AUTODESK **UNIVERSITY** 2015

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# Database Management from a Database Manager's Point of View

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## Learning Objectives

- Discover how Fitting Dimensions work.
- Discover how connectors are applied to content.
- Discover how Estimating Data is applied to Fittings.
- Discover how the products integrate with each over.

## Description

Learn how to manage content for Autodesk, Inc.'s, Fabrication Solutions from a database manager's point of view. We will dive into how to apply fitting dimensions to product-listed information for accurate dimensional content and apply connectors. Then learn how to apply estimating information for reporting of information to be used for ordering, estimating, and job tracking.

## Your AU Experts

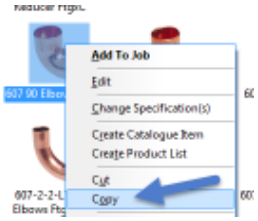
***Greg Murphy*** *is currently working at Murphy Company, a $200m+ St. Louis, MO Design Build Mechanical Contractor, as Supervisor – BIM Technology & Support. He has over 30yrs of experience in the Mechanical Contracting Industry with extensive experience in estimating and detailing for mechanical piping, sheet metal and process piping. Greg has trained Autodesk Fabrication ESTmep as well as other software packages. He attended Louisburg Junior College in Louisburg, NC for computer science and also attended Wake Technical Community College in Raleigh, NC for mechanical engineering technology. Greg enjoys helping others get the most out of their Integrated Fabrication Solutions.*

***William Tucker*** *is currently working at Comfort Systems USA, a Premier Mechanical Systems Installation and Service provider, as BIM Trainer and Product Specialist. CSUSA is a national organization with 23 companies, 6 Sheet Metal Fabrication Shops and 154 users currently sharing the Autodesk Fabrication Products with one database. William is responsible for implementing, training, and advising on best practices for these companies, developing standards within the organization, and providing technology recommendations for the future. In the past, William has trained and Implemented Autodesk Fabrication CADmep, ESTmep, and CAMduct as well as utilized it as a 3D detailing and coordination package. William has been using Autodesk Products for 28 years. William enjoys helping others utilize the software to its fullest extent.*

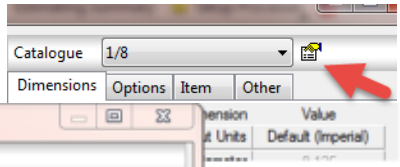
## Discover how Fitting Dimensions Work

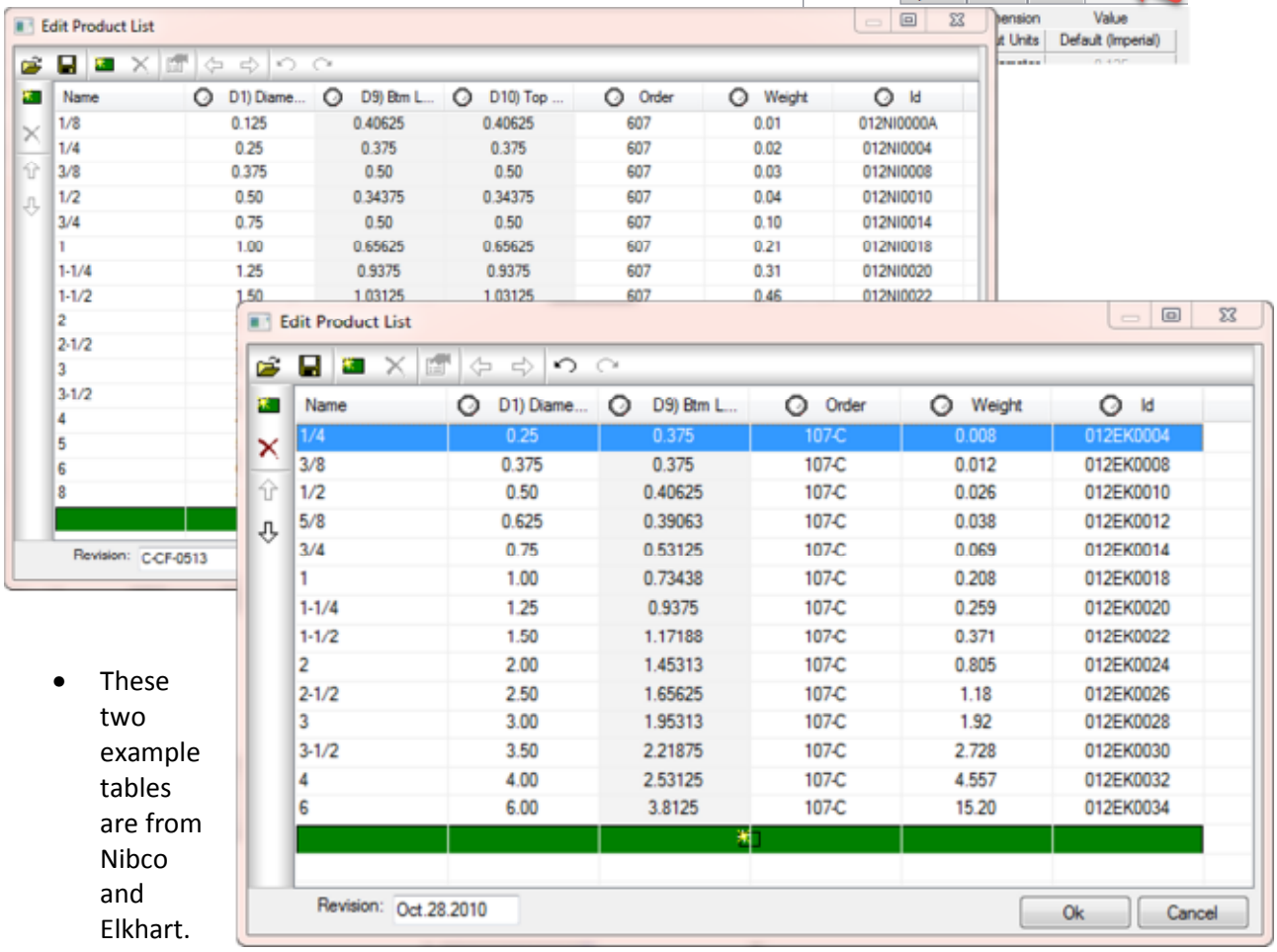
### Dimensions on Copper Fittings

- To do this you will first need dimensional data from a Manufactures Catalog (Nibco).
- Next we will need a pattern to use otherwise known as a CID. You can either copy from a similar fitting via the folders interface or use the MakePAT command with using CID 2523.




- Next rename the ITM (fitting) to match the new catalog name.
- Next right click the new fitting and select Edit
- Now we have the fitting editor open so next we select the Edit Product List button



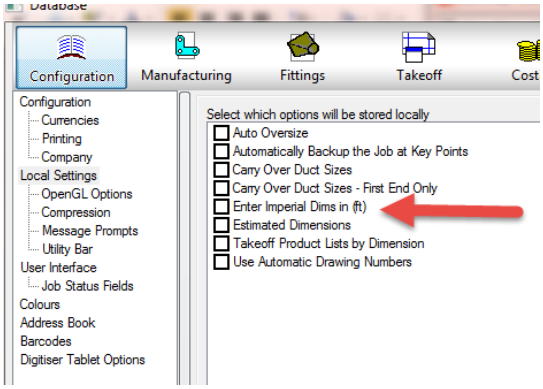




- These two example tables are from Nibco and Elkhart.

- If you are using the copy similar fitting method than you can do a select all in the table and copy and paste into Excel. Now make the changes needed to make this new fitting the proper dimensions.

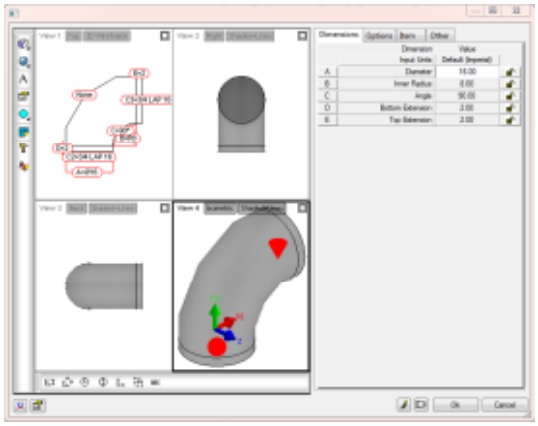
| | A | B | C | D | E | F | G |
|---|---|---|---|---|---|---|---|
| 1 | 607 90 deg Elbow - Nibco | | | | | | |
| 2 | Name | Dia | Btm Ext | Top Ext | Order | Wt | ID |
| 3 | 1/8 | 0.125 | 0.40625 | 0.40625 | 607 | 0.01 | 012NI0000A |
| 4 | 1/4 | 0.25 | 0.375 | 0.375 | 607 | 0.02 | 012NI0004 |
| 5 | 3/8 | 0.375 | 0.5 | 0.5 | 607 | 0.03 | 012NI0008 |
| 6 | 1/2 | 0.5 | 0.34375 | 0.34375 | 607 | 0.04 | 012NI0010 |
| 7 | 3/4 | 0.75 | 0.5 | 0.5 | 607 | 0.1 | 012NI0014 |
| 8 | 1 | 1 | 0.65625 | 0.65625 | 607 | 0.21 | 012NI0018 |
| 9 | 1-1/4 | 1.25 | 0.9375 | 0.9375 | 607 | 0.31 | 012NI0020 |
| 10 | 1-1/2 | 1.5 | 1.03125 | 1.03125 | 607 | 0.46 | 012NI0022 |
| 11 | 2 | 2 | 1.40625 | 1.40625 | 607 | 0.84 | 012NI0024 |
| 12 | 2-1/2 | 2.5 | 1.625 | 1.625 | 607 | 1.41 | 012NI0026 |
| 13 | 3 | 3 | 2 | 2 | 607 | 2.07 | 012NI0028 |
| 14 | 3-1/2 | 3.5 | 2.4375 | 2.4375 | 607 | 2.94 | 012NI0030 |
| 15 | 4 | 4 | 2.46875 | 2.46875 | 607 | 4.23 | 012NI0032 |
| 16 | 5 | 5 | 3.03125 | 3.03125 | 607 | 7.74 | 012NI0033 |
| 17 | 6 | 6 | 3.625 | 3.625 | 607 | 10.95 | 012NI0034 |
| 18 | 8 | 8 | 4.65625 | 4.65625 | 607 | 29.5 | 012NI0036 |
| 19 | | | | | | | |

- Once the updating is done just copy paste back to the Product listed table.
  - Tip1: When copying back make sure you have the same number of columns.
  - Tip2: I would suggest if you have Imperial Dimension in feet enabled, I would change it back to decimal before copying the product listed tables. Found in the database under Configuration, Local Settings.



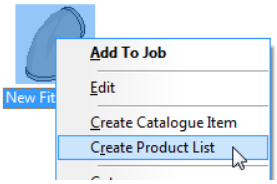

- Now, to complete the fitting we can apply an image, so the icon will display as the button. This can be created from the graphical representation of the pattern by making color and size changes and when ready just right click on the pattern shown and select **Save as Icon**. I usually use a copy of the image from the manufactures website or catalog and resize it to 64x64 to make it display properly and save it as a .png format.
- Tip3: If you copy an image from the website just rename the image the same name as your fitting name.

- If we use the **MakePAT** option we first need to know what CID pattern to use. If you right click on a fitting and select properties then go to the General Tab you will see the CID/pattern number.

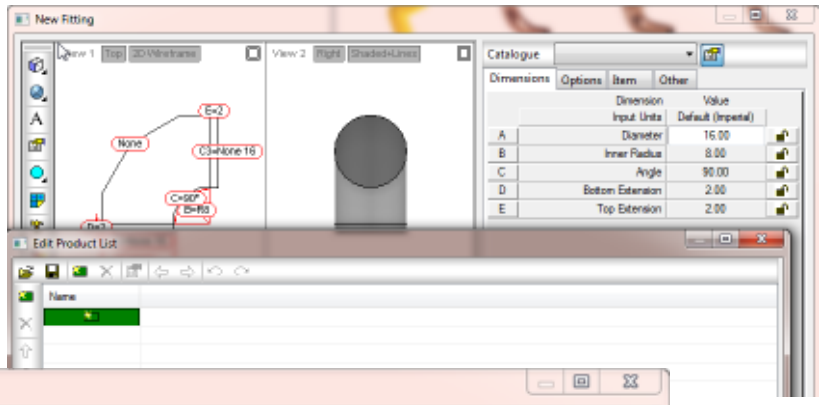


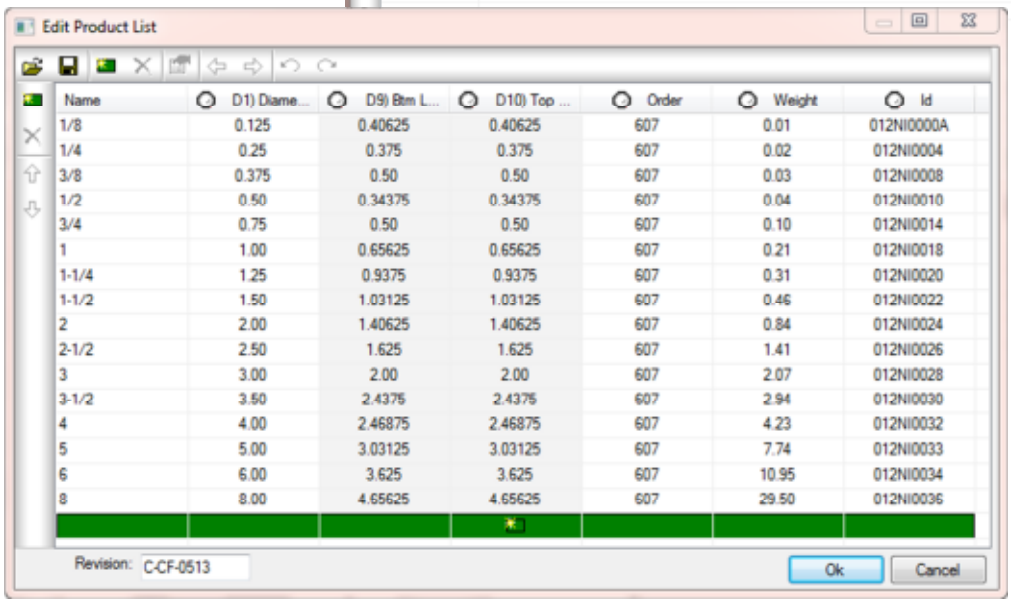
- Next we need to save the fitting to the library folder with a new name.

- Next we need to make this fitting product listed by right clicking the newly created fitting and select **Create Product List**.

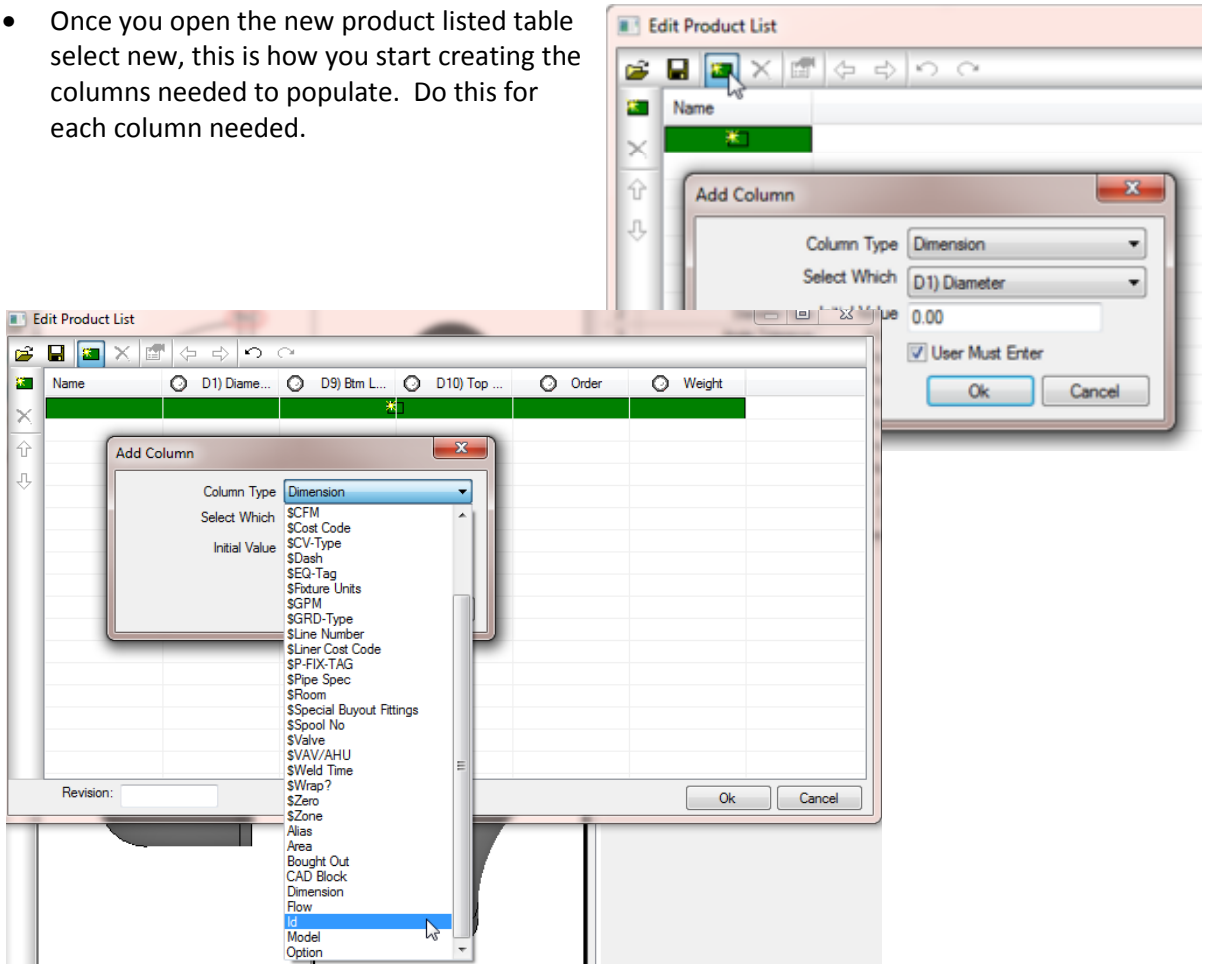



- This will add the Product Listed Table for us to decide which columns we want to use to populate.
- Note that the unlock fields are the fields that we can be used to create columns within the product listed table. We can lock the ones we don't want to be modified or changed.

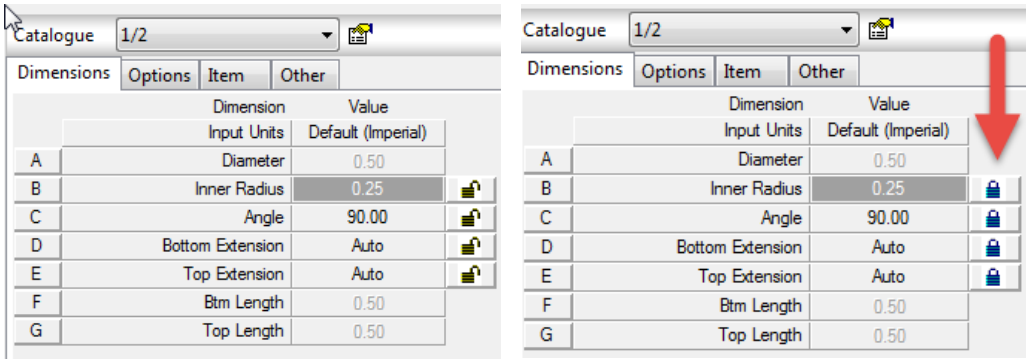


- Once you open the new product listed table select new, this is how you start creating the columns needed to populate. Do this for each column needed.



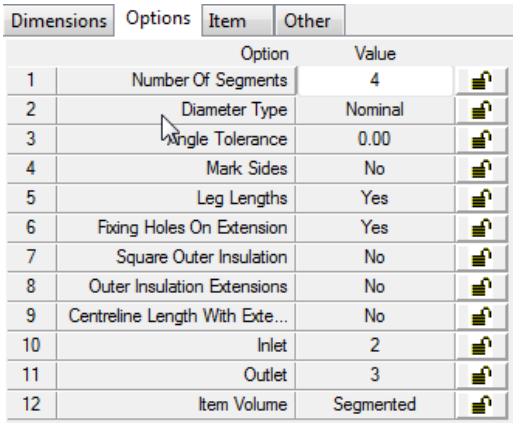

- Next we need to lock the fields we don't want to ever be changed or might remain constant.




- Note, we set the Bottom Extension and Top Extension to Auto, this will allow the Connectors to

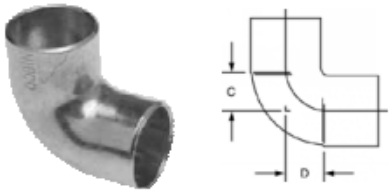
assign the length of the ends. These are different ways you can assign lengths to the fittings and is a preference for this type of control.

- Now let's explore some of the options. First is the Number of Segments that controls the look of the fitting from 2 to 16. Ex. Use 3 to make it look like it has 3 segments or set it to 16 for smooth radius. Diameter Type is usually set to Nominal. Angle Tolerance is used for sloped systems. If you use this fitting in a sloped system then put in an Angle Tolerance (3.00 typically). If not then leave it set to zero.



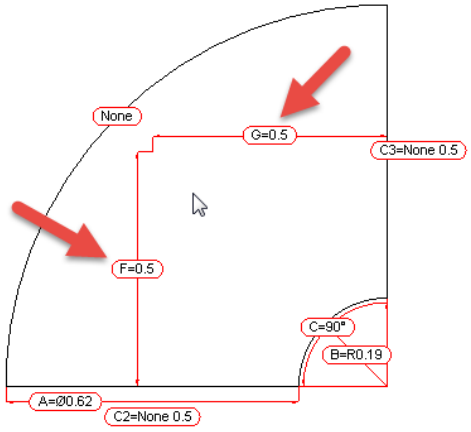
| | Option | Value |
|---|---|---|
| 1 | Number Of Segments | 4 |
| 2 | Diameter Type | Nominal |
| 3 | Angle Tolerance | 0.00 |
| 4 | Mark Sides | No |
| 5 | Leg Lengths | Yes |
| 6 | Fixing Holes On Extension | Yes |
| 7 | Square Outer Insulation | No |
| 8 | Outer Insulation Extensions | No |
| 9 | Centreline Length With Exte... | No |
| 10 | Inlet | 2 |
| 11 | Outlet | 3 |
| 12 | Item Volume | Segmented |

- Another option for this fitting type would be to use Leg Lengths (Yes/No). Yes will allow you to enter the length on the fitting like shown below.

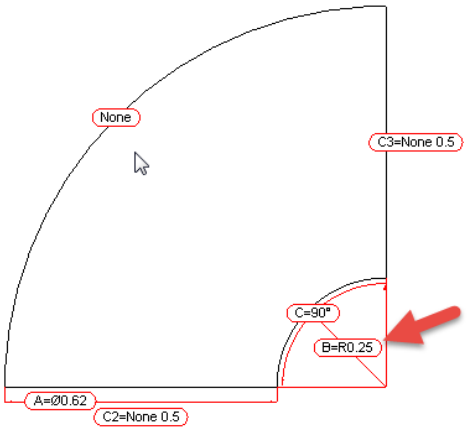



607
90° Elbow – Close Rough
C x C – Wrot

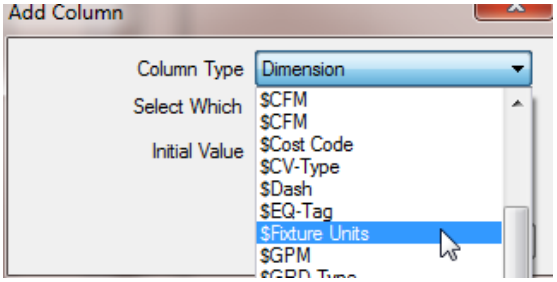
| NOM. SIZE | APPROX. NET WT./LBS. | DIM. C INCHES | DIM. D INCHES |
|---|---|---|---|
| 1/8 | 0.02 | 13/32 | 13/32 |
| 1/4 | 0.02 | 3/8 | 3/8 |
| 3/8 | 0.03 | 1/2 | 1/2 |
| 3/8 x 1/4 | 0.03 | – | – |
| 1/2 | 0.04 | 11/32 | 11/32 |



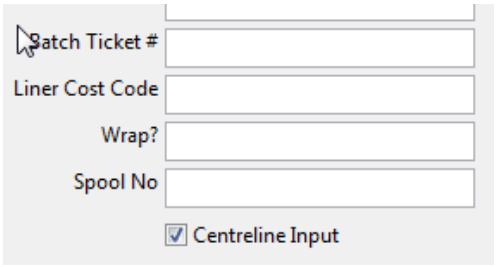

- If we set the Leg Lengths to No then we would need to enter the Radius and you will not be able to enter the Leg Lengths. This option would be good for Weld elbows that need to have a 1.5 times radius.
- Note that Inlet and Outlets also need to be set and can be critical for Flow, DWV fittings and for Street Fittings which sets the proper end to use for insertion. On the 90 deg elbow in our example the Inlet and outlets are not critical.

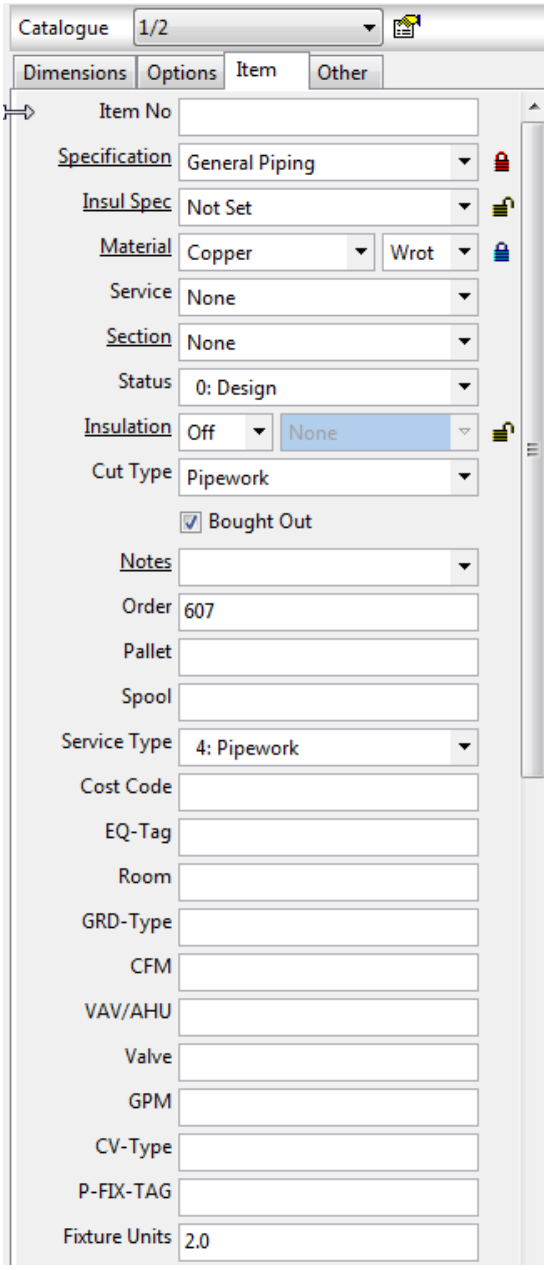


- On to the Item Tab we find Specification, Material used for OD, Standard Length of Pipe, Cut Type and if it's bought out. Note below is the list of additional data that can be filled in is called custom data. This data can also be used in the product listed information to be reported on.




- If we scroll down to the bottom there is one more check box that when we are entering the elbow by radius and check this box we get Centerline Input.

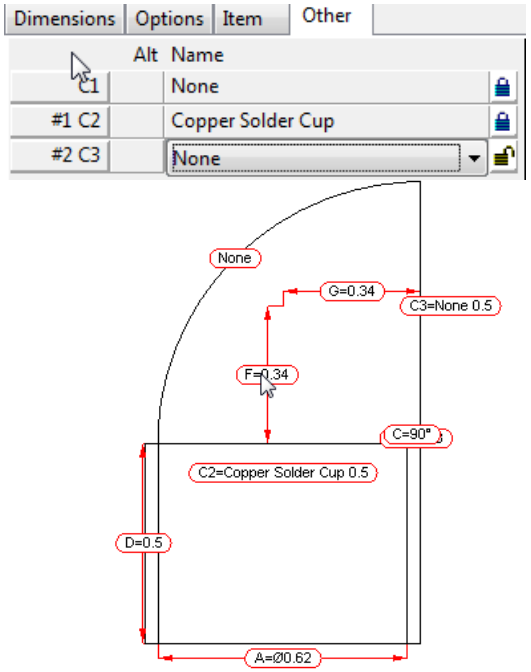


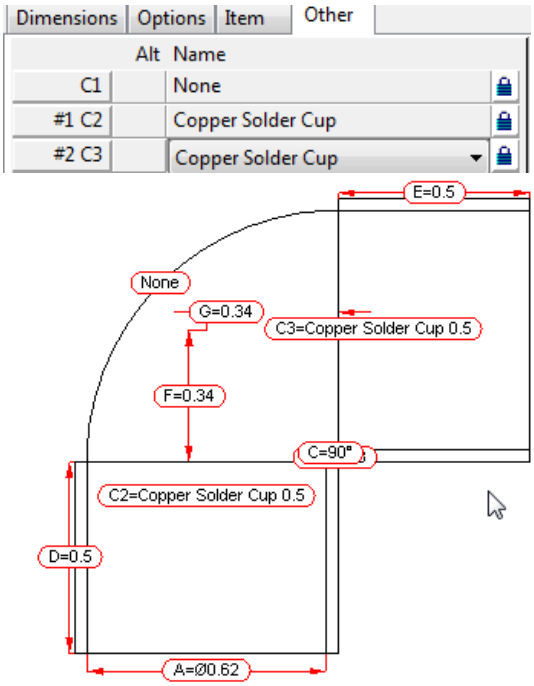



## Discover how connectors are applied to content

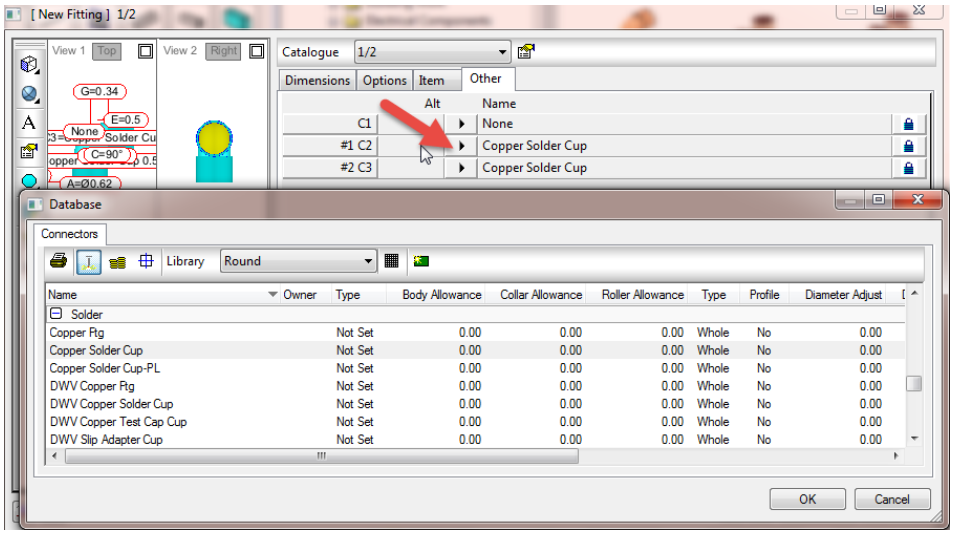
### Connectors are applied on the Other Tab

- When applying the connectors we need to pay attention to which connectors we need to enter data for. In this case for this fitting we need to add connectors to #1 C2 and #2 C3. Note C1 for this fitting will be set to None. On a Sheet Metal Fitting this does have importance and would represent the seam. Notice once each connector is added it extends the fitting cup in this case automagically.

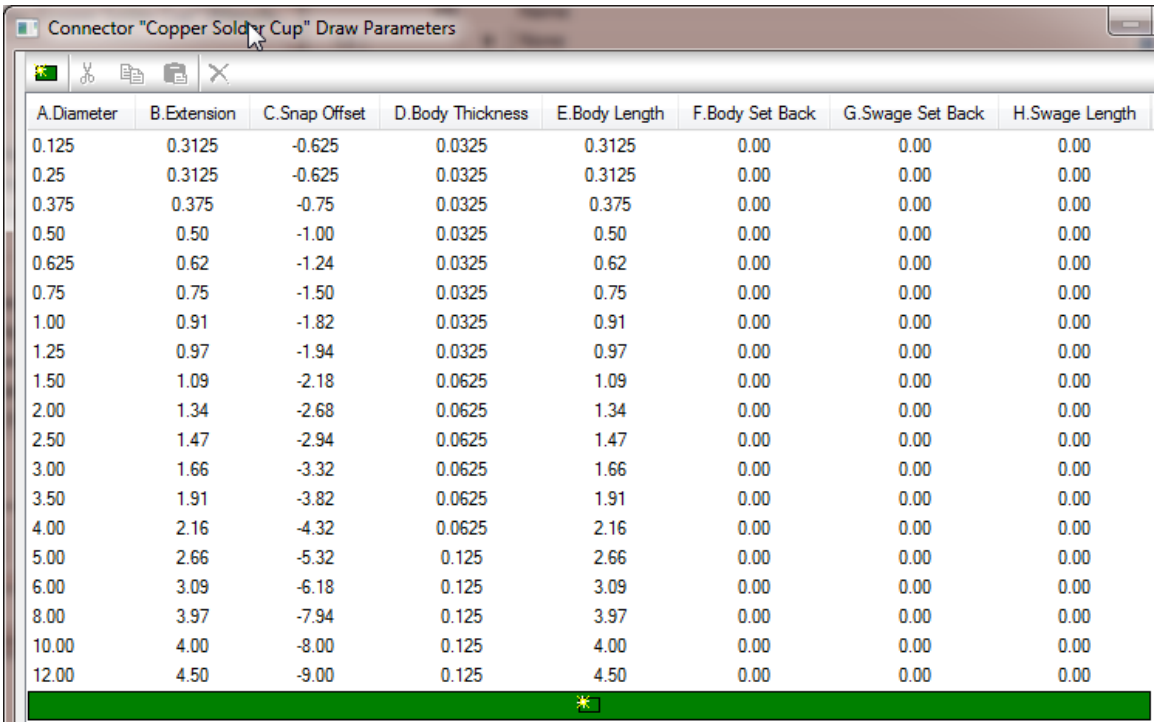



- The Copper Solder Cup has connector properties found in the database that can be accessed here with this hyper-link button.

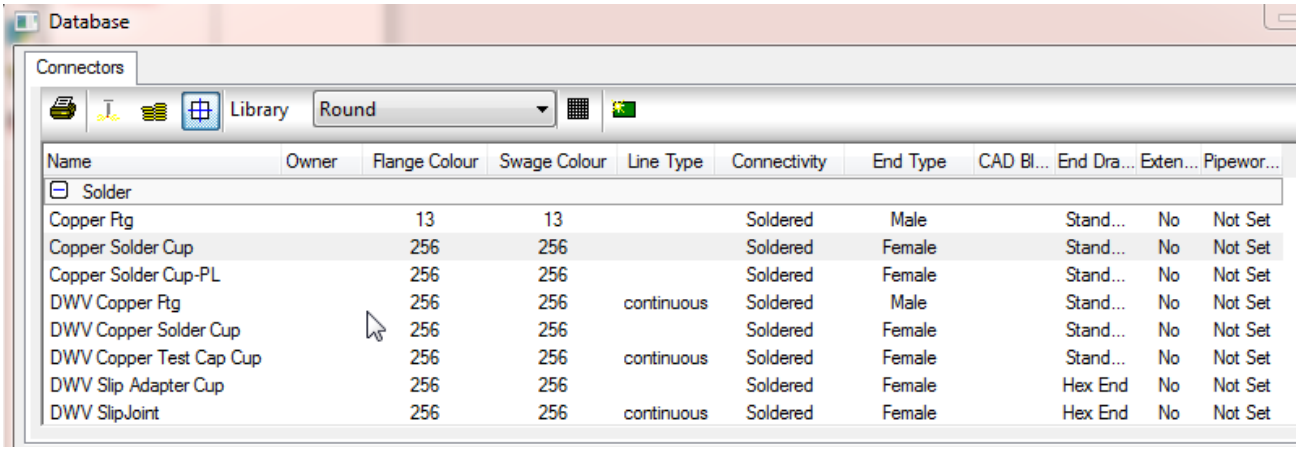


- If we open the Parameters of the Copper Solder Cup we get this table that controls the length, cup size/ OD thickness and Snap Offset for the connector insertion location.




| A.Diameter | B.Extension | C.Snap Offset | D.Body Thickness | E.Body Length | F.Body Set Back | G.Swage Set Back | H.Swage Length |
|---|---|---|---|---|---|---|---|
| 0.125 | 0.3125 | -0.625 | 0.0325 | 0.3125 | 0.00 | 0.00 | 0.00 |
| 0.25 | 0.3125 | -0.625 | 0.0325 | 0.3125 | 0.00 | 0.00 | 0.00 |
| 0.375 | 0.375 | -0.75 | 0.0325 | 0.375 | 0.00 | 0.00 | 0.00 |
| 0.50 | 0.50 | -1.00 | 0.0325 | 0.50 | 0.00 | 0.00 | 0.00 |
| 0.625 | 0.62 | -1.24 | 0.0325 | 0.62 | 0.00 | 0.00 | 0.00 |
| 0.75 | 0.75 | -1.50 | 0.0325 | 0.75 | 0.00 | 0.00 | 0.00 |
| 1.00 | 0.91 | -1.82 | 0.0325 | 0.91 | 0.00 | 0.00 | 0.00 |
| 1.25 | 0.97 | -1.94 | 0.0325 | 0.97 | 0.00 | 0.00 | 0.00 |
| 1.50 | 1.09 | -2.18 | 0.0625 | 1.09 | 0.00 | 0.00 | 0.00 |
| 2.00 | 1.34 | -2.68 | 0.0625 | 1.34 | 0.00 | 0.00 | 0.00 |
| 2.50 | 1.47 | -2.94 | 0.0625 | 1.47 | 0.00 | 0.00 | 0.00 |
| 3.00 | 1.66 | -3.32 | 0.0625 | 1.66 | 0.00 | 0.00 | 0.00 |
| 3.50 | 1.91 | -3.82 | 0.0625 | 1.91 | 0.00 | 0.00 | 0.00 |
| 4.00 | 2.16 | -4.32 | 0.0625 | 2.16 | 0.00 | 0.00 | 0.00 |
| 5.00 | 2.66 | -5.32 | 0.125 | 2.66 | 0.00 | 0.00 | 0.00 |
| 6.00 | 3.09 | -6.18 | 0.125 | 3.09 | 0.00 | 0.00 | 0.00 |
| 8.00 | 3.97 | -7.94 | 0.125 | 3.97 | 0.00 | 0.00 | 0.00 |
| 10.00 | 4.00 | -8.00 | 0.125 | 4.00 | 0.00 | 0.00 | 0.00 |
| 12.00 | 4.50 | -9.00 | 0.125 | 4.50 | 0.00 | 0.00 | 0.00 |

- There are other things at play here that control what the connector End Type looks like and Connectivity that allows certain types of connections to be made to this connector.

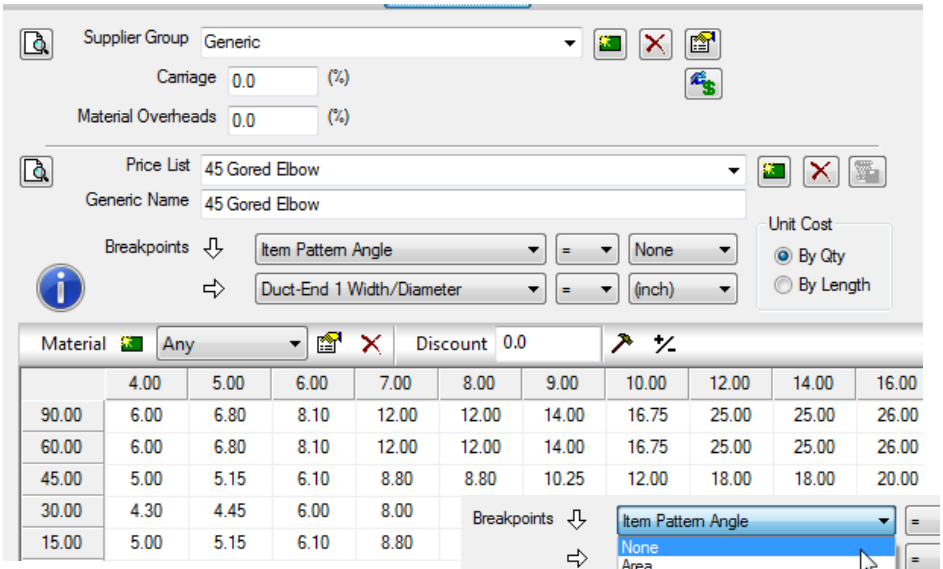



| Name | Owner | Flange Colour | Swage Colour | Line Type | Connectivity | End Type | CAD Bl... | End Dra... | Exten... | Pipewor... |
|---|---|---|---|---|---|---|---|---|---|---|
| Solder | | | | | | | | | | |
| Copper Ftg | | 13 | 13 | | Soldered | Male | | Stand... | No | Not Set |
| Copper Solder Cup | | 256 | 256 | | Soldered | Female | | Stand... | No | Not Set |
| Copper Solder Cup-PL | | 256 | 256 | | Soldered | Female | | Stand... | No | Not Set |
| DWV Copper Ftg | | 256 | 256 | continuous | Soldered | Male | | Stand... | No | Not Set |
| DWV Copper Solder Cup | | 256 | 256 | | Soldered | Female | | Stand... | No | Not Set |
| DWV Copper Test Cap Cup | | 256 | 256 | continuous | Soldered | Female | | Stand... | No | Not Set |
| DWV Slip Adapter Cup | | 256 | 256 | | Soldered | Female | | Hex End | No | Not Set |
| DWV SlipJoint | | 256 | 256 | continuous | Soldered | Female | | Hex End | No | Not Set |

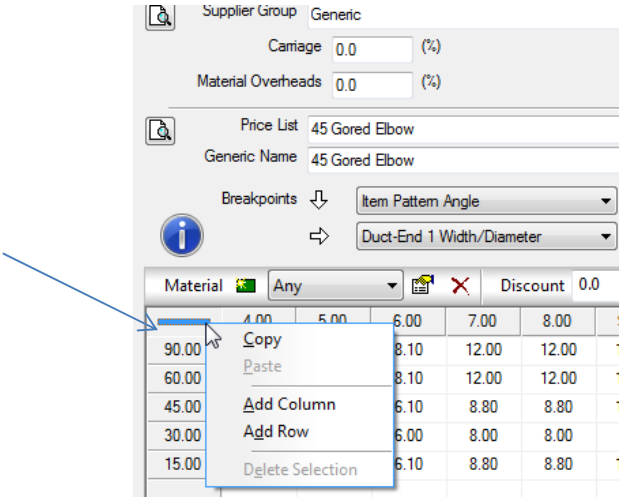
## Discover how Estimating Data is applied to the fittings

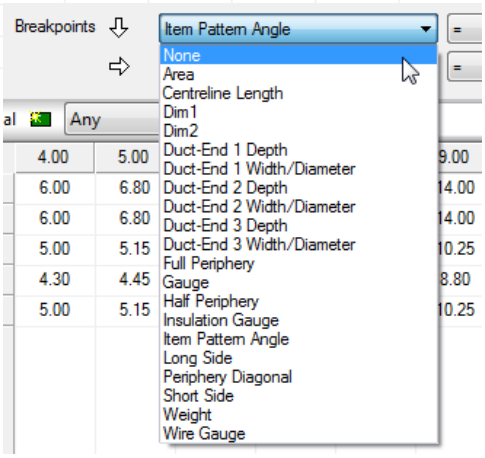
### Estimating Data is applied through Costing information

- Before we start applying the costing information we must first explore the types of tables that can be used.
    - Breakpoint tables
        - This table uses the x,y axis type table to apply costing to items based on breakpoint parameters as shown here.

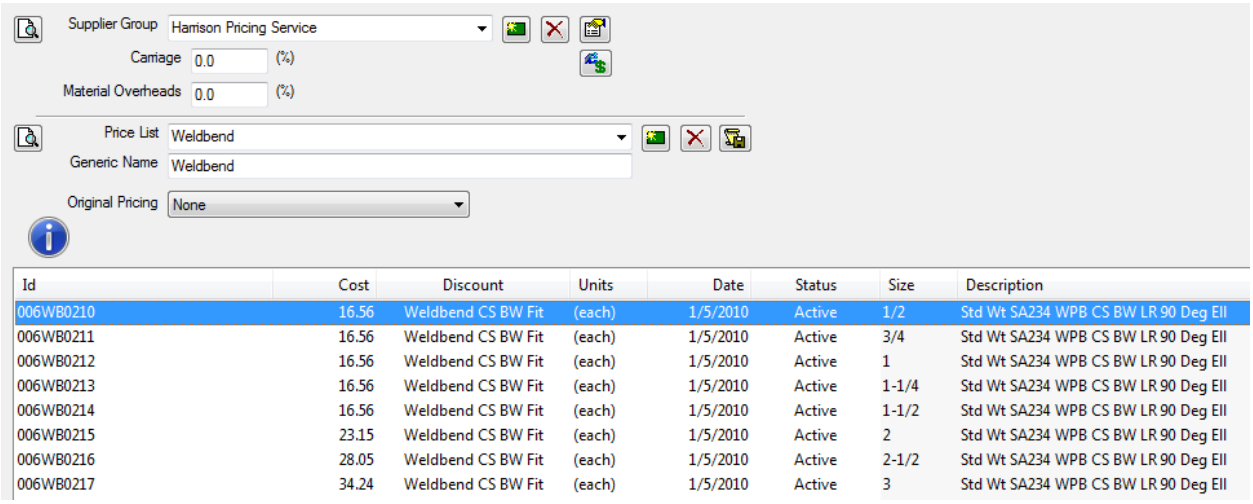



        - These tables can be cut & pasted into Excel to help with updating or modifying.



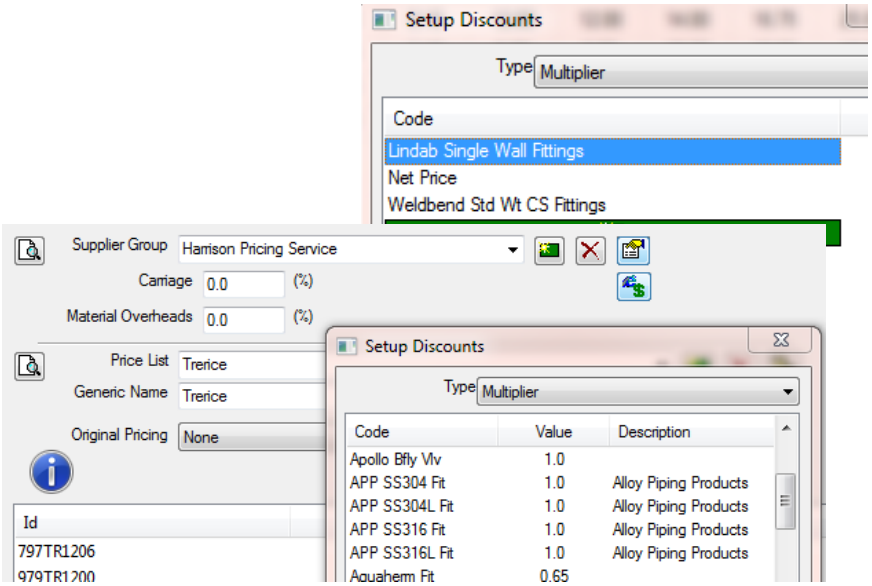



- Product Listed tables
  - This type of table uses the Database ID Code or Supplier code to get costing information for the item.

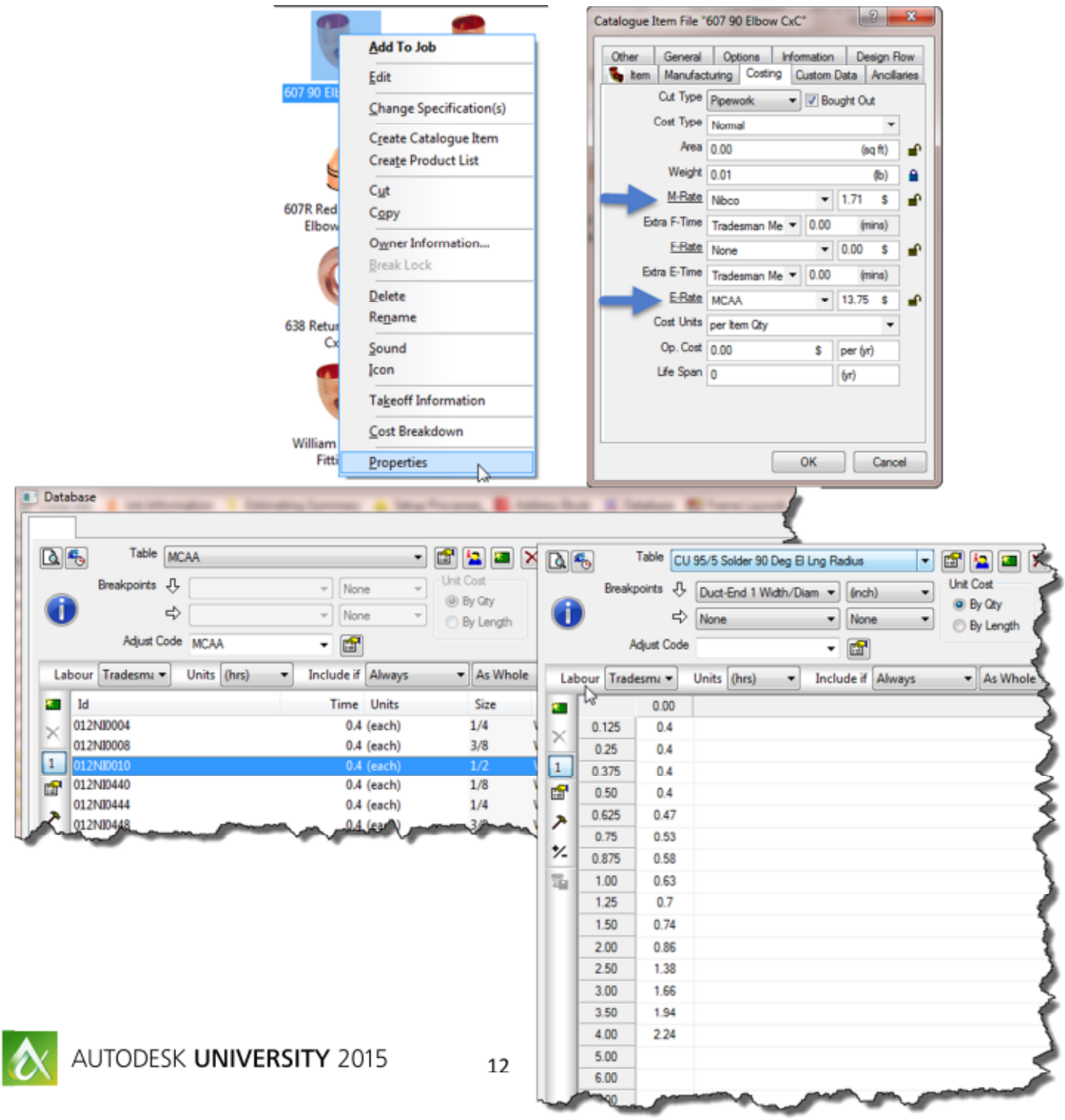



| Id | Cost | Discount | Units | Date | Status | Size | Description |
|---|---|---|---|---|---|---|---|
| 006WB0210 | 16.56 | Weldbend CS BW Fit | (each) | 1/5/2010 | Active | 1/2 | Std Wt SA234 WPB CS BW LR 90 Deg Ell |
| 006WB0211 | 16.56 | Weldbend CS BW Fit | (each) | 1/5/2010 | Active | 3/4 | Std Wt SA234 WPB CS BW LR 90 Deg Ell |
| 006WB0212 | 16.56 | Weldbend CS BW Fit | (each) | 1/5/2010 | Active | 1 | Std Wt SA234 WPB CS BW LR 90 Deg Ell |
| 006WB0213 | 16.56 | Weldbend CS BW Fit | (each) | 1/5/2010 | Active | 1-1/4 | Std Wt SA234 WPB CS BW LR 90 Deg Ell |
| 006WB0214 | 16.56 | Weldbend CS BW Fit | (each) | 1/5/2010 | Active | 1-1/2 | Std Wt SA234 WPB CS BW LR 90 Deg Ell |
| 006WB0215 | 23.15 | Weldbend CS BW Fit | (each) | 1/5/2010 | Active | 2 | Std Wt SA234 WPB CS BW LR 90 Deg Ell |
| 006WB0216 | 28.05 | Weldbend CS BW Fit | (each) | 1/5/2010 | Active | 2-1/2 | Std Wt SA234 WPB CS BW LR 90 Deg Ell |
| 006WB0217 | 34.24 | Weldbend CS BW Fit | (each) | 1/5/2010 | Active | 3 | Std Wt SA234 WPB CS BW LR 90 Deg Ell |

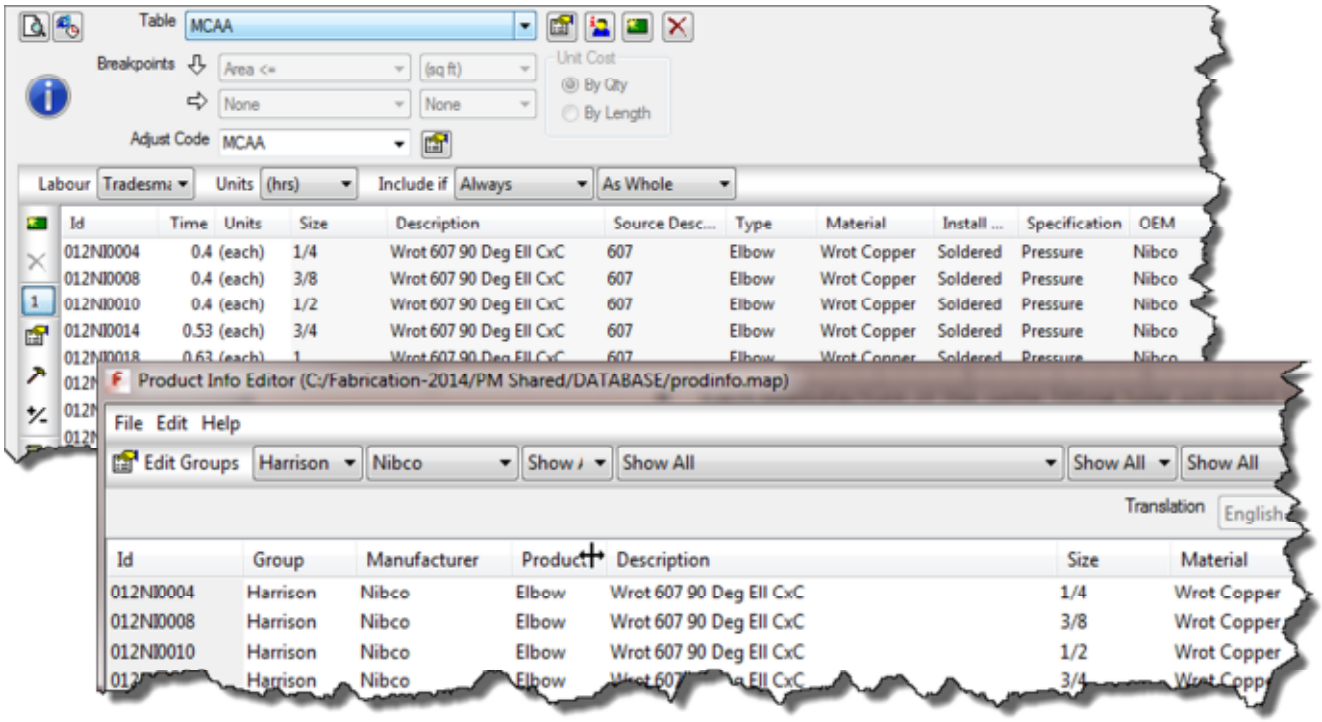
- Discounts (Multipliers)
  - Discounts are applied per Supplier Group using the  setup discounts button.



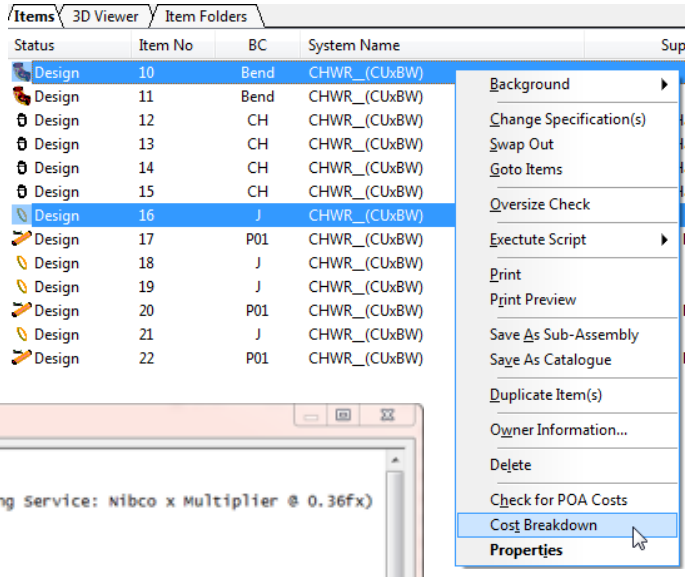
- Fabrication Tables & Install Tables
  - These tables are similar to pricing tables as they have Breakpoint tables and Product Listed Tables.
  - We can view these from the database directly and also from the properties of the item. The underline **M-Rate** (Material$) and **E-Rate** (Install hrs) are hyperlinks into the database.

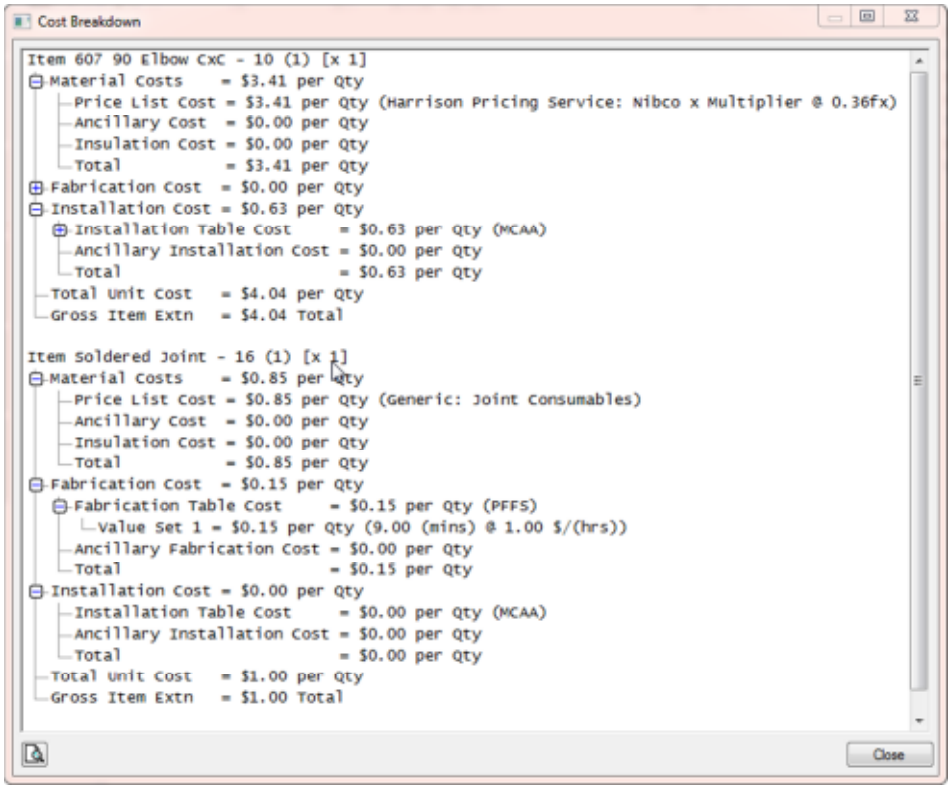


- Note the difference between using Breakpoint Tables and a Product listed Tables have Pros and Cons.
    - Breakpoint tables – Pros:
        - One table can be used for multiple manufactures of the same fitting type.
        - Ex. Copper Soldered 90 deg elbows
    - Breakpoint tables – Cons:
        - You can only assign a few fittings to one table.
        - If you have the need to change a labor source for all fittings then this would be very difficult as you would have to reassign them to new tables. Unless you reassign with a Product Listed Table.
        - Updating tables can use Excel but one table at a time.
    - Product Listed Tables – Pros:
        - One table can hold all labored items using the same ID codes we use for pricing.
        - Easy to change Labor Sources
    - Product Listed Tables – Cons:
        - One table holds all the labored items.
        - Each Manufacture of the same fitting type will need to have each the ID Codes listed.
- Product Information (MapProd)
    - This allows you to use the ID Codes to generate more reporting capabilities when filled out. This also provides description information within the Costing and Install Product Listed Tables.



- Once all the information is applied than we can verify the Costing, Fabrication (if applicable) and Install Table tables using the Cost Breakdown. This is done by right clicking on the taken-off item and selecting **Cost Breakdown**.
- This allows us to trouble shoot any issue. Also for maybe why an item is not pricing or adding labor like we would be expecting.



## Discover how the Product Integrate with each other

### Fittings like the one we created here are already integrated

- Since CADmep, ESTmep and CAMduct use the same database they are by default integrated.
- The Items have to have Dimensional data anyway to display properly so they just need the Estimating information applied to get the rest of the puzzle.
- Data files are shared between CADmep, ESTmep and CAMduct using the .MAJ (Manufacturing JOB) format or the internal interchange file.
- Files also created in ESTmep as a .MAJ file can also be opened in CADmep using the OpenJOB command.