

Look Up, There's a Table

The demystification of Lookup Tables in Revit Families

Michael Göhring

Technical Sales Specialist AEC – Autodesk GmbH

Class summary

In this hands-on class you will learn how to use lookup tables (Revit 2015 software and above) within your families.

Even though this feature is mainly used in MEP Domain we will focus on the generic functionality as the method is also applicable to other usecases than MEP.

Key learning objectives

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

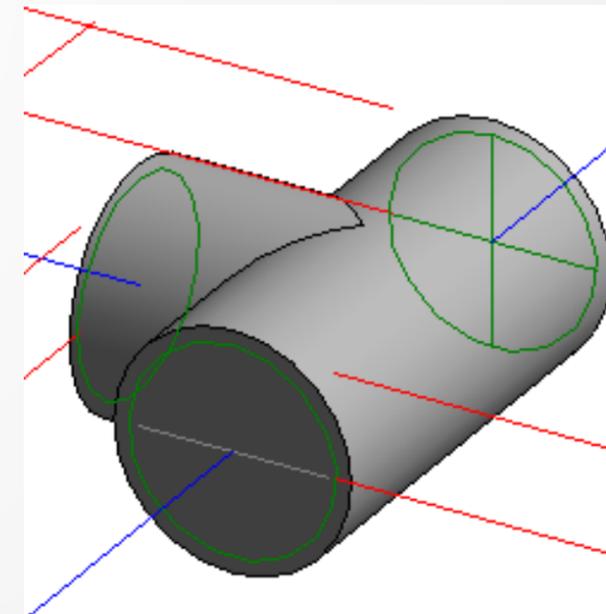
- create own lookup tables
- implement lookup tables into your Revit families
- use the parameters in your families
- know the limitations of lookup tables
- Think about your use cases

Lookup table?

What is a lookup table at all?

- Parameters that are brought into Revit with a tabular layout
- Lookup tables allow to steer geometry with non linear values, based on Instance parameter input

	A	B	C	D	E
1		Input1##length##millimeters	Input2##length##millimeters	Output1##length##millimeters	
2	1	1000	1000	15	
3	2	1200	1000	16	
4	3	1000	1200	16	
5	4	1200	1200	18	
6	5	1200	1400	20	
7					



How to create your own lookup table

How to create your own lookup table

- Start with a table using Microsoft Excel

	A	B	C	D	E	F
1		Input1	Input2	Output1	Output2	Output3
2						
3						
4						
5						

How to create your own lookup table

The Structure

	A	B	C	D	E	F
1		Input1	Input2	Output1	Output2	Output3
2						
3						
4						
5						
	Numbering	Input		Output		

How to create your own lookup table

The Syntax

- Lookup table is a .csv file formatted with those separators

- comma “,”

```
;Input1##length##millimeters;Input2##length##millimeters;Output1##length##millimeters
```

- semicolon “;”

```
1;1000;1000;15
```

```
2;1200;1000;16
```

- colon “:”

```
3:1000:1200:16
```

```
4:1200:1200:18
```

- stroke “|”

```
5|1200|1400|20
```

- There's a heading row that defines Name, Type and Units for the columns
- Each row represents a possible value combination

How to create your own lookup table

The Headline Syntax

```
ParameterName##ParameterType##ParameterUnits
```

- ***ParameterName***: could be any Name you want to have. Remember, keep it simple!
- ***ParameterType***: Acceptable parameter types are: NUMBER, LENGTH, AREA, VOLUME, ANGLE, and OTHER
- ***ParameterUnits***: millimeters, meters, feet, inches, square_feet, cubic_feet degrees, etc.

Exercise 1

Create the table

Exercise 1

- Create an Excelsheet with those values (use imperial if you like to):

	A	B	C	D	E
1		Input1##length##millimeters	Input2##length##millimeters	Output1##length##millimeters	
2	1	1000	1000	15	
3	2	1200	1000	16	
4	3	1000	1200	16	
5	4	1200	1200	18	
6	5	1200	1400	20	
7					

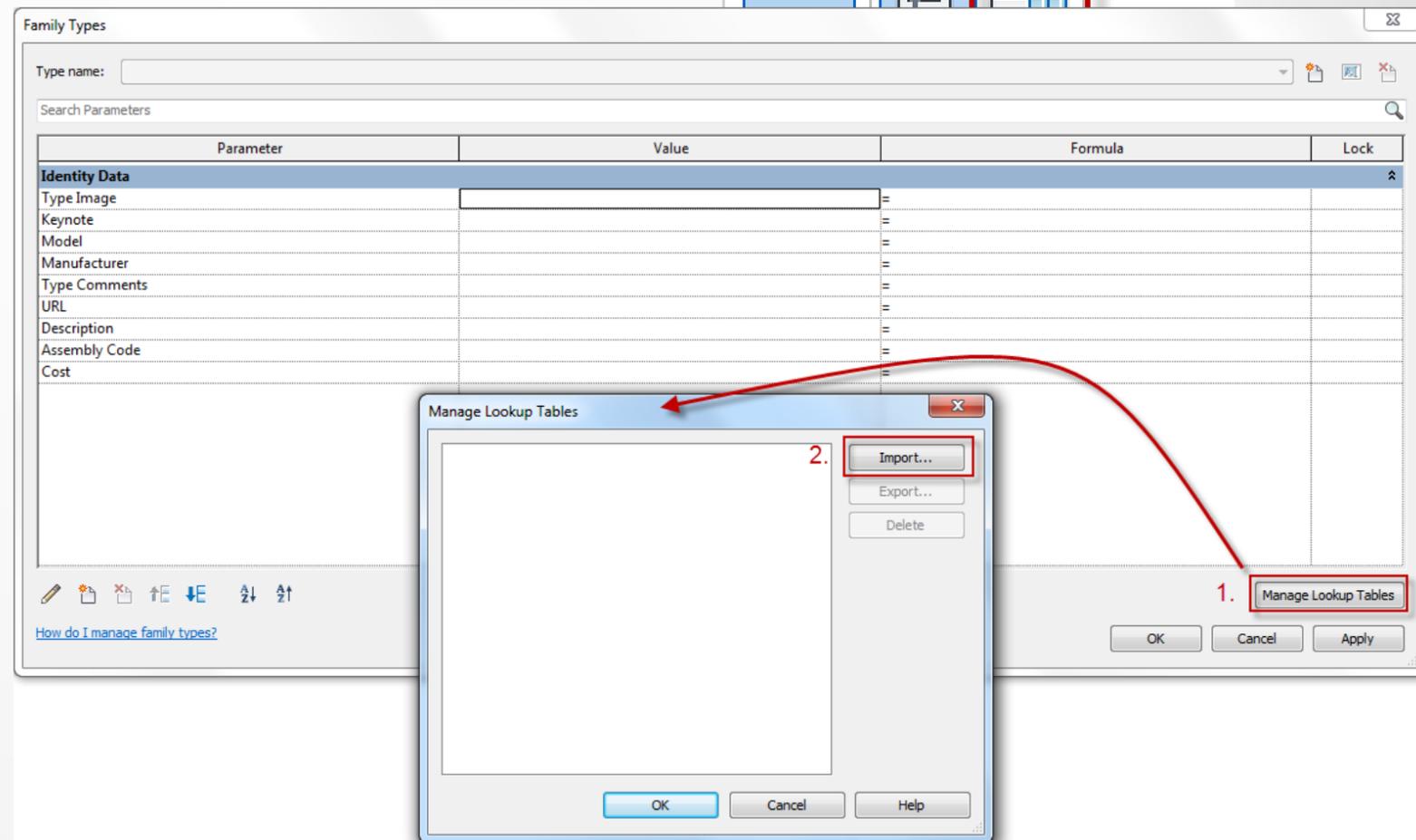
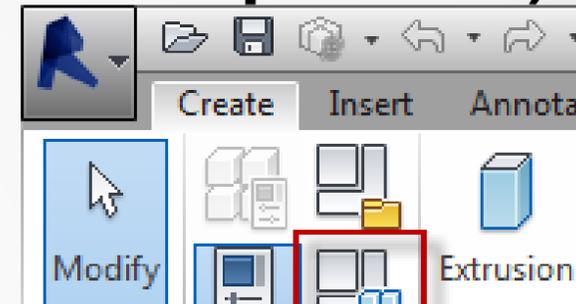
- Make sure field A1 is blank!!!
- Save as .csv file
- Check result in text editor

```
1 ;Input1##length##millimeters;Input2##length##millimeters;Output1##length##millimeters
2 1;1000;1000;15
3 2;1200;1000;16
4 3;1000;1200;16
5 4;1200;1200;18
6 5;1200;1400;20
```

Implement into Revit

Implement into Revit

- Start with a family template (Metric or imperial)
- Go to Family Types
- Use „Manage Lookup tables“ to load your .csv file



Implement into Revit

- For easy usage create a new type parameter called „lookup“, „Table1“ or whatever you want to
- Use the name of your lookup table as value

Parameter	Value
Data	
Table1	ExampleValues

Exercise 2

Implement

Use parameters in your Family

Create Parameters

- Create
 - Width
 - Length
 - Thickness
- All of those parameters are going to be
 - Discipline *common* and
 - parametertype: *length*
 - ***need to be instance Parameters***
- Use the correct parametertype like it was defined in the table

Parameter	Value
Dimensions	
length (default)	0.0
width (default)	0.0
thickness (default)	0.0

The lookup formula

Syntax

- Get the value through formula

=size_lookup	(LookupTableName	LookupColumn	DefaultIfNotFound	LookupValue1	LookupValue2)
--------------	---	-----------------	--------------	-------------------	--------------	--------------	---

=size_lookup	This is telling Revit that it should deal with lookup tables at this point
(Opens the term
LookupTableName	You're going to use the name of the lookup table you defined previously. Table1 in our exercise
LookupColumn	Name of the column that you want to get your value from. Put this Name into quotation marks, as this could include spaces.
DefaultIfNotFound	This is the Value or Formula that is used if you don't get a match within the table. E.g. combination of length and width is not defined in the table.
LookupValue1	Here you have to insert the ParameterName from the Revit-Family you want to search for in the Table. Please Note that this is always going to look into the second column of the lookup table (column B in Excel)
LookupValue2	Here you have to insert the ParameterName from the Revit-Family you want to search for in the Table. Please Note that this is always going to look into the third column of the lookup table (column C in Excel)
)	Closes the term

The lookup formula

What's happening

```
= size_lookup(Table1, "Output1", length / width * 10 mm, length, width)
```

Parameter	Value
Data	
Table1	ExampleValues

A	B	C	D
	Input1##length##millimeters	Input2##length##millimeters	Output1##length##millimeters
1	1000	1000	15
2	1200	1000	16
3	1000	1200	16
4	1200	1200	18
5	1200	1400	20

- If we have a **length of 1200** and a **width of 1200**, the formula will return the **value 18** (as this matches row 4)

Exercise 3

Use the lookup table

Exercise 3

- Create instance Parameters and Type in the formula

Family Types

Type name:

Search Parameters

Parameter	Value	Formula
Dimensions		
length (default)	1200.0	=
width (default)	1000.0	=
thickness (default)	16.0	= size_lookup(Table1, "Output1", length / width * 10 mm, length, width)
Data		
Table1	ExampleValues	=

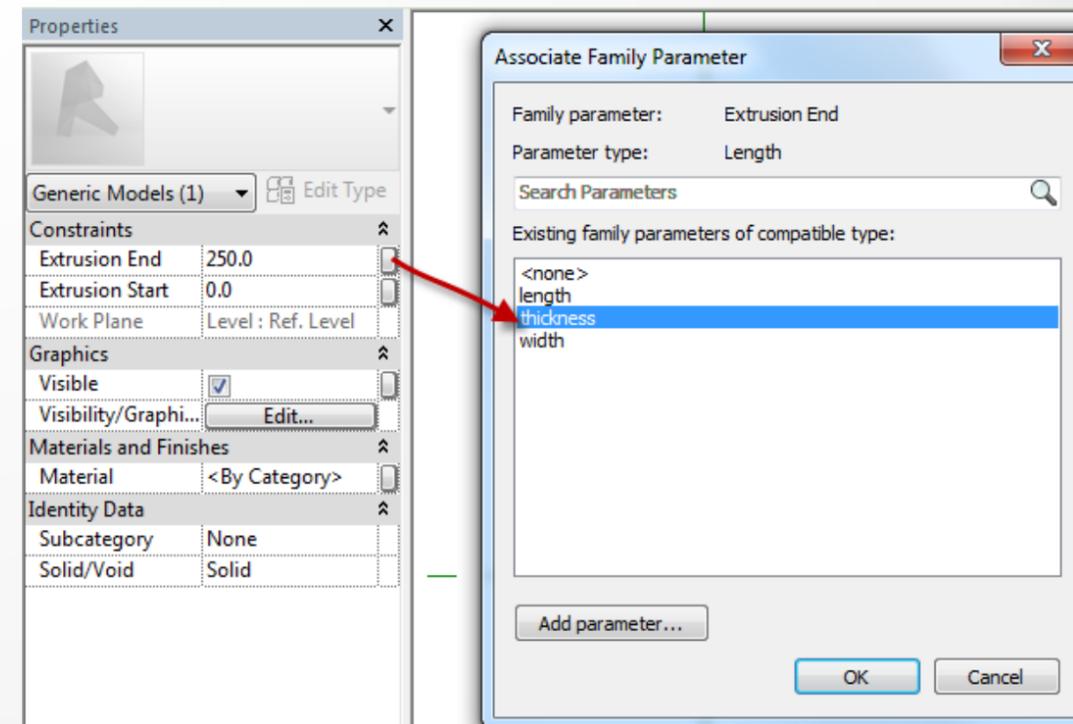
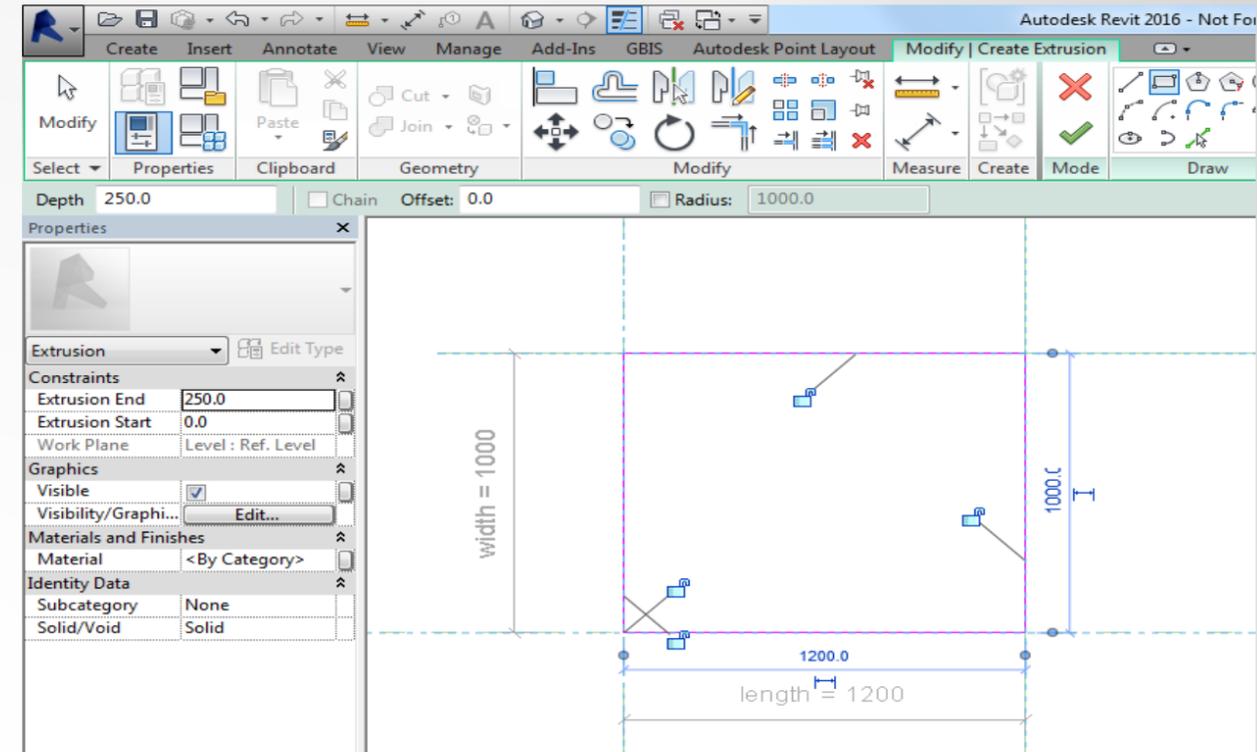
Exercise 4

Parametrize Geometry

Exercise 4

- Create Extrusion
 - Use reference lines
 - Set length & width
 - Close locks

- Link thickness to extrusion end

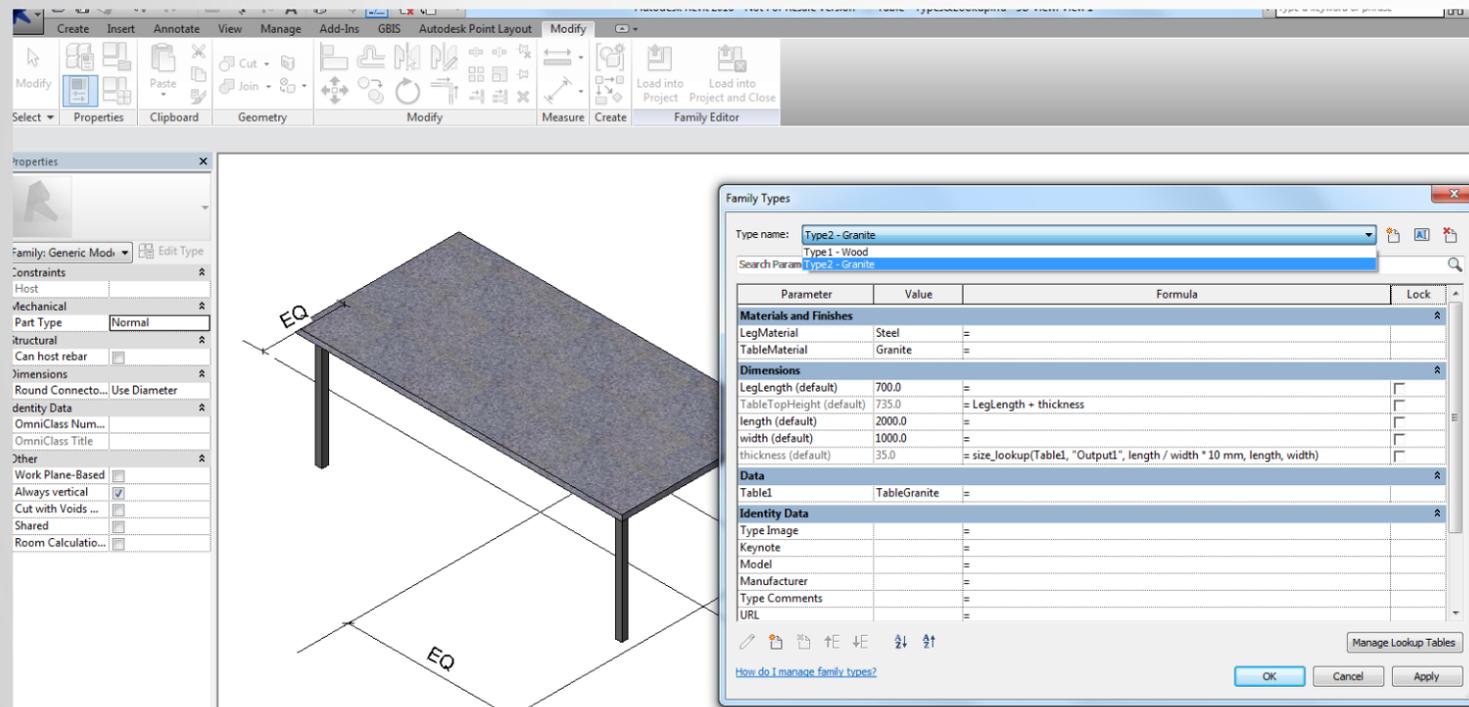


Use cases and limitations

Use Case Example 1

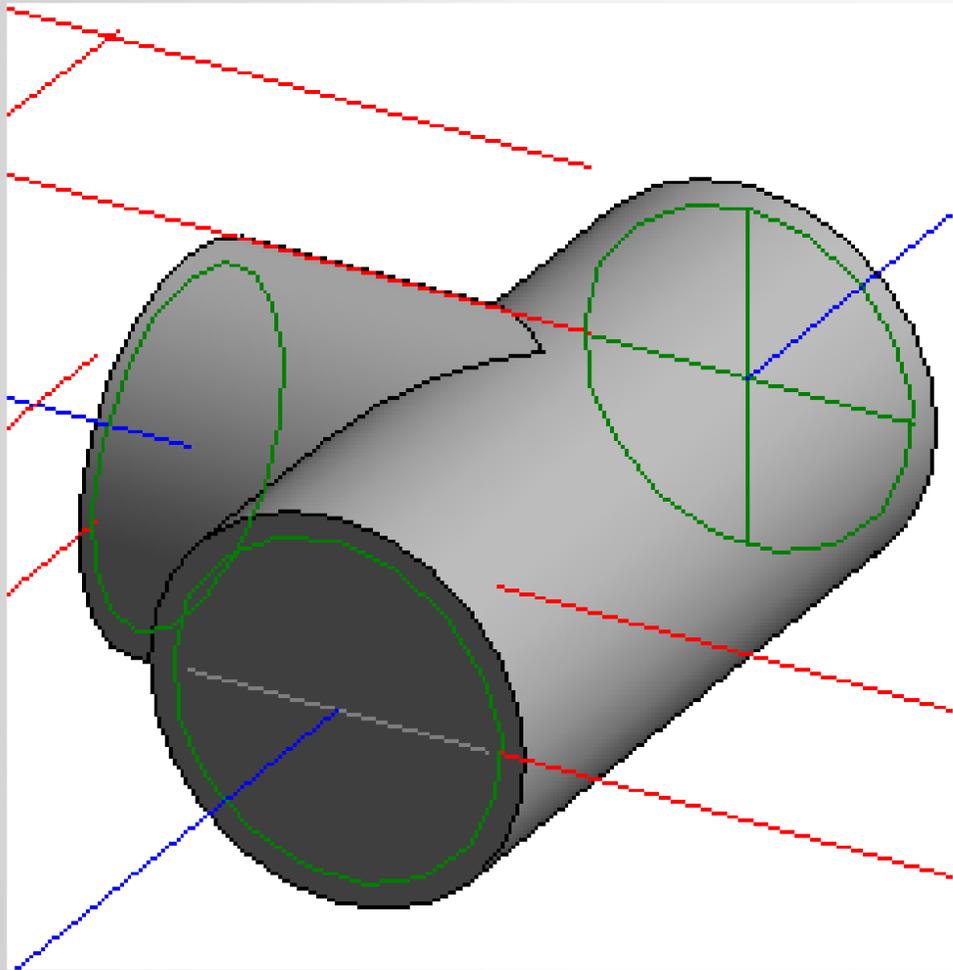
Table

- Mixture of Types and lookup usage
 - Different lookup table per Type



Use Case Example 2

MEP T-Piece



- Length of T-Piece is not following a linear rule
- Type based family would not adjust to changes on connected pipes

Limitations

- Can be used only with instance parameters
- Only working with number values (number, length, area, volume,)
- Need to be defined properly (Syntax, Structure, column definition)
- Formula within instance parameter needs to be correct

Appendix

Changes on lookup table functionality

Revit Versions before Revit 2015:

.csv Files needed to be in one specific Folder that was defined in Revit.ini

Families with lookup tables didn't get the right values if .csv file wasn't at this location

```
[Directories]
ProjectPath=%USERPROFILE%\Documents\
ImportLineweightsNameDWG=C:\Program Files\Autodesk\Revit 2015\Data\i
MaterialLibraryFiles=..\Data\Rendering
IESFileLocation=C:\ProgramData\Autodesk\RVT 2015\IES\
LookupTableLocation=C:\ProgramData\Autodesk\RVT 2015\Lookup Tables\
ExternalParameters=..\..\..\Users\goehrinm\AppData\Roaming\plus4revi
ExportLayersNameDGN=
```

Revit 2015: .csv Files could be included into Revit Families which enabled easy sharing of Families using lookup tables and increased performance.

Revit 2015 R2 Release: Lookup Tables are available for all domains (previously only MEP)

Links for further Reference

- Revit Online Help – Lookup Tables:
<http://help.autodesk.com/view/RVT/2016/ENU/?guid=GUID-91270AEF-225A-49D7-BF84-1F44D1E3E216>
- Revit Online Help – CSV File Structure:
<http://help.autodesk.com/view/RVT/2016/ENU/?guid=GUID-DD4D26EB-0827-4EDB-8B1F-E591B9EA8CA0>
- Revit Online Help – Create Type Cataloge (gives you some more usable Units)
<http://help.autodesk.com/view/RVT/2016/ENU/?guid=GUID-FFA71D72-D4C5-416D-BF65-1757657C3CE9>

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