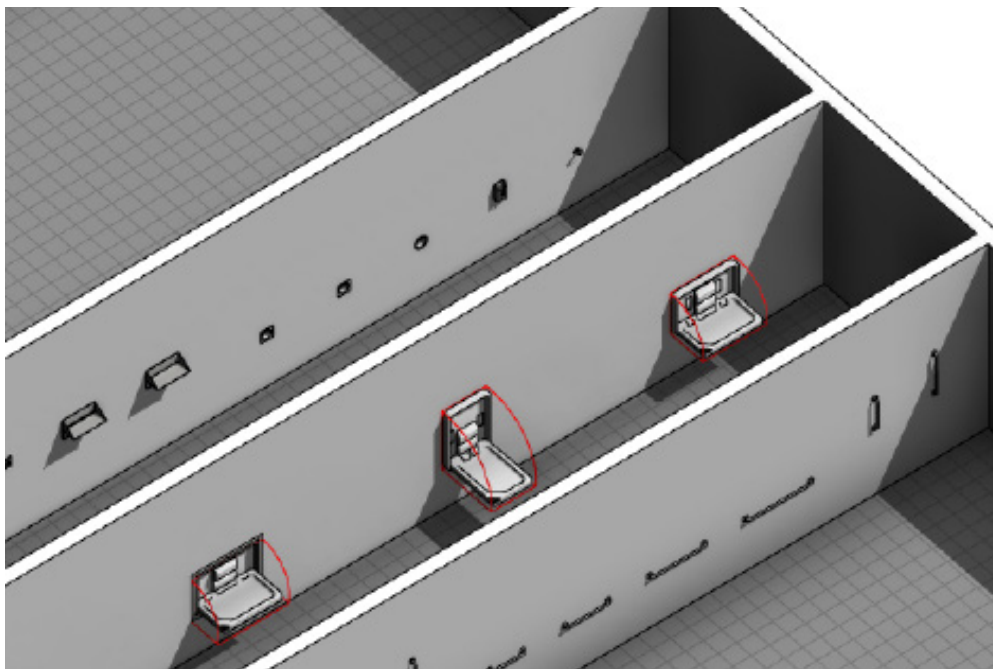
9- CREATE VIRTUAL SHOWROOMS FOR FAMILIES

An interesting trend that has emerged with both manufacturers content and with professional firms is the creation of Virtual Showroom models, sometimes called “Container Files”.

Trying to open each family one by one when trying to find the correct one is a long and boring process.

The idea of virtual showrooms is that families from a similar collection are placed together in a Revit .rvt model.

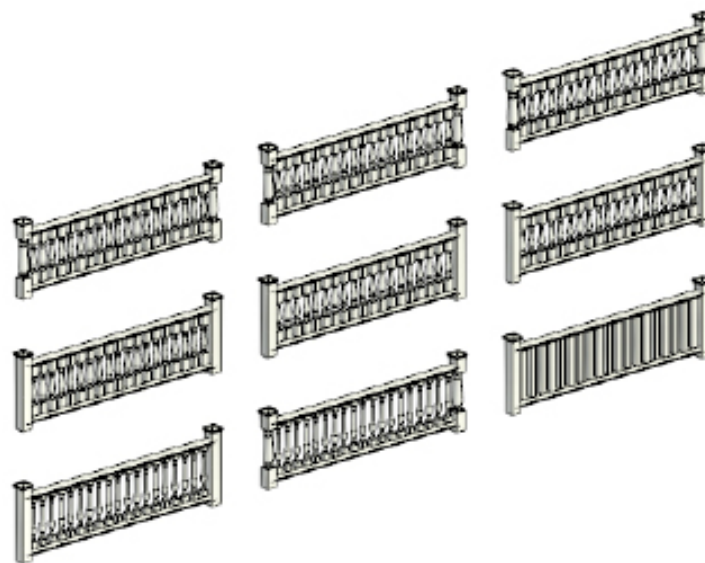
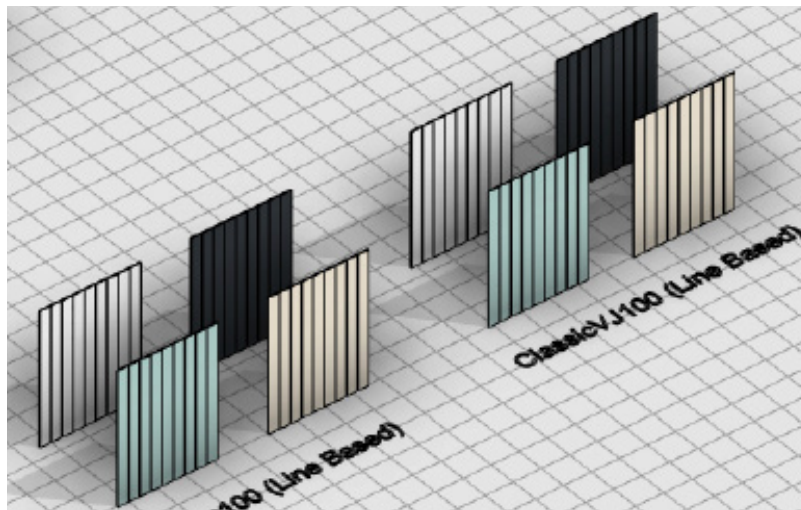
In the example below, the site bimcontent.com has created a virtual showroom for washroom accessories. Much easier to locate what you are looking for and to verify the content.





Another use of the showroom is for system families such as walls and railings, which cannot be downloaded as individual .rfa.

Here are examples of walls and railings virtual showroom from BIMSmith and BIM Content. If you have a large collection of system families, you can build this for your firm as well instead of putting everything in your template.





10- VERIFY AND CLEAN MANUFACTURERS CONTENT

If you really need families found on the internet, you should at least follow this rule: never load them directly in your project.

Always verify and clean the family first. Purvi Irwin wrote a great article on how to clean internet Revit families here:

<https://www.caddmicrosystems.com/blog/revit-content-cleanup-aka-dont-trust-the-internet/>

The main points of the article:

- Delete useless parameters.
- Delete the family types you don't need.
- Delete the useless "Object Styles" subcategories.
- Purge the family 2-3 times.
- Make sure to purge the materials.
- Change materials parameter to By Category so you can change the materials inside a project.
- Clean the nested families as well.
- Delete unneeded line patterns and fill patterns.

If you follow all these rules and the content is still heavy (more than 2 MB), it may indicate poor modeling practice. Perhaps a sign that you shouldn't use the family at all.



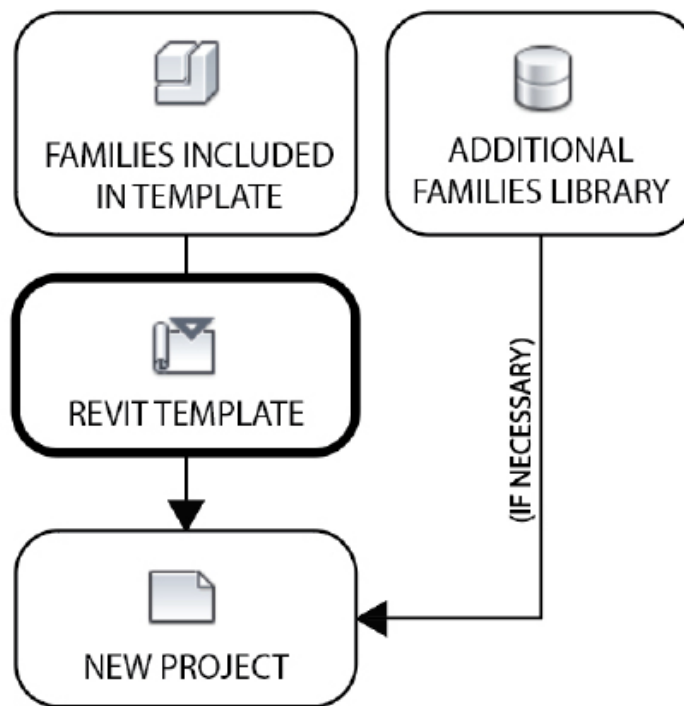
11- ORGANIZE YOUR REVIT FAMILY LIBRARIES

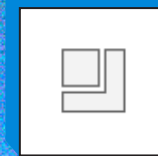
Families that you use in the majority of your projects and that aren't too heavy (more than 1MB) can be included in your template.

Families that you don't use on the majority of your projects or that are very heavy should stay in a separate library or in a container .rvt file. You can load the individual families as required.

When a family is loaded to a file, it is embedded in the .rvt. It means the external .rfa isn't linked to the model, it only serves as a backup.

Here is a diagram of how you should organize your families:





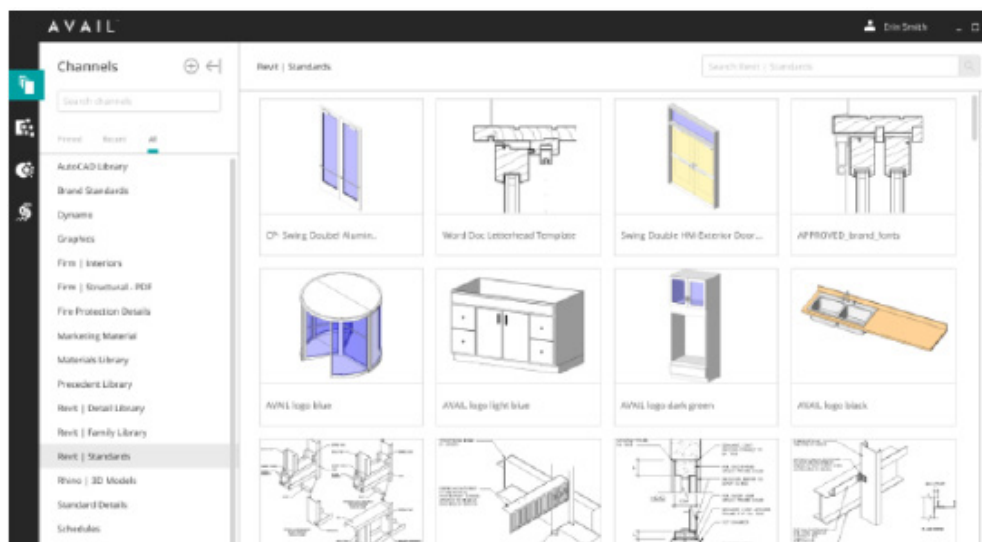
12- USE REVIT PLUGINS TO MANAGE FAMILIES

Managing families can be quite complex with multiple Revit versions, local servers, cloud and different files. In recent years, cloud-based plugins have been created to manage families and assets more efficiently. They can be used to manage not only loadable families but also system families, details, legends, etc. Here are the most interesting plugins.

AVAIL™

AVAIL - <https://getavail.com> - starts at \$20/user/month

This platform allows you to collect all your Revit assets, including families but also schedules, legends, details and more. You can also harvest the assets from a Revit file, then sort and organize them for all users to access. It contains both a Revit plugin and a desktop app.

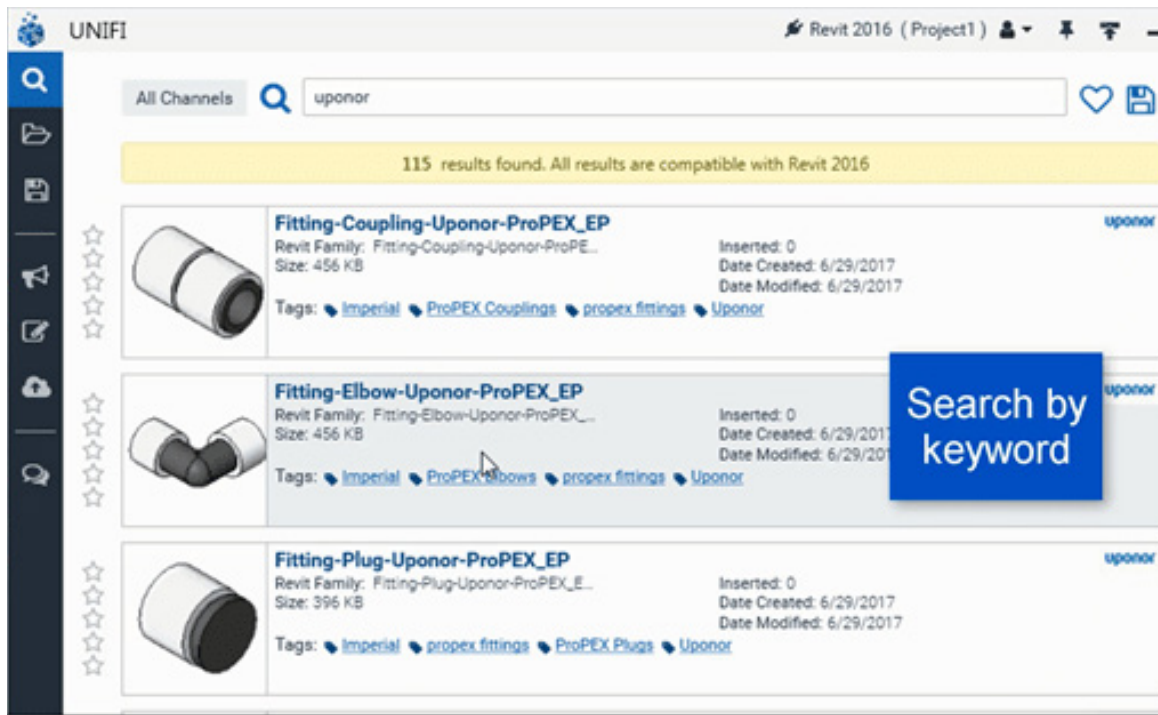




UNIFI Labs - <https://unifilabs.com/> - starts at \$20/user/month

UNIFI and AVAIL are similar, but the big difference is that UNIFI is entirely in the cloud. Once a Revit asset is integrated into the system, it becomes available for all in the cloud. That might be a big selling point for many businesses, although some might prefer to keep their data local.

UNIFI also offers analytics, including the number of downloads for each asset, but also a project health dashboard.

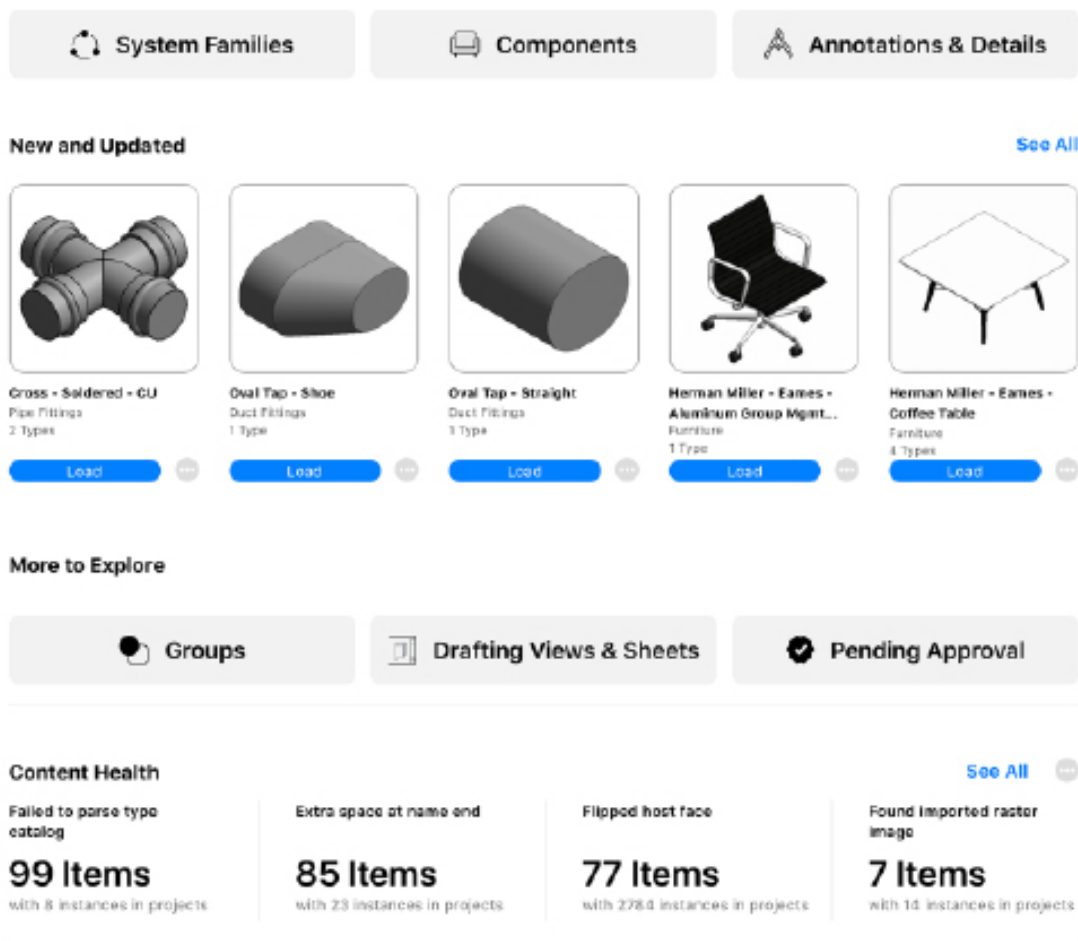




Kinship

Kinship - <https://kinship.io> - starts at \$10/user/month

This tool is simpler and cheaper than previous options, and it also features a model health dashboard. It lacks certain features of other plugins and isn't as polished, but it's easier to install and manage. It doesn't include a desktop app, only a Revit plugin and a browser portal. It is used by some major architecture firms including BIG.



The screenshot displays the Kinship web interface with the following sections:

- System Families**, **Components**, and **Annotations & Details** navigation tabs.
- New and Updated** section with a **See All** link, featuring five items:
 - Cross - Soldered - CU Pipe Fittings**: 2 Types, Load button.
 - Oval Tap - Shoe Duct Fittings**: 1 Type, Load button.
 - Oval Tap - Straight Duct Fittings**: 1 Type, Load button.
 - Herman Miller - Eames - Aluminum Group Mgmt...**: Furniture, 1 Type, Load button.
 - Herman Miller - Eames - Coffee Table**: Furniture, 8 Types, Load button.
- More to Explore** section with **Groups**, **Drafting Views & Sheets**, and **Pending Approval** tabs.
- Content Health** section with a **See All** link and four metrics:
 - Failed to parse type catalog**: 99 Items with 8 instances in projects.
 - Extra space at name end**: 85 Items with 23 instances in projects.
 - Flipped host face**: 77 Items with 2784 instances in projects.
 - Found imported raster image**: 7 Items with 10 instances in projects.

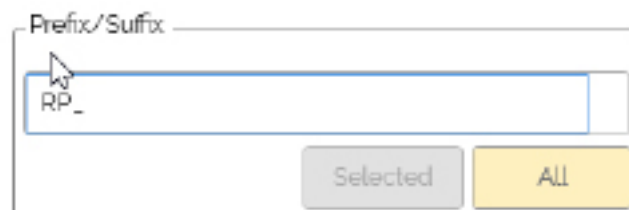


13- USE DIROOTS “FAMILY REVISER” TO EXPORT AND RENAME FAMILIES

Family Reviser by **DiRoots** is an amazing free plugin that helps you export and rename families. In the image below, you can see we check categories of families we want to export to .rfa, inside a specific folder.



You can also use this plugin to quickly add a prefix or a suffix to your families.



[Click here to download this great plugin.](#)



PART 2: CREATING LOADABLE FAMILIES

Now, that you understand the basic principles of families in Revit, you are ready to create one by yourself. First, let's break 2 myths about Revit families:

Myth 1: Families should always be parametric.

Reality: No. It is perfectly reasonable to build a family that is not parametric. You can create a simple family without any parameters or formulas. The geometry is fixed.

Myth 2: Families should always be in 3D.

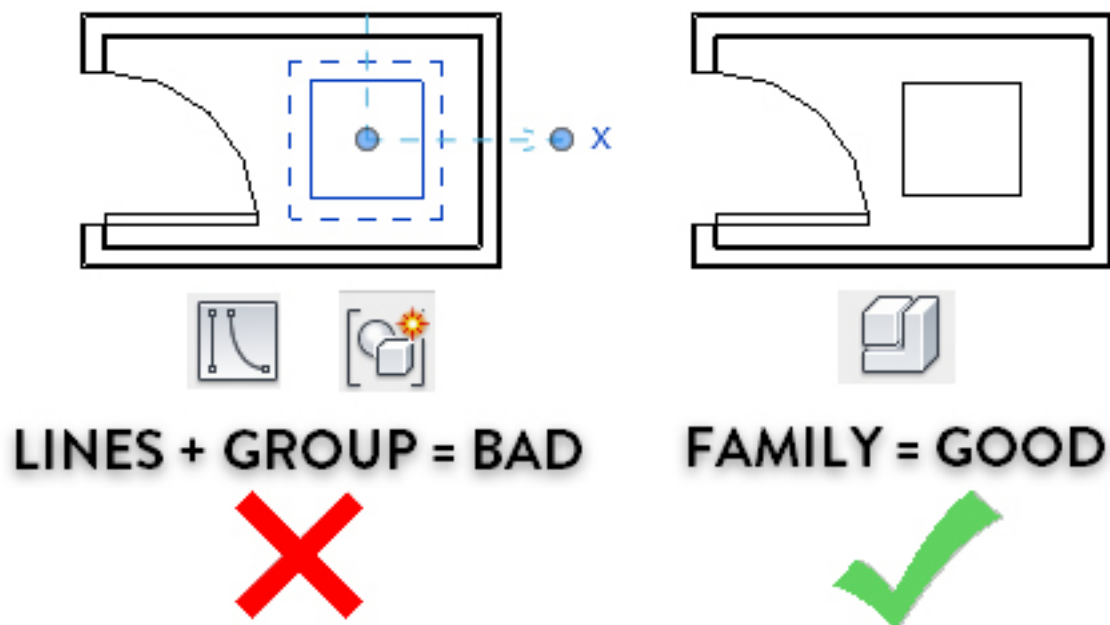
Reality: No. 2D families can be very useful. Sometimes, it is not necessary to model the 3D geometry of a component. In early phase, it can help you keep a faster model.



Too many users are scared of creating a family because they think they need to create something complex. Instead, they end up using lines and group for components, which is terrible for the model quality.

Lines and groups are “dumb” elements. You cannot use them in scheduling, they can’t have an assigned model category and they will slow down your model.

It is ok to build a simple, non-parametric family that only contains a few model lines.



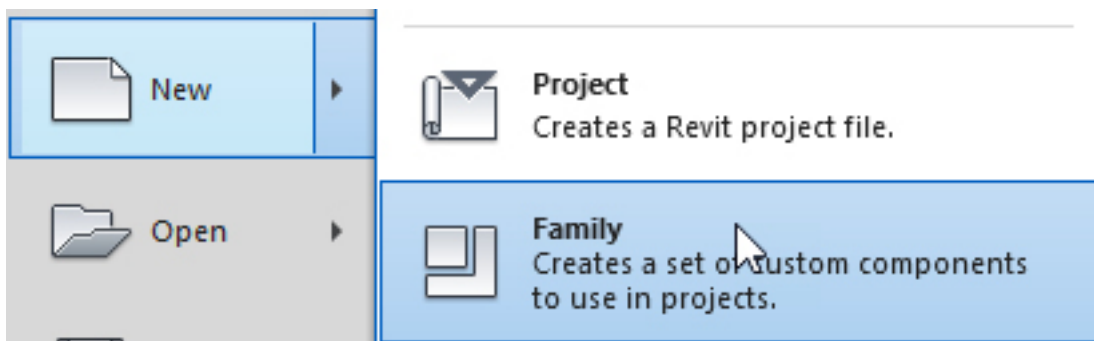
In the upcoming pages, you’ll learn how to create a basic family.



11 STEPS TO CREATE A SIMPLE FAMILY IN REVIT

STEP 1: SELECT THE CORRECT FAMILY TEMPLATE

To create a family, click on the R at the top right of the screen. Go to New, then Family.



Then, go to the default Autodesk folder where family templates are located. In this case, we pick the Generic Model template. It is possible to change the category of the family later on in certain cases.

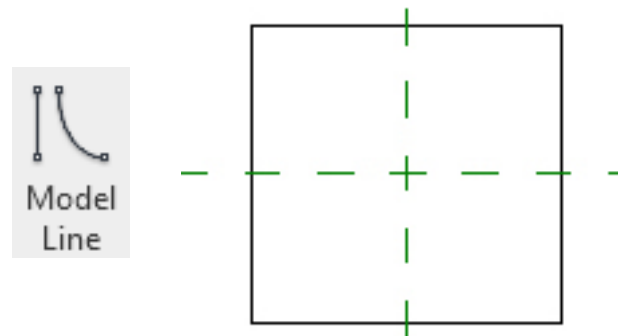
Look in: English-Imperial	
Name	Size
Generic Model two level based	388 KB
Generic Model wall based	412 KB
Generic Model	408 KB
Lighting Fixture ceiling based	408 KB
Lighting Fixture wall based	420 KB



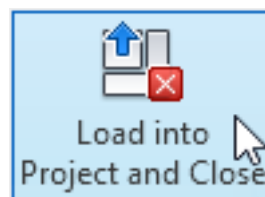
STEP 2: DRAW MODEL LINES

In this example, we'll create a very simple family that is aimed to represent a simple piece of rectangular equipment. We'll start with an entirely 2D, non-parametric family.

Go to a floor plan view in the family and draw model lines. You can make sure it is centered on the reference planes.



You can save this family and load it to your project.

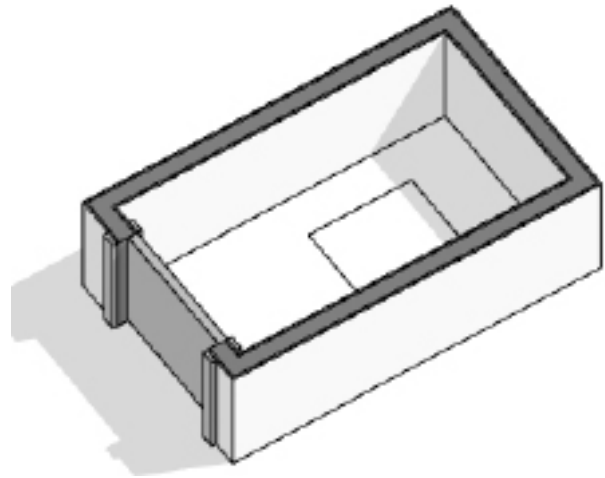
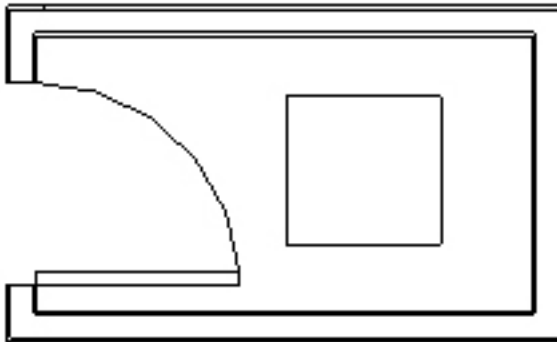


Then, select the component tool. Since it was the last family loaded in the project, it should appear as the first option.





You can see we place this simple family in the project. Since it is made with model lines, it is also visible in 3D views as lines.

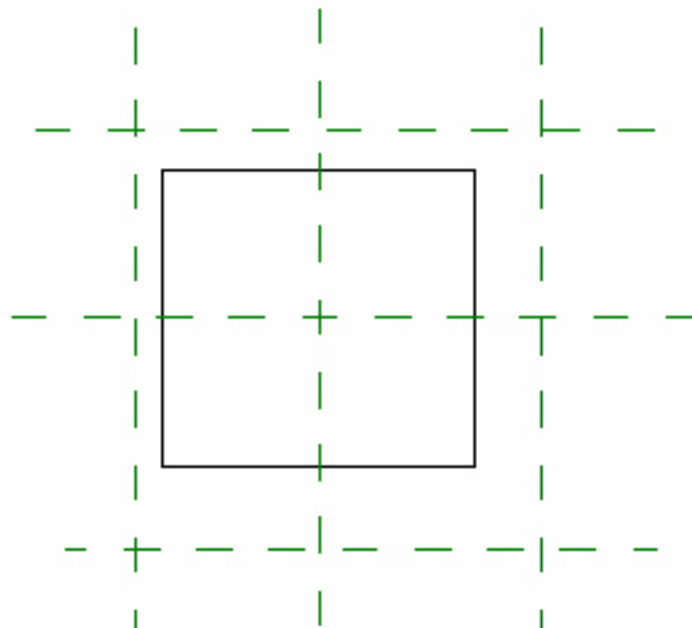
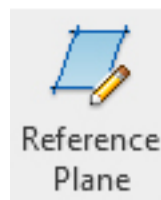


This might seem like a useless family, but no. It can be used in scheduling and you can assign project parameters to it. Much better than drawing lines directly in the model.



STEP 3: ADD REFERENCE PLANES

Now, let's upgrade the family we've made. We will convert it to a parametric family. The length and depth will be adjustable. You will need to create 4 new reference planes around the rectangle shape, like in this image:

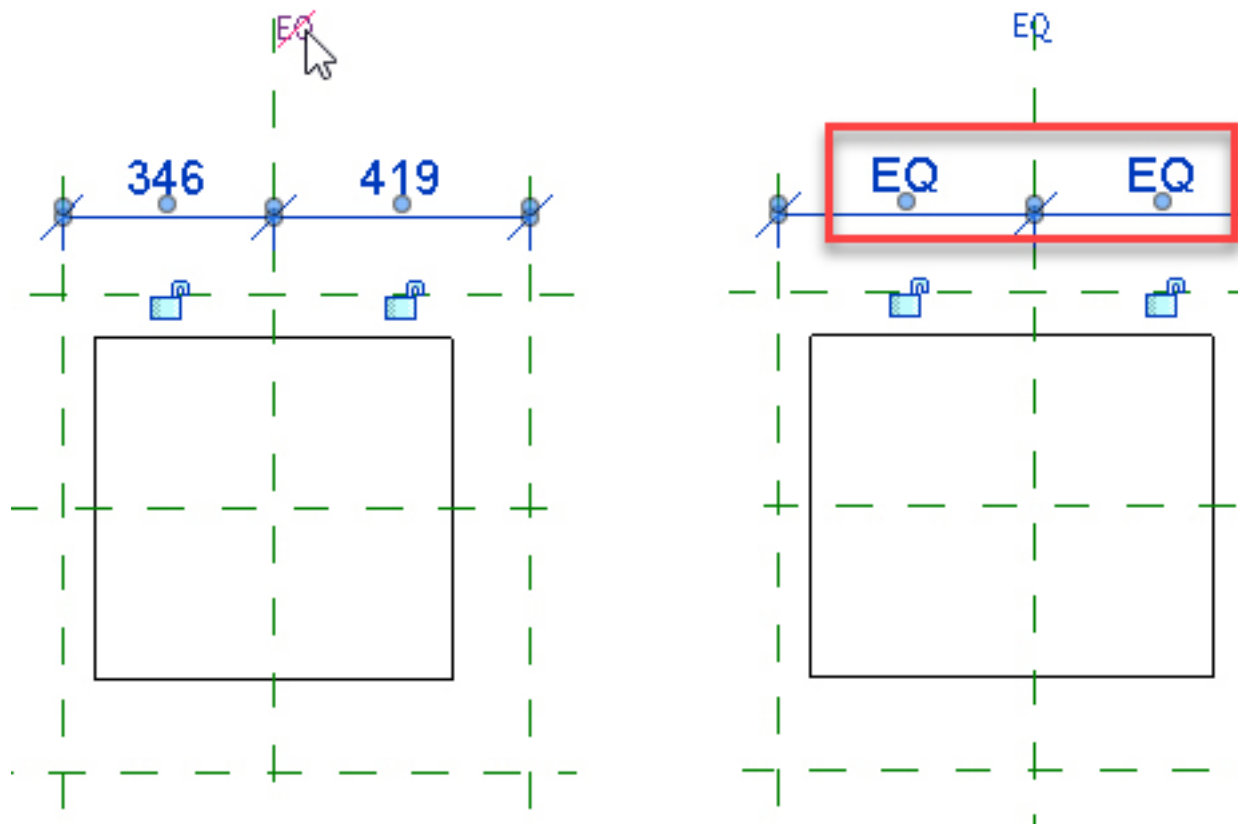




STEP 4: ADD EQ DIMENSIONS

Now, create a dimension for all the vertical reference planes and another one for all the horizontal ones.

Select the dimension and click on the EQ button. This way, you will ensure that the middle reference plane is always centered on the family.

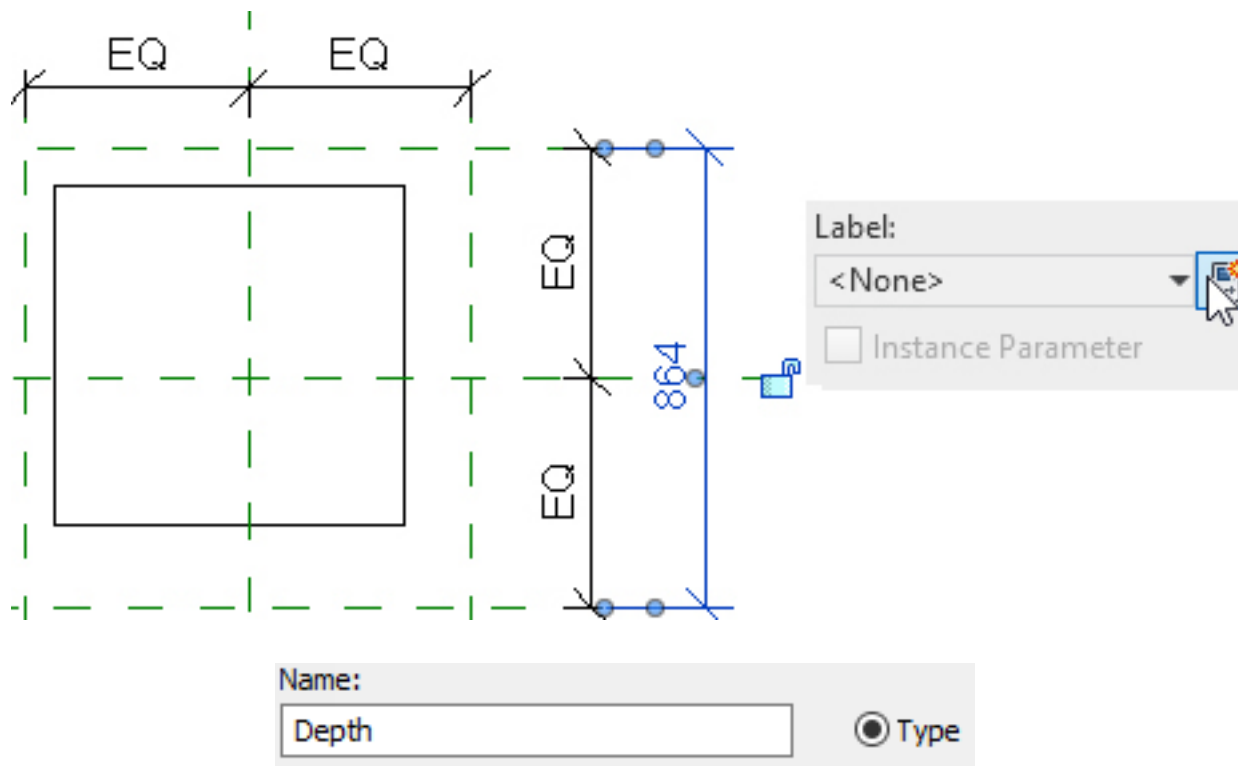




STEP 5: ADD DIMENSIONS LABEL

Create a dimensions for the bottom and top horizontal reference planes. In the ribbon, click on the small icon in the “Label” menu.

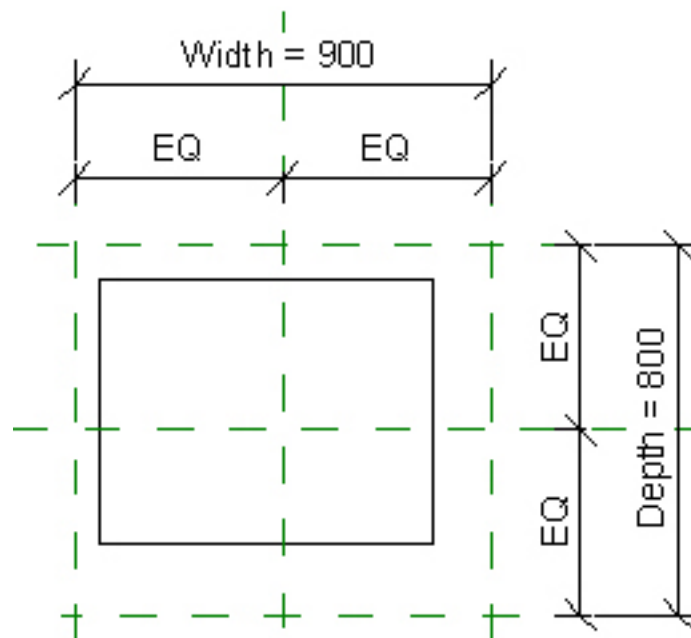
You will be prompted to create a parameter. Call it “Depth”. If you want to use this parameter in a schedule, you’ll need to employ a **Shared Parameter**.



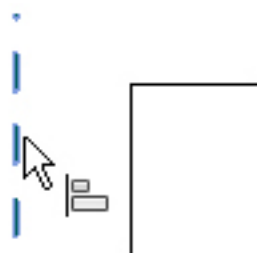
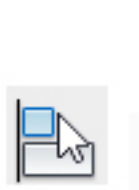


STEP 6: ALIGN MODEL LINES TO REFERENCE PLANES

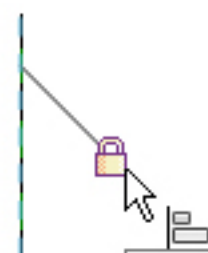
Your family should now look like this:



Now, use the Align tool in the modify tab (or use shortcut AL). Select a reference plane, then click on the model line. Lock it.



**ALIGN LINE TO
REFERENCE PLANE**

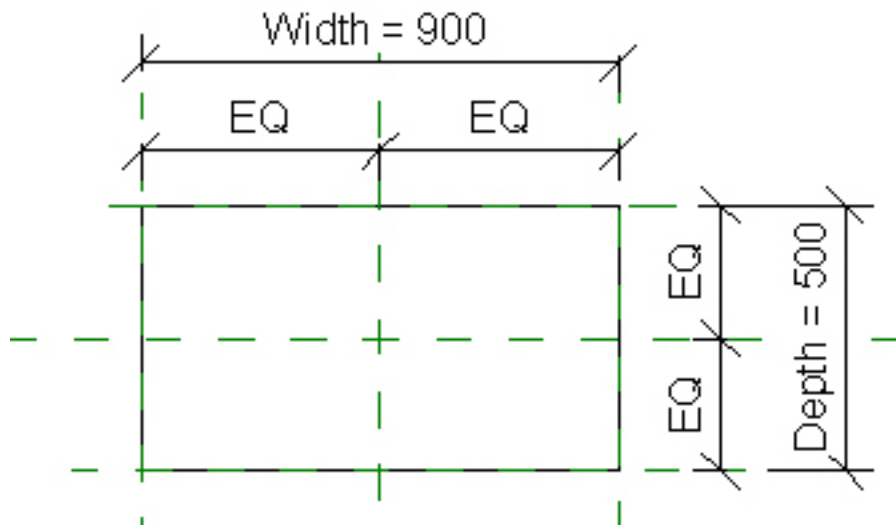


CLICK ON LOCK 

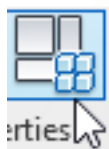


STEP 7: ADJUST DIMENSIONS

Before loading a family back to the project, you need to make sure it properly works. Try to change the dimensions of the width and depth.

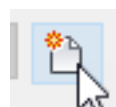


In the Create or Modify tab, you can see the Family Types menu. If you click on it, you can see the complete list of parameters in this family. You can modify the dimensions from here as well.

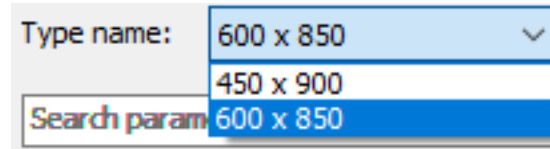


Dimensions	
Depth	500.0
Width	900.0

You can pre-create multiple types by clicking on the “New Type” icon. Give a name to the type and make sure to adjust the dimensions.

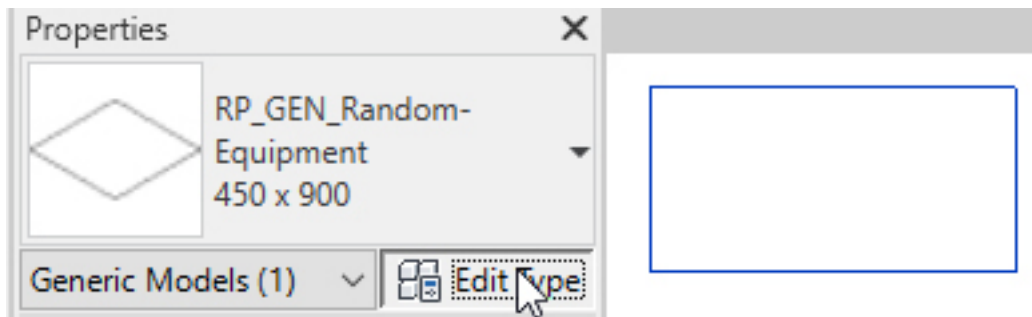


Name: 450 x 900



You can see we have “pre-created” two types for this family. Each type has different dimensions. Load the family back into the project.

When an instance of the family is placed, you can select it and click on Edit Type. You can modify the dimensions and create new types from here as well.



You can now create a schedule to list all instances of this Random-Equipment family. If you want to learn more about schedules, check out our [Pamphlet #2](#).

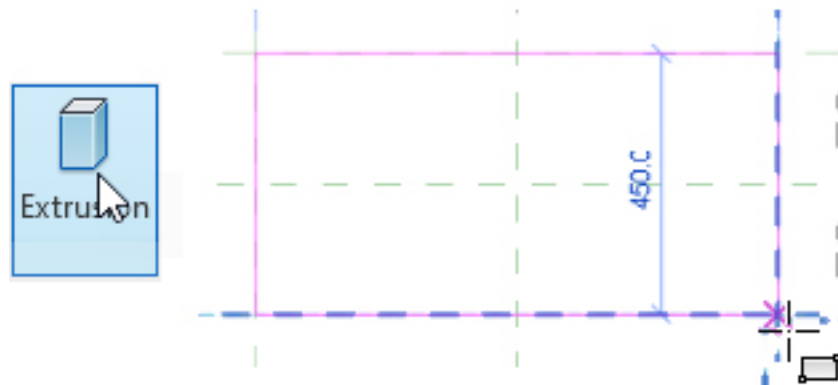
<RANDOM EQUIPMENT>	
A	B
TYPE	AMOUNT
600 x 850	2
700 x 700	4



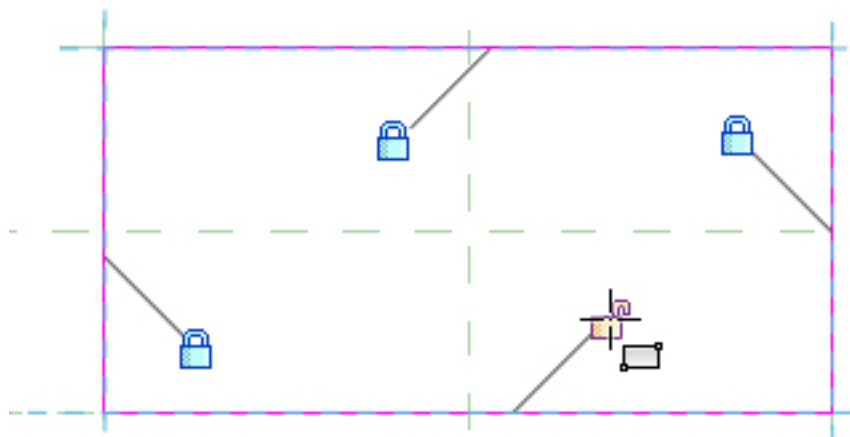
STEP 8: CREATE AN EXTRUSION

Go back inside the family. Now, we're going to transform this 2D family into a 3D one. Delete all the model lines. Click on the extrusion tool in the Create tab.

Use the rectangle and place it to match the reference planes like this:

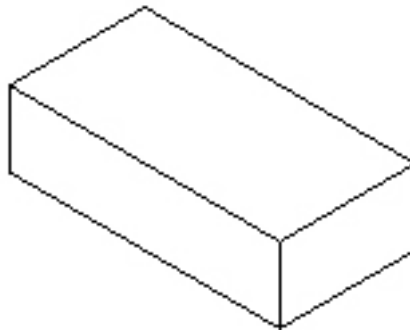


Then, make sure to click on the Lock icon for each segment of the extrusion.

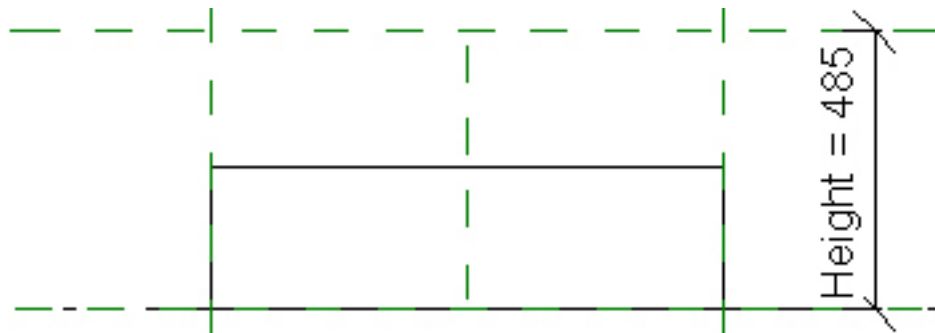




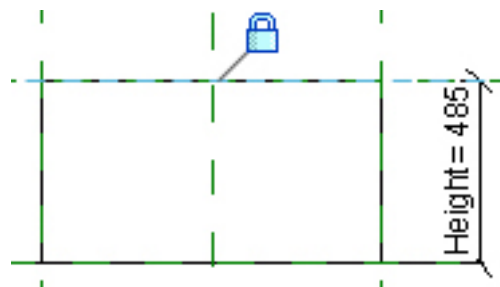
If you go to a 3D view inside the family, you should see the extrusion.



Now, go to an elevation view. Create a horizontal reference plane above the level and extrusion. Place a dimension and assign a new parameter called “Height” to it.



Then, align and lock the top of the extrusion to the new ref. plane.

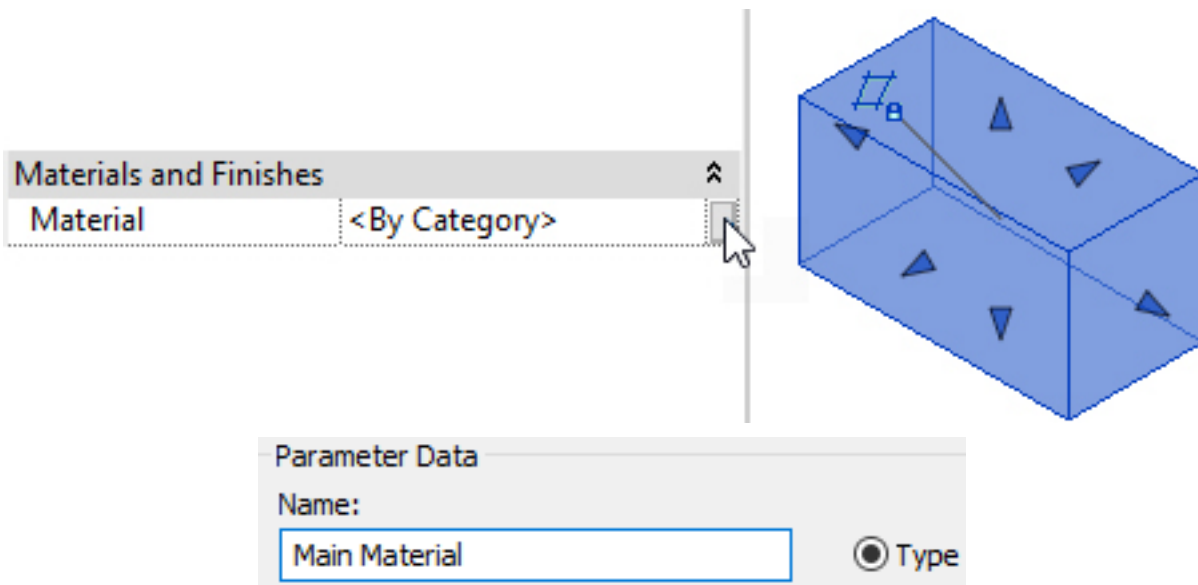


Try to adjust the height parameter to make sure the family properly works.

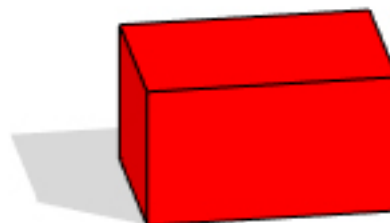
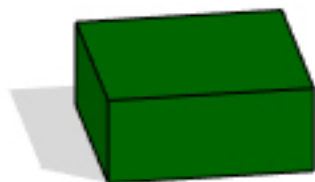
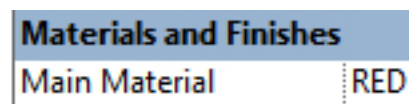
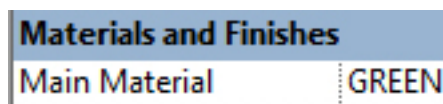


STEP 9: ADD A MATERIAL PARAMETER

Select the extrusion and in the properties, click on the small rectangle next to material. Create a new parameter for the material of this geometry.



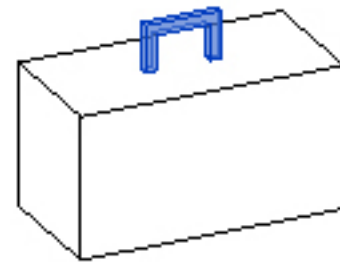
For each type, you can now set a different material. You can assign a material either directly in the family editor or you can wait for the family to be loaded in the project. In the example below, you can see different materials for different types.





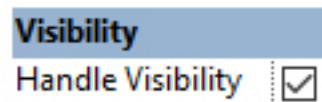
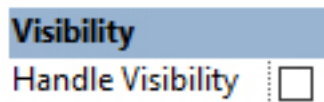
STEP 10: ADD A VISIBILITY PARAMETER

It is possible to model geometry whose visibility can be turned on and off. For example, we create a handle shape placed on top of the box. Select the geometry and click on the small rectangle next to Visible in the properties. Call it “Handle Visibility”.



This doesn't affect the visibility of the shape inside the family, only when the family is loaded back into the project.

You can see what happens when you check and uncheck that visibility box:



THANKS FOR READING!

As always, send your thoughts to pamphlets@bimpure.com. We read and answer all emails. Also, please send us your request for upcoming pamphlets.

