

# The B.O.M. Tool, Symbols, and Graphite

## Section One : Basic BOM Table Creation

During the course of your work as a draftsman, engineer, or designer you might ask , “How do I use the B.O.M. Tool in Graphite?”, or “Is it possible to define a generic part in Graphite and have it retain BOM attributes?”. You may not know it, but Graphite comes with BOM tools and Symbol Tools.

If you’re a former AutoCAD user you’ll soon find out how you can avoid defining a block and manually building a BOM on your prints. If you’re new to Graphite, this tutorial will give you a head start in streamlining workflow. These tools can help maximize efficiency no matter what your drafting background.

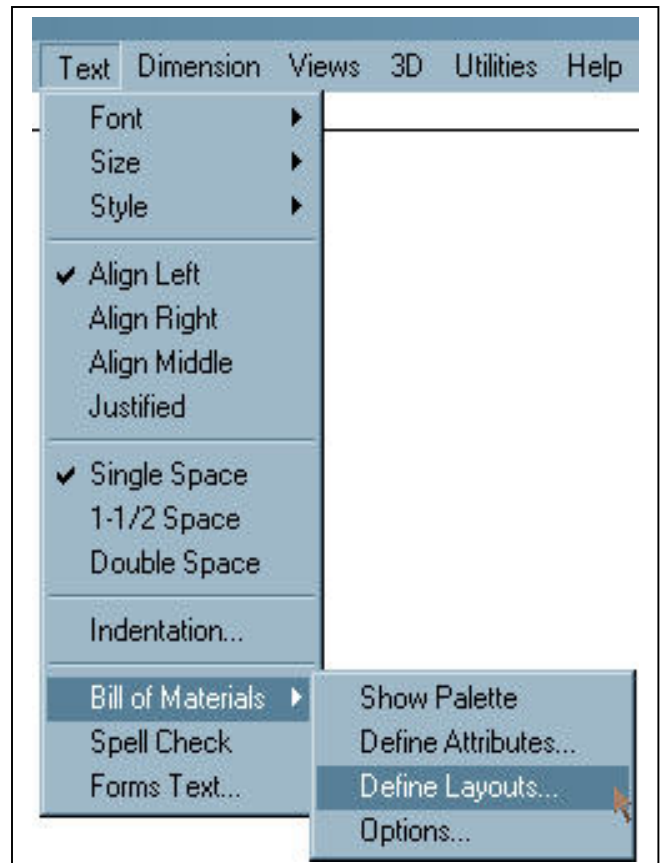
Without further exposition, let’s dive in and get started!

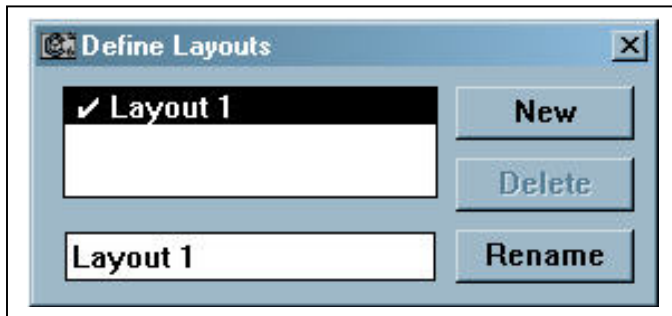
*\*NOTE: Set your View AND Plane to Top at this time. All work is performed in the Top View and Top Plane unless otherwise specified.*

*\*\*NOTE: If you have not already done so, read the Graphite Bom Read.me file now. It contains important set-up information for successfully completing this tutorial.*

Open Graphite and make sure you have a single blank page open.

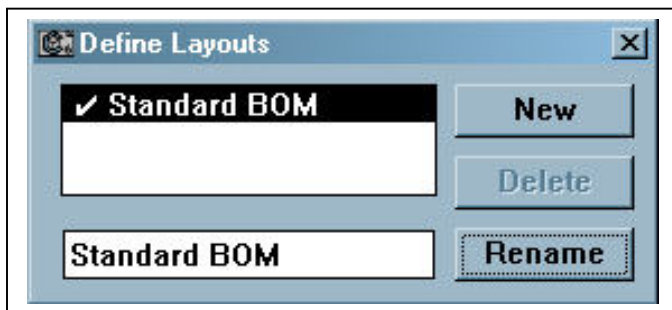
Now browse to **Text> Bill Of Materials>Define Layouts**





You should now see the dialogue box shown here.

Use your cursor and highlight the Layout1 text next to the **Rename** button. Replace with the name *Standard BOM*. Click the **Rename** button.

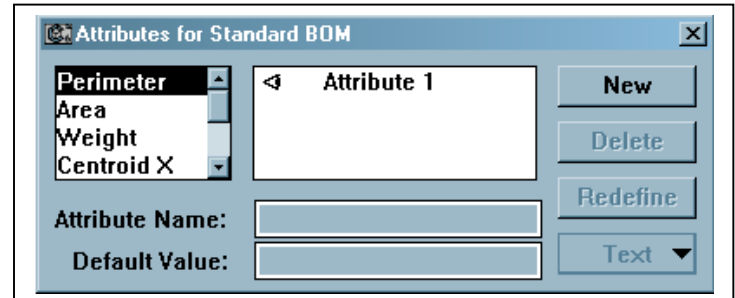


Your dialog box should update to look like this one.

What we have done is given our BOM a Layout where all its information can be stored. If needed, we can define multiple Layouts to handle different BOM tables. For now, we'll stick with a single Layout to keep it simple.

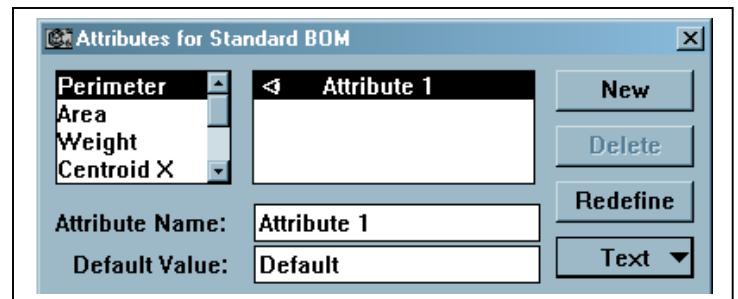
Now we must define the *columns* that we want in our BOM table. These will have names like Description, Manufacturers Part Number, Quantity, and Material. These “columns” are known as Attributes in Graphite.

Select **Text> Bill Of Materials > Define Attributes**. You’ll now see the dialog pictured here.

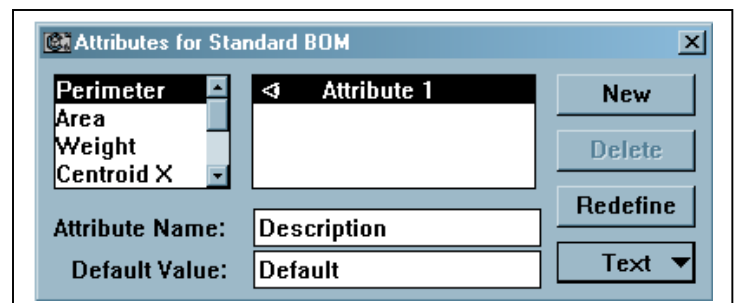


**Pay close attention to these next few steps. It is imperative that your BOM attributes be set up correctly now. If they are not you’ll have to come back and re-define the attributes.**

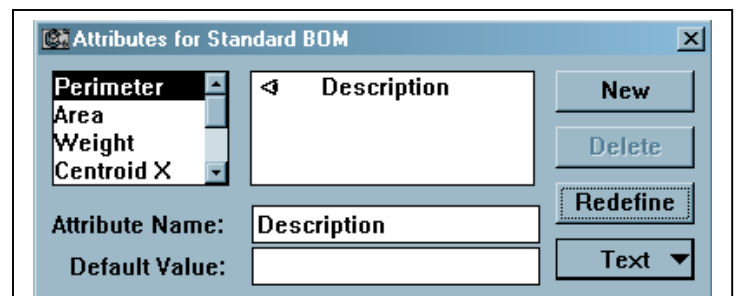
Click on the **Attribute 1** title in the dialog box so that it highlights.



Now highlight the phrase *Attribute 1* located in the **Attribute Name** field. Drag your cursor across the word(s) to highlight them. Type in *Description*. This is what you should see.



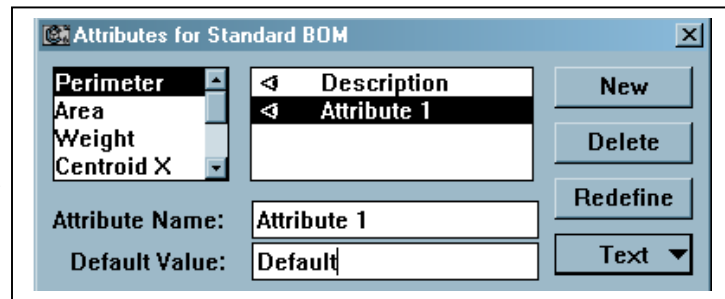
Highlight the word *Default* located in the **Default Value** field. Delete the word and leave it blank. Hit the **Redefine** button (this is *very important*, otherwise your attribute will not “take”). The dialog box should now look like the one pictured here.



Now we must define the other Attributes we want in our BOM. We will create the following Attributes by repeating the previous steps.

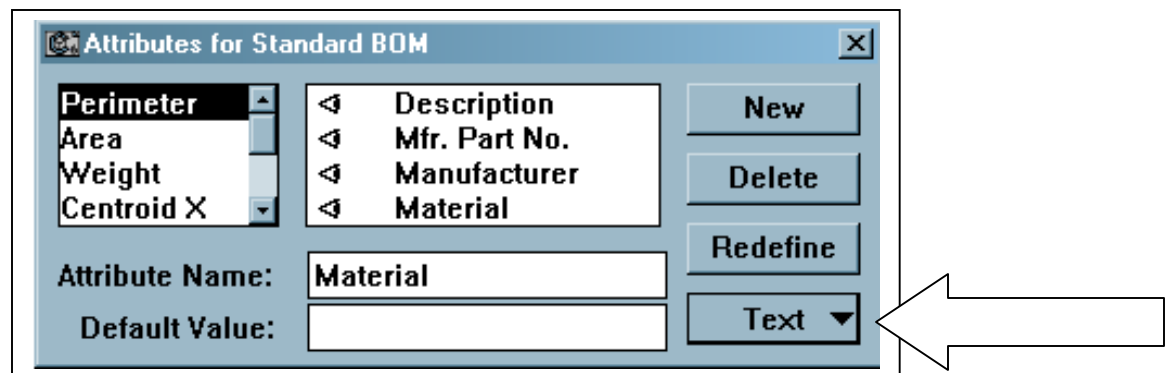
- *Mfr Part No.*
- *Manufacturer*
- *Material*
- *Quantity*

With the Attributes dialog box still open, click on the **New** button. Now you get a new *Attribute 1* in your dialog box like the one shown.

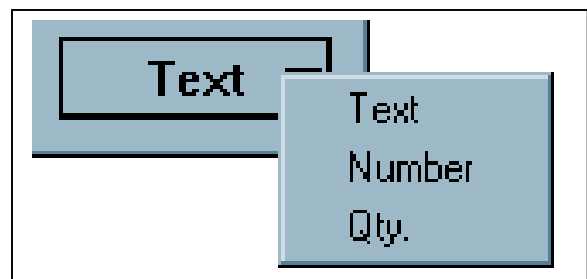


Create *Mfr Part No.*, *Manufacturer*, and the *Material* attributes using the same steps we used to create the *Description* attribute. When you've accomplished that move on to the next step(s) to learn how to create the *Quantity* attribute.

Defining the *Quantity* attribute differs only slightly from the others. If you were looking at the other buttons in the dialog box you may have been wondering what that **Text** dropdown menu does. Look at the screenshot below for clarification.



Click on the dropdown menu **Text** to expand it. Here's what it will look like.



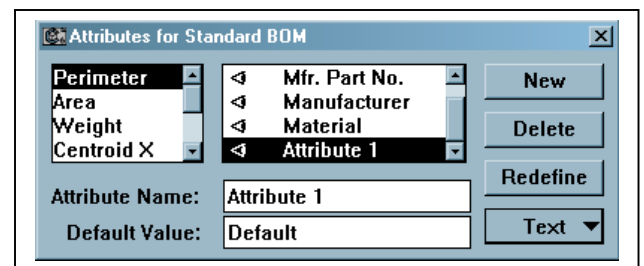
This dropdown menu allows you to define the type of information that an attribute can hold. For example, if you define an attribute as a **Number** type you won't be able to input anything other than numbers. Here's an explanation of what each type does . . .

**Text** : Allows a BOM attribute to hold alphanumeric information including some special characters such as dashes ( - ). EX. Valex 123.10

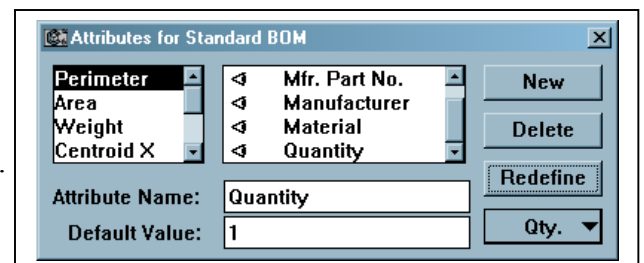
**Number**: Choosing this type will force a BOM attribute to accept only numbers. EX. 1234554321, 1.234

**Qty.**: This type allows you to set how many parts are needed per print. By defining a BOM attribute type as **Qty.**, the program will automatically count how many times geometry occurs on a drawing. This only applies if geometry has a BOM attribute with a **Qty.** type. The majority of **Qty** attributes will have a **Default Value** of 1.

Let's create the *Quantity* attribute.  
Hit **New** on the attribute dialog box so that a new *Attribute 1* option appears like this one.



Rename the **Attribute Name** field from *Attribute 1* to *Quantity*. Enter 1 in the **Default Value** data field. Click on the **Text** dropdown menu and change the attribute type to **Qty.** Make sure to click the **Redefine** button. Your dialog Box should look like the one shown here.



**STOP: Very Important! Go to Layout > Preferences> Save Preferences RIGHT NOW!**

After you have set-up and defined the Layout and BOM Attributes, you **MUST** save your preferences. This cannot be stressed enough. If this step is not performed, the next time you open Graphite all the BOM information will be lost. Now close and re-open Graphite. You should have a blank page open.

Now we are ready to apply these attributes to some geometry and have Graphite create a BOM table for our drawing(s).

Provided with this tutorial is a file for you to work with. It is called **chalice.vc6**. Import this file onto your blank page. Follow these steps to Import the file properly.

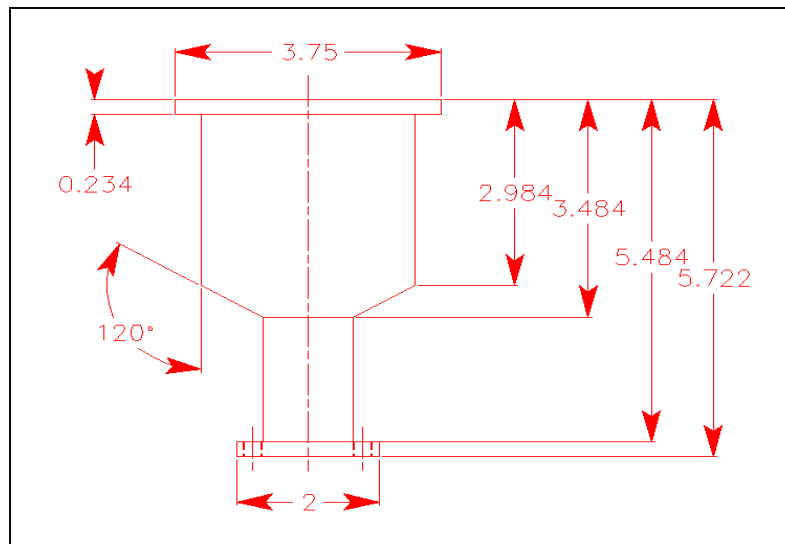
- 1) Go File>Import
- 2) Browse to where the file is saved. It should have been saved to your desktop.
- 3) Select the file named **chalice.vc6** and click the **Open** button.
- 4) The Import type dialog will appear.
- 5) Set the Import type to Graphite.
- 6) Click **OK**

Why is it necessary to **Import** this file?

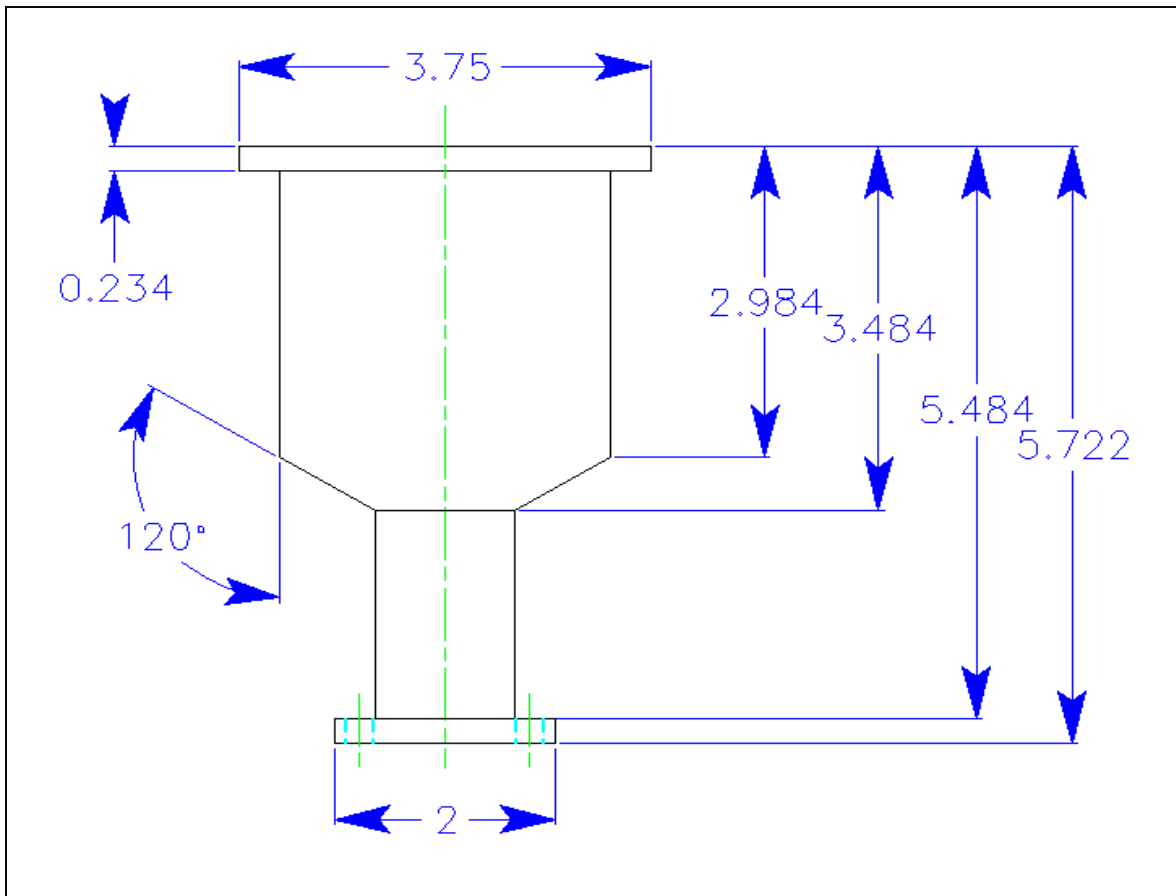
Graphite cannot assign a BOM layout or BOM attributes to files that were created lacking these important features. The **chalice.vc6** file was created “naked”, or in other words; it was drafted without a BOM Layout or BOM Attributes assigned to it. So when a **File>Open** is performed it is opened without any of the BOM settings. However, when we **Import** the file Graphite will automatically force the file to accept the BOM Layout and BOM Attributes: provided that they have been created beforehand. As a general rule, import the file to ensure BOM settings are applied.

If the drawing does not show up on your page perform a Zoom All by pressing CTRL+F on the PC , or Command+F on the Mac. Your screen should look like this . . .

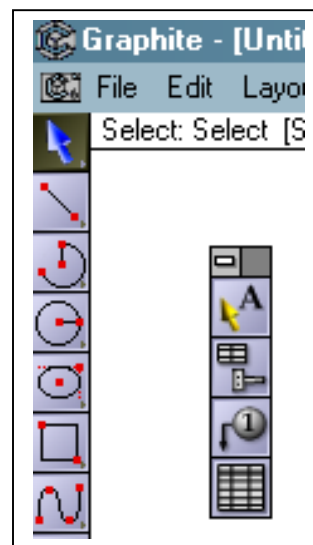
Your dimensions may appear slightly differently depending on the precision and tolerances set in the **Dimensions** menu.



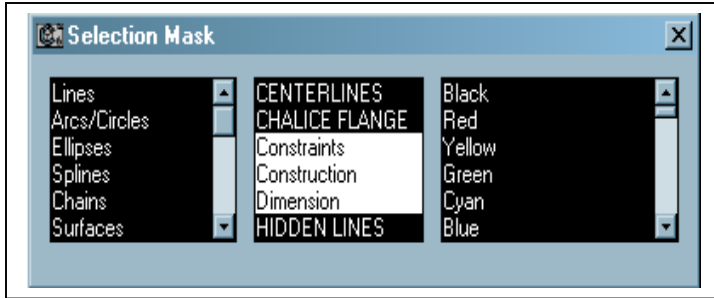
Click in blank space to deselect the geometry in the **chalice.vc6** file.



Select **Text>Bill Of Materials>Show Palette**. A new toolbar will appear near the upper left-hand corner of your screen. This is the BOM tool palette.

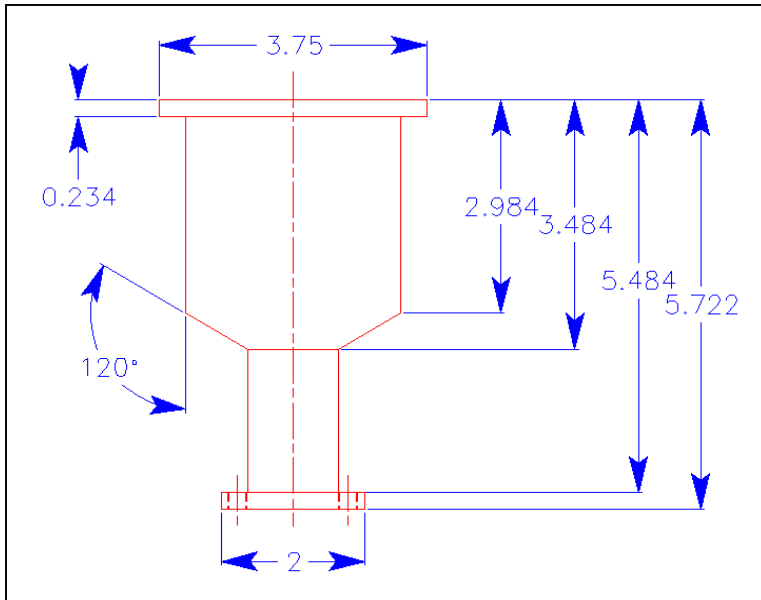


We are now going to apply the BOM Attributes we defined earlier to some of the on-screen geometry. Our initial set-up is going to be wrong, but we are going to do this for good reason. It will demonstrate a very important point about how Graphite assigns a QTY type attribute to geometry.



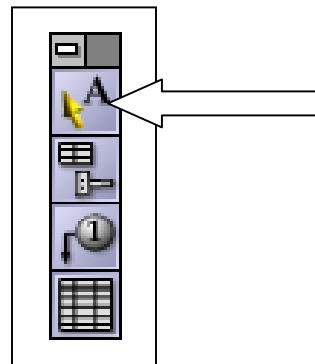
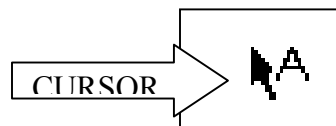
Go **Edit>Selection Mask**. A dialog box will appear. Hold down the CTRL key (COMMAND key on the Mac) and set it so that the middle column of the dialog box highlights ONLY **CENTERLINES**, **CHALICE FLANGE**, and **HIDDEN LINES**.

\*\*\* You may have an extra layer called **Forms**. Make sure it is not selected. \*\*\*



Now press CTRL+A (COMMAND+A on Mac) and all the geometry except the dimensions should highlight.

Select the first tool in the BOM tool palette; the **User Attribute Tool**. Your cursor will change to an arrow with the letter "A" by it.



Hold down the your right-mouse button(or just hold down your mouse if you use a single button Mac mouse) and drag a selection fence around the entire drawing. Because we took the time to set up our **Selection Mask**, only the part geometry, hidden lines, and centerlines should highlight. But something else happens, too. Look down at the bottom of your screen. You should see all the BOM Attributes you defined at the beginning of this tutorial appear. Next to each attribute should be a blank data field. Here is where we type in the specific BOM information we want to see on our print.

Description	Mfr. Part No.	Manufacturer	Material	Quantity
				1

Type the following information into the database fields . . .

**Description:** Chalice Flange

**Mfr. Part No.:** 12345-001

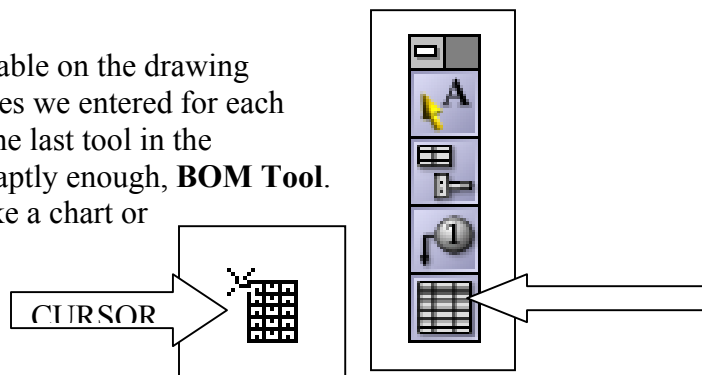
**Manufacturer:** HPS Inc.

**Material:** 304SS

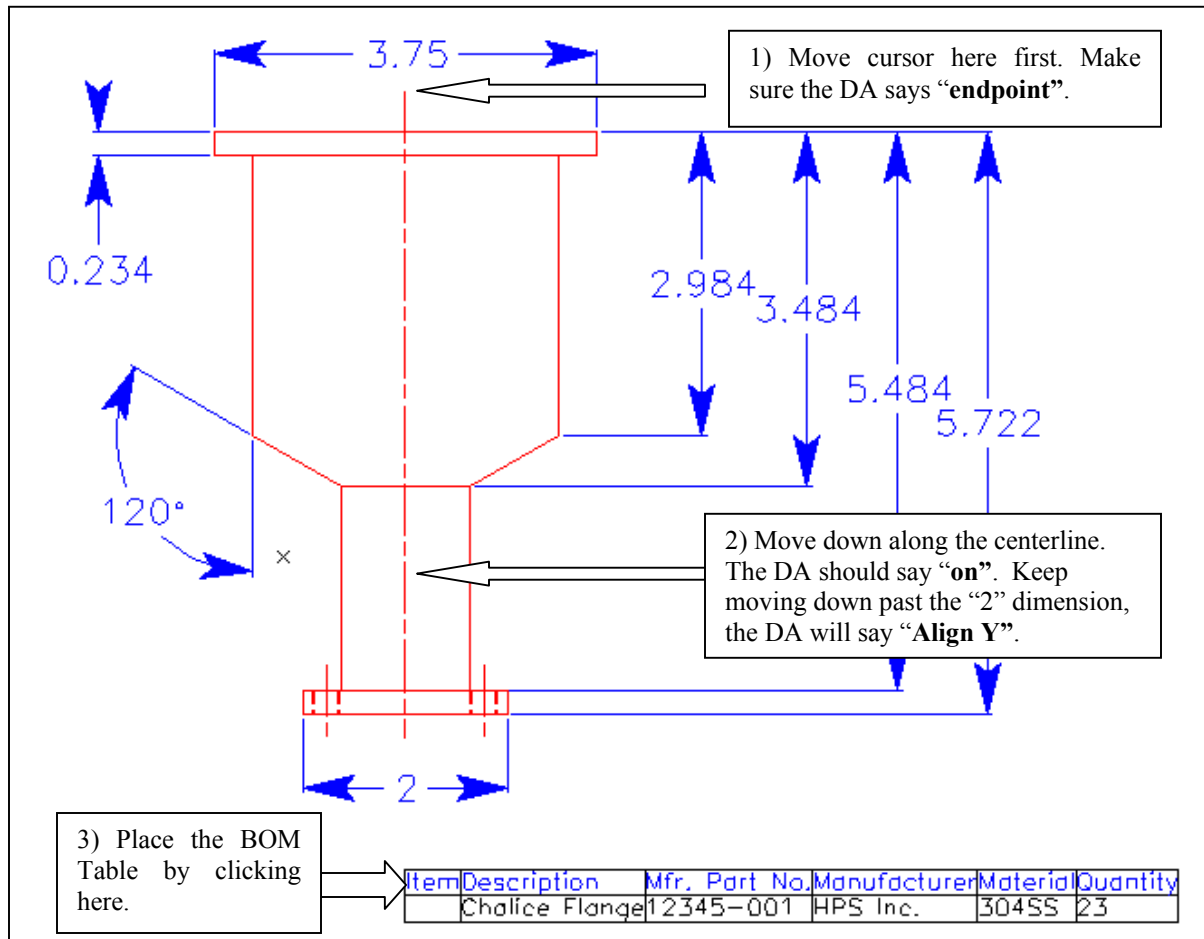
**Quantity: 1 (STOP! AFTER YOU TYPE IN “1” HERE PRESS THE ENTER KEY (RETURN ON THE MAC)!)**

If you do not perform this action the BOM Attributes will not be applied and you will get a blank BOM Table.

The next step is to place a BOM Table on the drawing that will display the BOM Attributes we entered for each of those fields. Start by selecting the last tool in the BOM Tool Palette. This is called ,aptly enough, **BOM Tool**. Your cursor will change to look like a chart or spreadsheet icon.



Using the Drafting Assistant, move your cursor to the top of the part centerline. The Drafting Assistant should “wake up” the endpoint. Move down along the centerline. The word “**on**” should appear as you move the cursor. Keep moving down the centerline until your cursor is about 1”-2” below the 2 dimension. Click here. You will now see that Graphite creates a BOM table for this part at this location. (See picture below for clarification).



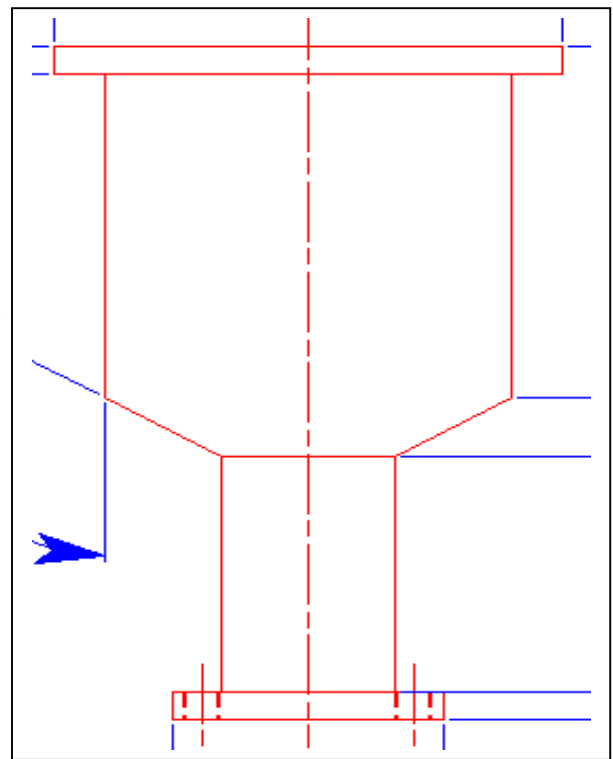
Congratulations! You’ve just created your first Graphite BOM Table. Yet, there’s something fishy about it. Take a look at the Quantity column. Notice it indicates that we have 23 parts for this drawing. We also have no Item # listing. Well, that can’t be right! We want our BOM to show a quantity of 1. After all, we’ve only got one part on the print.

Why has this occurred? The answer is simple – because we have assigned our BOM attributes to each of the 23 lines that make up the geometry. If we want the BOM Tool to treat this piece as a single entity the geometry **MUST** be grouped. In addition, we’ve no Item # because we have not applied a numbered balloon callout to the drawing. Now that we know what’s wrong it’s easy to go back and fix it.

To fix our BOM., first close the **Selection Mask**, if not already done so. Press CTRL+A (APPLE+A on the Mac). All geometry should highlight. We have to do this to reset the **Selection Mask**. We don't want to filter out any geometry. Now pick the **Selection Tool** and click in an empty area on the screen to deselect everything. With the **Selection Tool** still active, click on the BOM Table you've just placed. It will highlight. Press the **Delete** key and erase the table.

Item	Description	Mfr. Part No.	Manufacturer	Material	Quantity
	Chalice Flange	12345-001	HPS Inc.	304SS	23

Once we've deleted the "bad" BOM Table, we need to go and access the **Selection Mask** again. Select **Edit> Selection Mask**. Once again, set your filters in the middle column so that CHALICE FLANGE, CENTERLINES, and HIDDEN LINES are the only items highlighted in that column. Press CTRL+A (COMMAND+A on the Mac) to highlight the part geometry only. Select **Arrange> Group**. Close the **Selection Mask**. Hit CTRL+A (COMMAND+A on the Mac) to select everything on-screen and thereby reset the **Selection Mask**. Pick the **Selection Tool**. Click anywhere on the part geometry. Only the part will highlight, even though we've reset the **Selection Mask**. The dimensions will remain unhighlighted.



All part geometry should highlight after grouping.



Pick the **User Attribute Tool** from then BOM Tool Palette.

Click on any part of the geometry, except for any dimensions. The part geometry will highlight. Your BOM attributes will also appear at the bottom of the screen.

◀	Description	<input type="text"/>	Mfr. Part No.	<input type="text"/>	Manufacturer	<input type="text"/>	Material	<input type="text"/>	Quantity	<input type="text" value="1"/>
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Type in the following data for the fields . . .

**Description:** Chalice Flange

**Mfr. Part No.:** 12345-001

**Manufacturer:** HPS Inc.

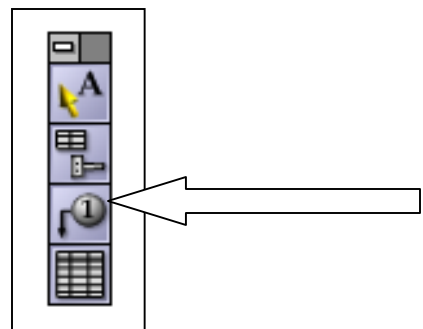
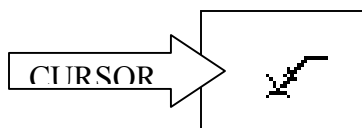
**Material:** 304SS

**Quantity: 1 (STOP! AFTER YOU TYPE IN “1” HERE PRESS THE ENTER KEY (RETURN ON THE MAC)!)**

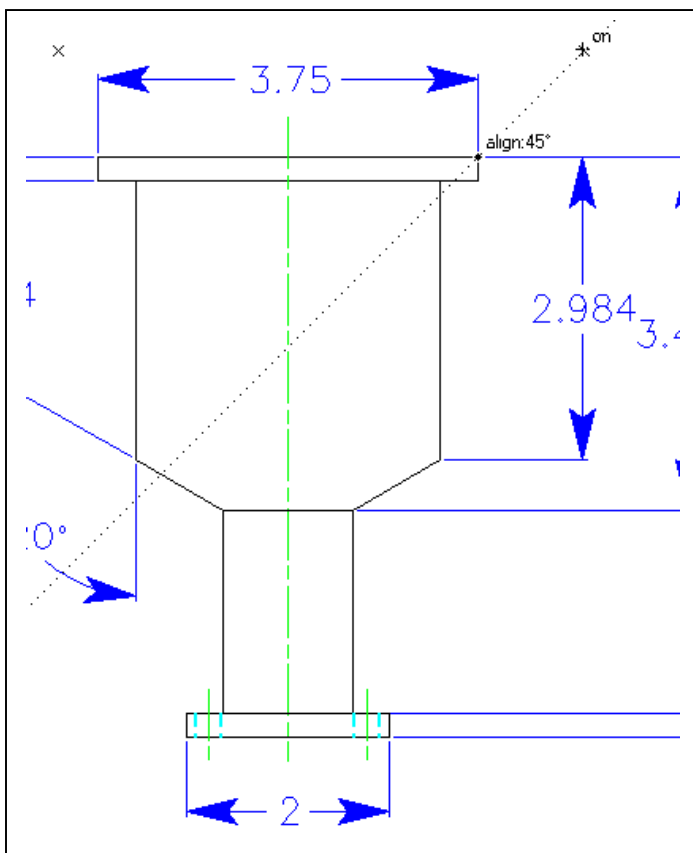
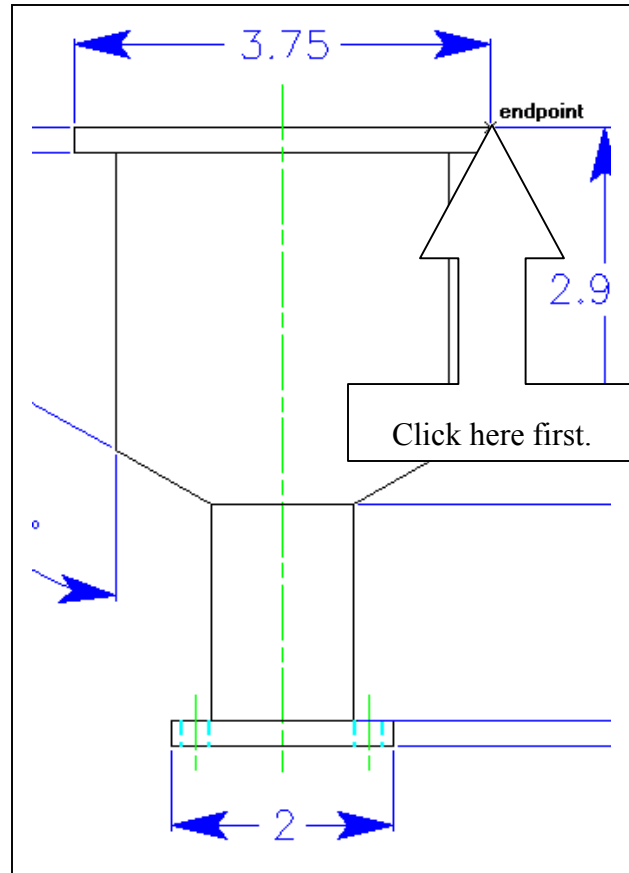
If you do not perform this action the BOM Attributes will not be applied and you will get a blank BOM Table.

Before we place our corrected BOM Table we need to put a ballooned item number callout on the part. This ensures that the BOM table will be properly filled out.

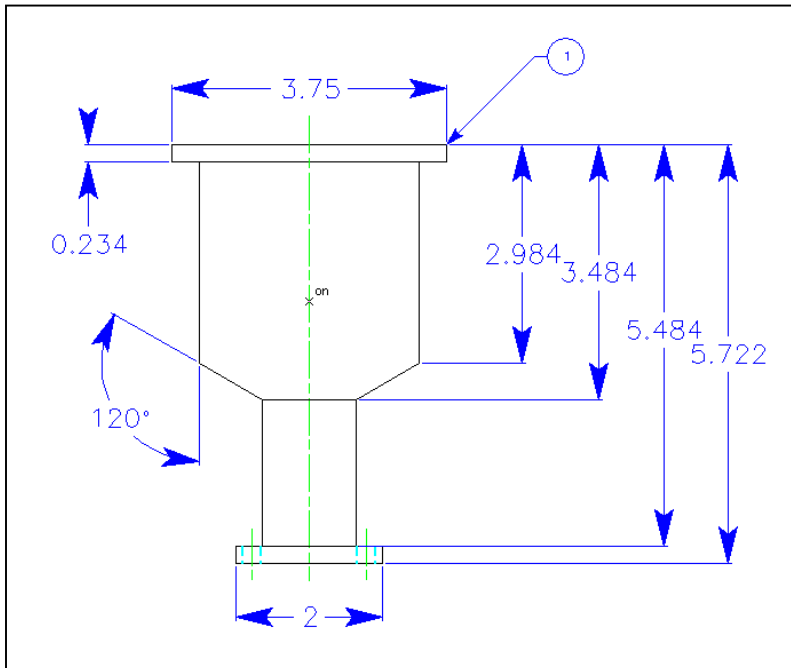
From the BOM Tool Palette, select the **Item Number Tool**. The cursor will change into a leader line.



Move the cursor to the upper-right Corner of the part. The Drafting Assistant should say **endpoint**. Click here once.

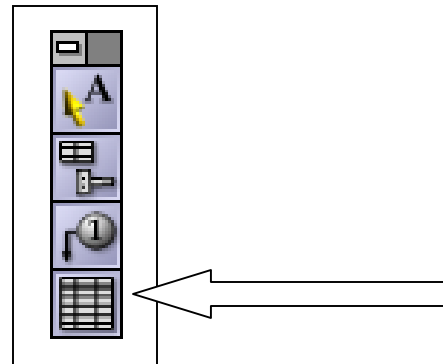


Drag your cursor away from the **endpoint** at a 45 degree angle at a distance of about 1.5" – 2".

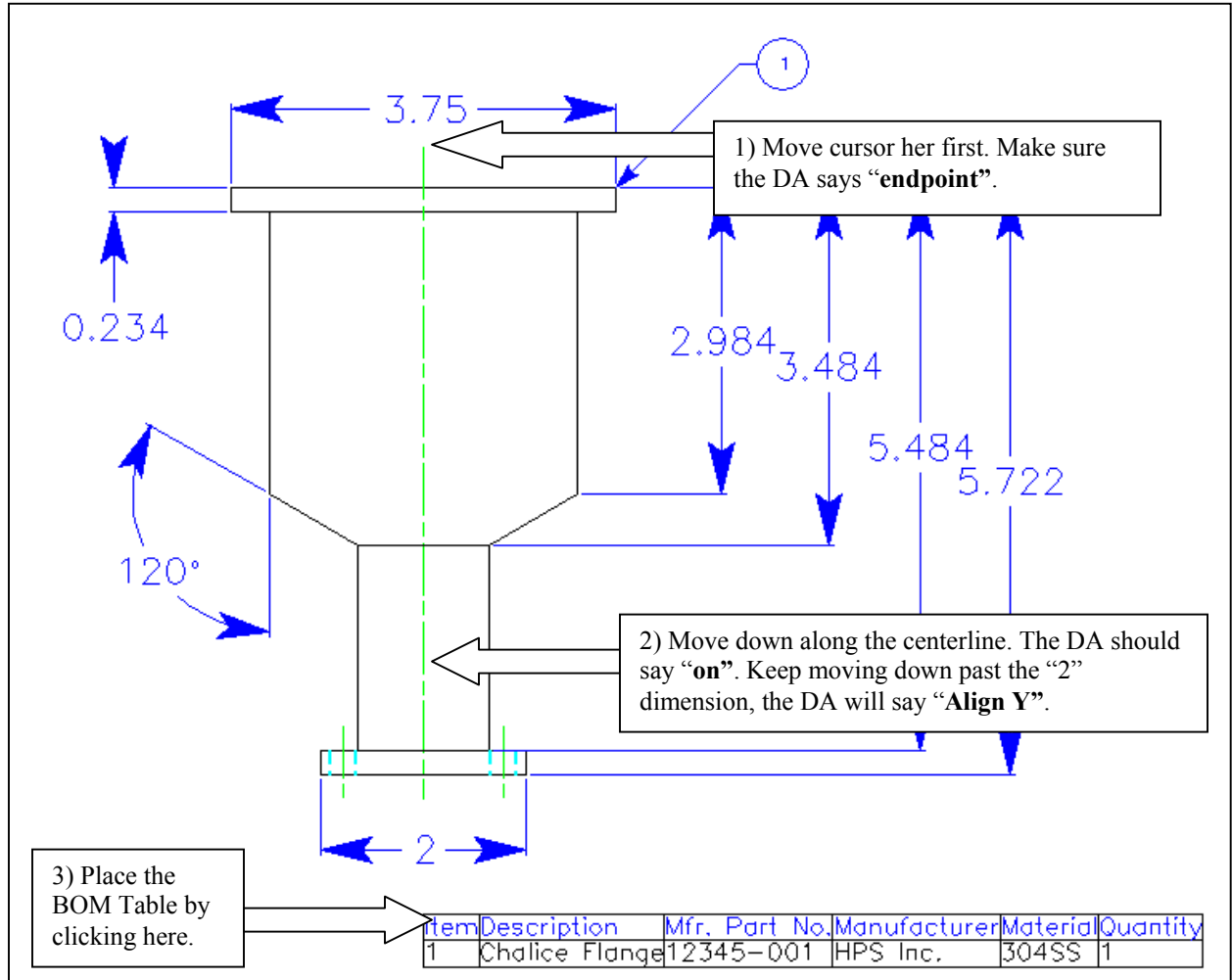


Click once. A ballooned item number callout will now attach to the part. Go pick the **Selection Tool**. Click in an empty area on-screen to deselect the item number balloon. You should have something like the screenshot at left.

We can now place a corrected BOM Table on the Drawing that will display the BOM Attributes, and the information we entered for each of those fields. Start by selecting the last tool in the BOM Tool Palette. Repeat the steps previously performed to create the corrected BOM Table.



Using the Drafting Assistant, move your cursor to the top of the part centerline. The Drafting Assistant should “wake up” the endpoint. Move down along the centerline. The word “**on**” should appear as you move the cursor. Keep moving down the centerline until your cursor is about 1”-2” below the 2 dimension. Click here. You will now see that Graphite creates a BOM table for this part. (See picture below for clarification).



Congratulations! This completes the BOM creation section of the tutorial.

If you want to learn how to use generic symbols for use across all of your prints then read on.

## **Section Two : Creating Generic Symbols With Editable BOM Attributes**

Creating generic symbols in Graphite is a powerful and highly useful feature. These symbols can help you . . .

- define a parts library
- create weld instructions (weld symbols)
- implement an industry specific symbols library that is not readily available
- update an existing parts library that's out of date.
- streamline workflow
- increase productivity
- use parametric symbols (see Users Guide for this).

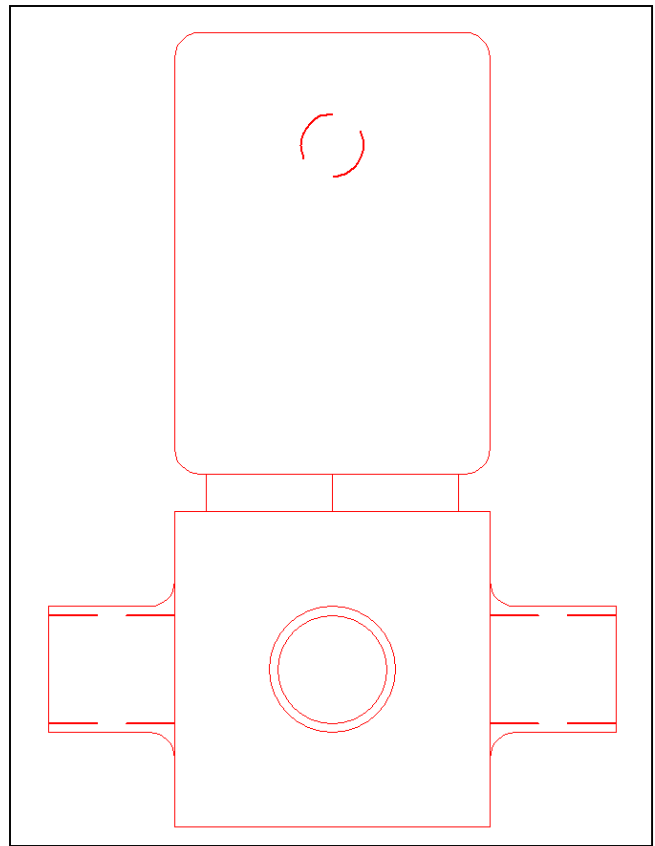
It is highly recommended that you complete the Basic BOM Table Creation section first. This will give you a good idea of how symbols interact with assigned attributes. You will also be assured that Graphite is set up with the same terms and specific BOM references used in this section. If you use your own BOM attributes and/or Layouts this section can be completed. However, Ashlar Technical Support will not troubleshoot any problems unless section one has been finished.

Defining a symbol with editable BOM attributes works in much the same fashion as setting up a part for use with a BOM table. The basic steps are the same. It is necessary to 1) draw the geometry of your part , 2) assign BOM attributes , and 3) place a BOM table. The manner in which these steps are performed differs.

For brevity's sake, this tutorial includes the files you'll need. This will save time since we won't have to draw a part from scratch. In addition, we will be using the **Standard BOM** layout and its BOM attributes that were defined in section one.

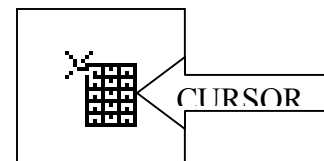
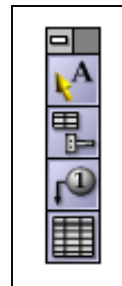
Let's get started then.

Open a new document in Graphite.  
Go **File>Import** and locate the file  
named **Symbol-Tutorial-Valve.vc6**. Click  
**Open**. The file import type dialog box  
will appear. Set the import type to  
**Graphite**, if not already done so. Hit **OK**.  
Press **CTRL+A (COMMAND+A  
on the Mac)**. Your screen should  
look like the one pictured at right.  
Pick the **Selection Tool**.  
Click on an empty area of the screen  
to deselect the drawing.



Let's assume that we know all the pertinent information about this part. Our objective is to create it so that we can use it across several prints, drop the part in place, and have it retain any predefined attribute data we assign to it.

Select **Text>Bill Of Materials>  
Show Palette**. This will place the BOM  
Tool palette on the screen. Select the second  
tool in the palette. This is the **BOM Symbol  
Attribute Tool**. The cursor will update to  
look like a chart or spreadsheet type icon.



At the screen bottom, the BOM Attributes will appear.

◀ Description	Mfr. Part No.	Manufacturer	Material	Quantity
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Input the following information for each BOM attribute field.

**Description:** 3-Port Valve

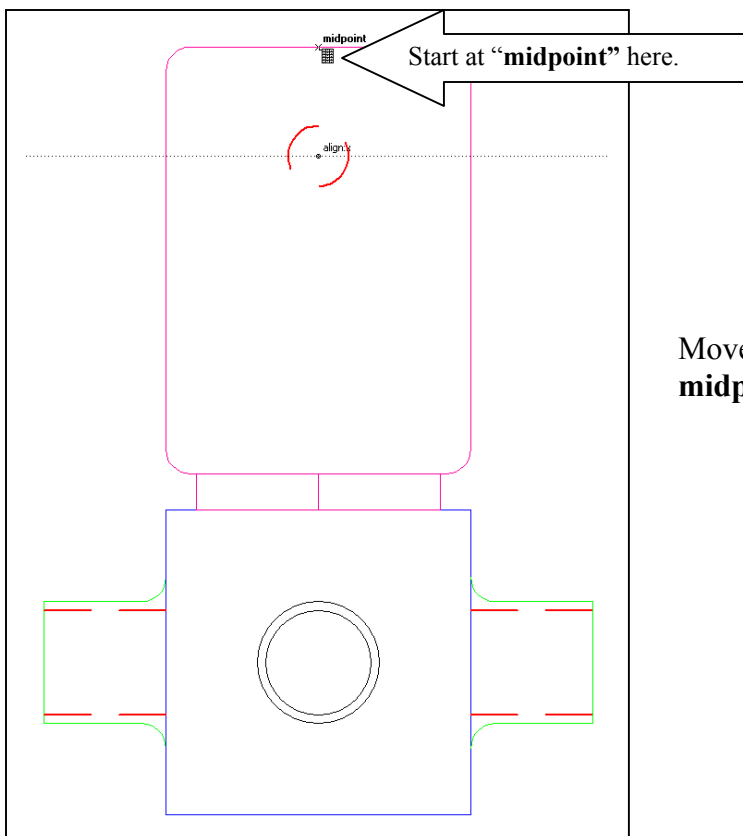
**Mfr. Part No. :** 6LV-DPA-111

**Manufacturer :** Swagelok

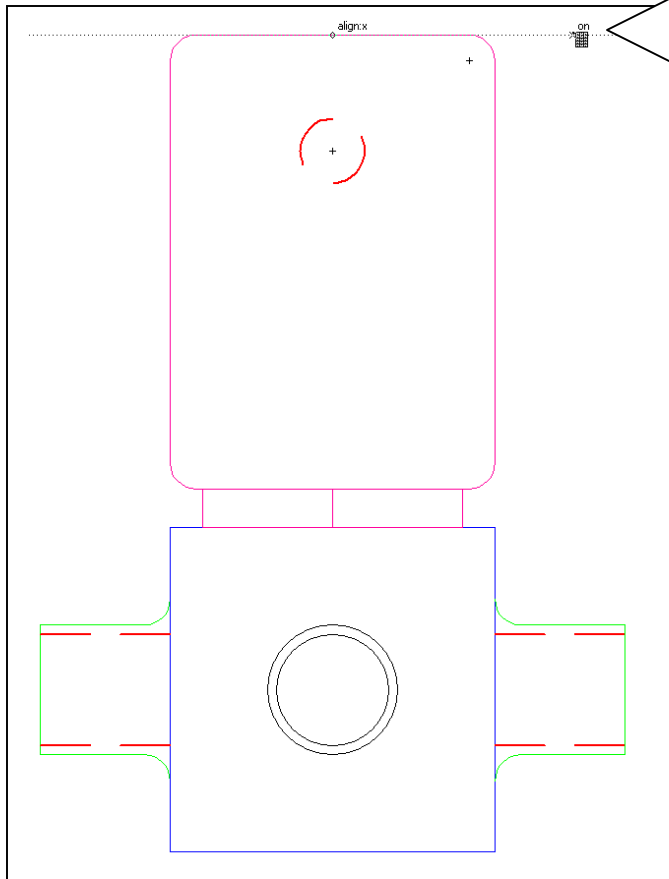
**Material :** 316SS

**Quantity: 1 (STOP! AFTER YOU TYPE IN “1” HERE PRESS THE ENTER KEY (RETURN ON THE MAC)!)**

If you do not perform this action the BOM Attributes will not “take” and you will get a blank BOM Table.

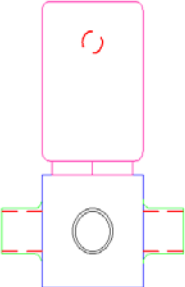


Move your cursor to the top **midpoint** of the part geometry.



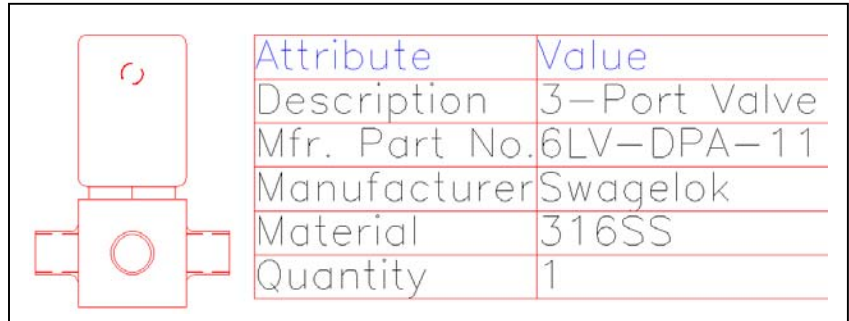
Move cursor off the part along “**Align X**” to this location. Click here once.

Move your cursor horizontally to the right off the geometry until the Drafting Assistant says **Align X**. Click once about 2.5”-3” off the part while the **Align X** notation is still active.

	Attribute	Value
	Description	3-Port Valve
	Mfr. Part No.	6LV-DPA-111
	Manufacturer	Swagelok
	Material	316SS
	Quantity	1

Perform a Zoom All by pressing **CTRL+F (COMMAND+F on the Mac)**. Your screen should look like this.

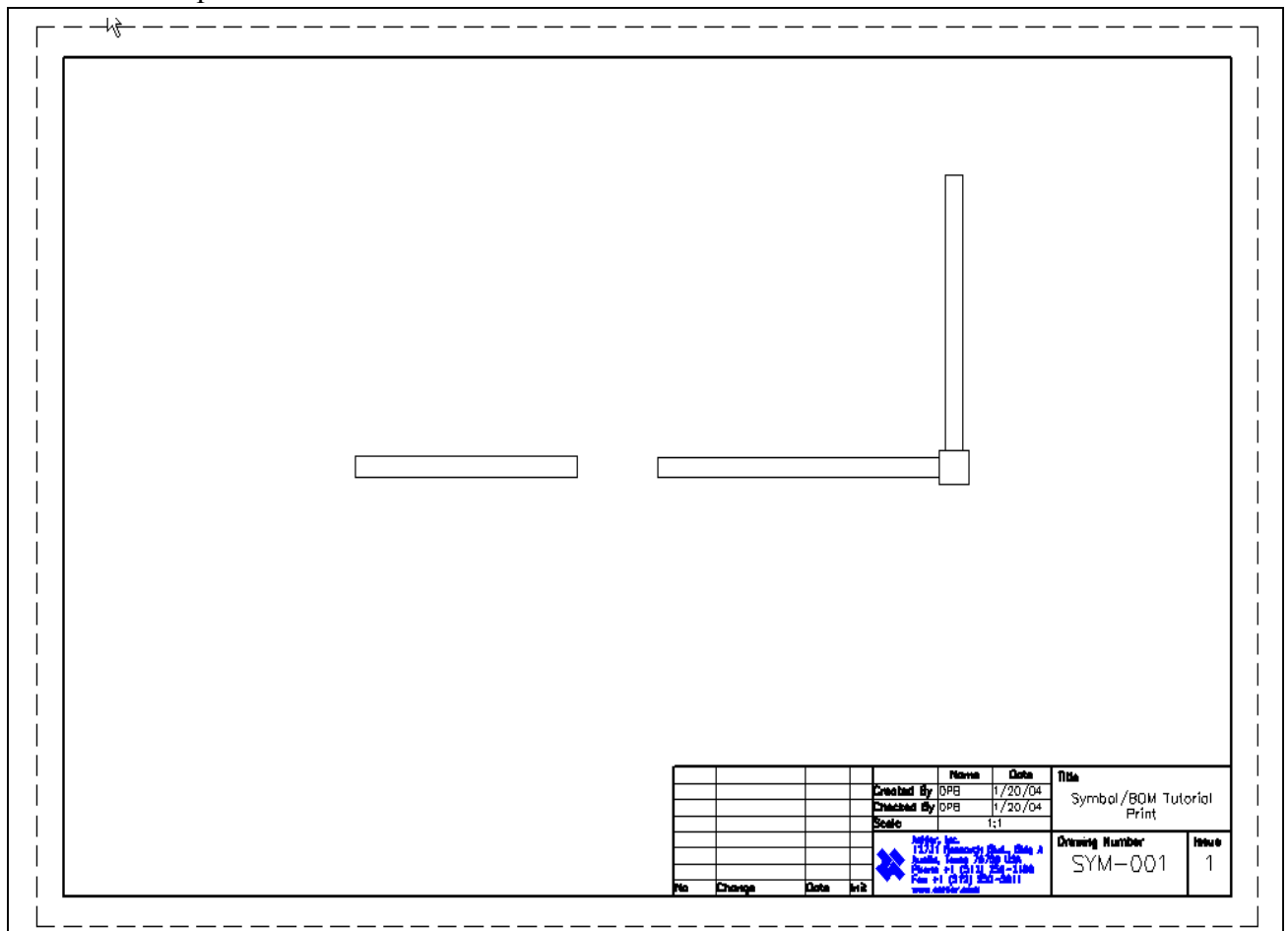
Now go pick the **Selection Tool**. Press **CTRL+A (COMMAND+A on The Mac)**. The drawing and the attribute table will highlight.



Select **File>Save As** and save the file on your Desktop as **Valve-Symbol.vc6** Close the **Valve-Symbol.vc6** drawing.

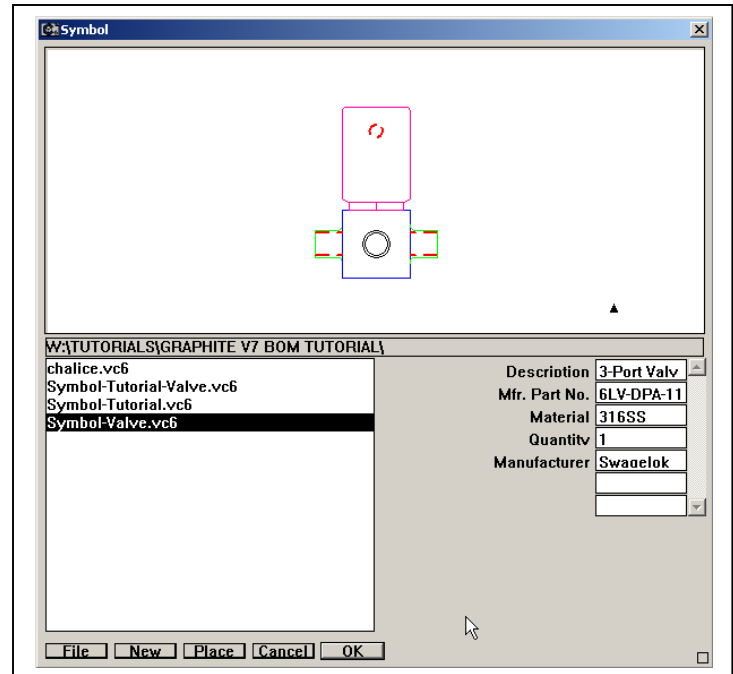
We will now place the symbol into an existing print. We'll need to assign BOM attributes to the existing geometry. Then we will place a BOM Table on the blueprint. Our objective here is to demonstrate that even though a symbol will retain BOM attribute information, any other geometry must have that information assigned to it. This is the only way to ensure that a proper BOM table is created.

Select **File>Import>** locate the file named **Symbol-Tutorial.vc6**. Select this file and click **Open**. Set the Import Type to Graphite. Perform a **Zoom All**. Your screen should look like the picture below.

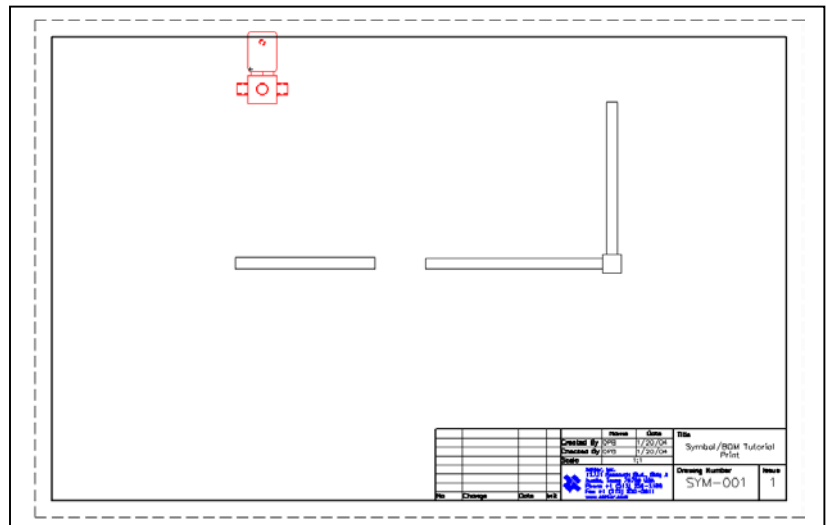


Select **File>Symbol**. The symbol dialog box will appear. If the **Valve-Symbol.vc6** is not automatically selected click **New**. Browse to the file named **Valve-Symbol.vc6**. Select the file, and click **Open**. You should get something similar to the screenshot at right.

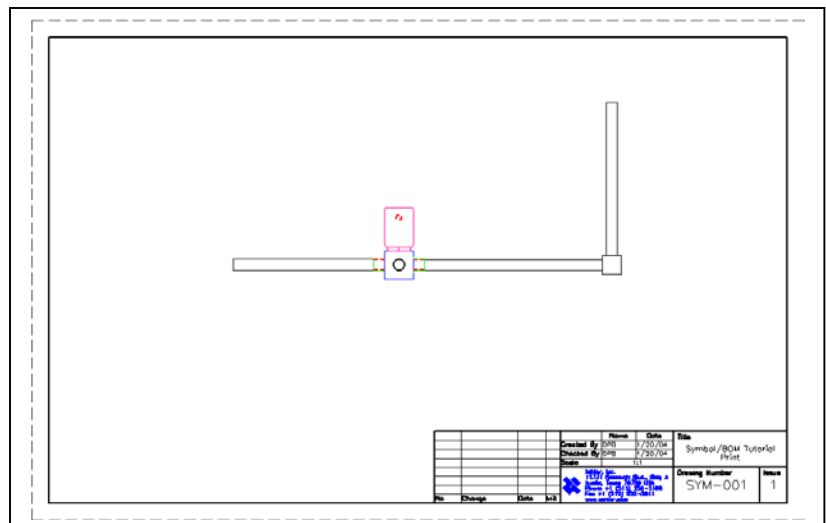
If it was necessary to go locate the file by clicking the **New** button, your data fields won't be filled out. This is perfectly fine. The BOM attributes that were previously assigned to the symbol are still intact.



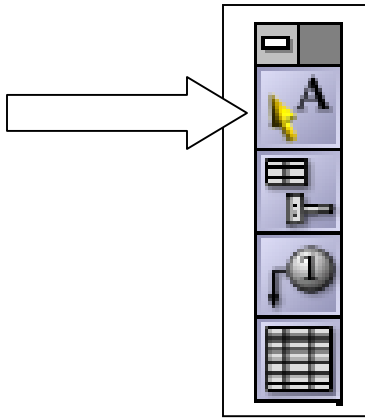
Move your cursor off the dialog box. Notice that it changes to a bulls-eye / crosshairs. Click once somewhere in the confines of the drafting border. Then move your cursor back to the dialog box and click **Place**. Close the dialog box. The valve should be placed within or very close to the drafting border. If you don't see it perform a **Zoom All**.



The symbol will be selected. Move the symbol such that the weld stubs on it fill the gap in the tubing on the print. Deselect the symbol by clicking on an empty area on the screen.

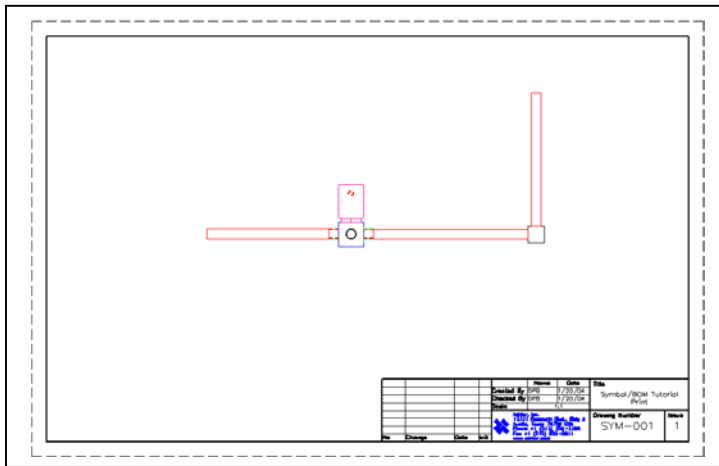


Before a BOM Table can be placed, it is necessary to assign our BOM attributes to the non-symbol geometry. Failure to do this will result in an incorrect BOM table. The reason is because we have filled out the BOM attribute data for the symbol only. The “tubing” and “elbow” on the print currently possess no attributes.



Select **Text>Bill Of Materials>Show Palette.**

The BOM Tool palette will display.  
Now select the **User Attribute Tool.**



Hold down the **SHIFT** key. Click on the three long rectangles so that they become highlighted. The BOM attributes will display at the screen bottom.

Type in the following information for the BOM Attributes . . .

**Description:** SS Tubing

**Mfr. Part No. :** 025-LS

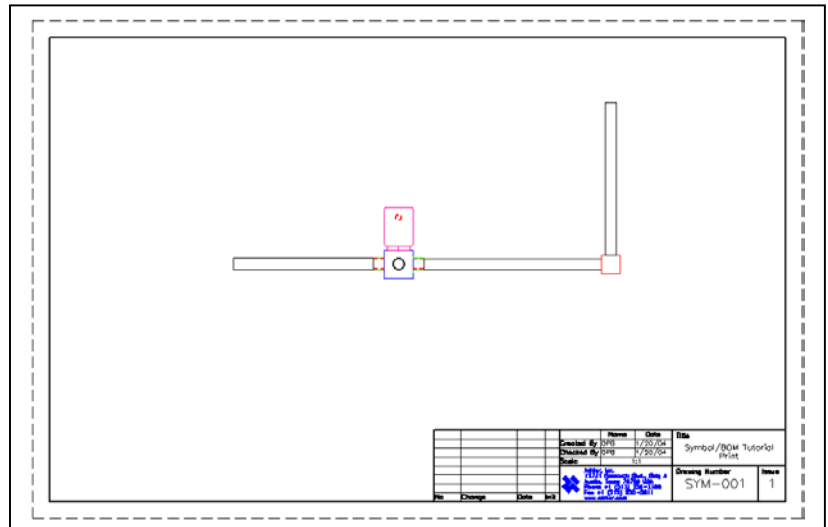
**Manufacturer :** Valex

**Material :** 316SS

**Quantity: 1 (STOP! AFTER YOU TYPE IN “1” HERE PRESS THE ENTER KEY (RETURN ON THE MAC)!)**

If you do not perform this action the BOM Attributes will not “take” and you will get a blank BOM Table.

Now click on the square that represents the elbow fitting. Again the BOM Attributes will appear at the screen Bottom.



Type in the following information for the BOM Attributes . . .

**Description:** 1/4 Elbow

**Mfr. Part No. :** 025-EL

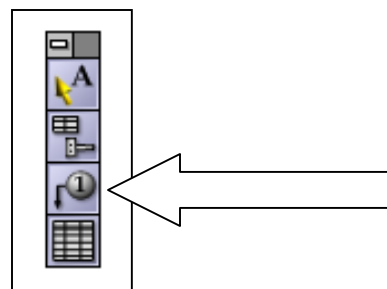
**Manufacturer :** Cajon

**Material :** 316SS

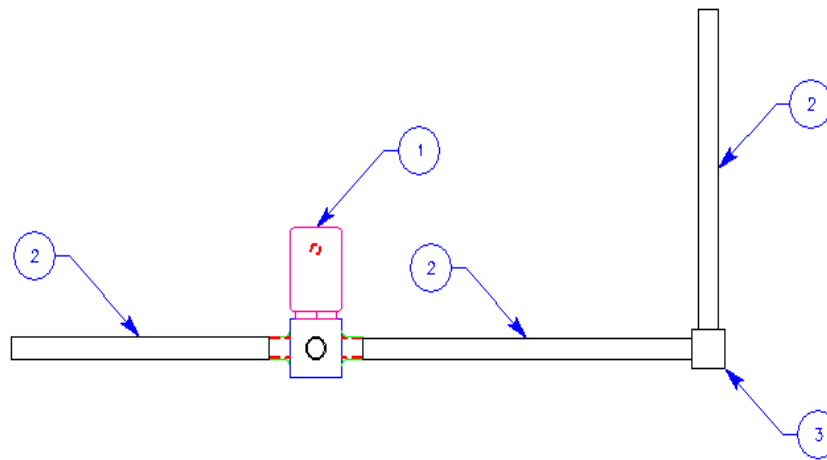
**Quantity: 1 (STOP! AFTER YOU TYPE IN “1” HERE PRESS THE ENTER KEY (RETURN ON THE MAC)!)**

If you do not perform this action the BOM Attributes will not “take” and you will get a blank BOM Table.

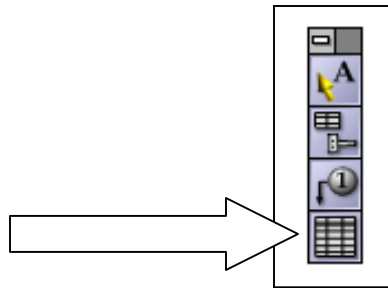
Now go to the BOM Tool Palette and select the third tool. This is the **Item Number Tool**.



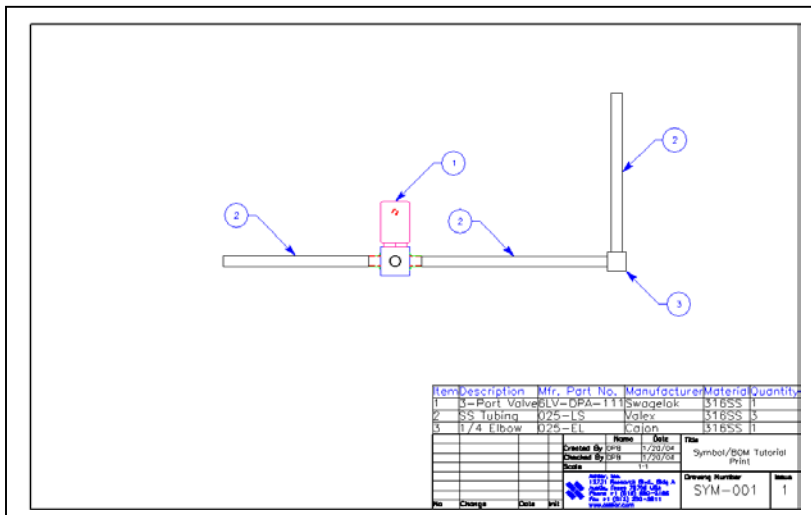
Assign an item number balloon to each piece of grouped geometry. If your item number balloons become non-sequential (i.e.the balloon numbers skip from ,say, 2 to 5) click on the balloon that is incorrectly numbered to select it. Press **CTRL+I (APPLE+I on the Mac)** to open the **Edit Objects Box**. Locate the **Text1** database field. Type in the correct number. Click **Apply** and then close the **Edit Objects Box**. When you are finished assigning item number balloons. Your print should look similar to the screenshot pictured below.



No	Change	Date	Init	Name	Date	Title	Drawing Number	Issue
				Created By	DPB	1/23/04	Symbol/BOM Tutorial Print	SYM-001
				Checked By	DPB	1/23/04		
				Scale		1:1		
				Author, Inc. 12731 Research Blvd., Suite A Austin, Texas 78759 USA Phone +1 (512) 250-2166 Fax +1 (512) 250-2811 <a href="http://www.austar.com">www.austar.com</a>				1



Select the **BOM Tool** from the BOM Tool Palette; the last tool in the palette.



Move your cursor to the upper left corner of the title block. The Drafting Assistant should read **endpoint**. Move the cursor vertically upwards along the Y axis. The Drafting Assistant should say **Align Y**. With **Align Y** still active, click a Point roughly 2"-2.5" above the title block. Voila! There is now a nice BOM Table on your print. Simply use the **Move** tool and **Expand / Shrink** tool to make the BOM Table sit on top of the title block at the right length. Your Print should be similar to the one shown at left.

A Quick Word About the Quantity Field : technically, the unit of measure for the “tubing” in the drawing should be in feet and/or inches, or read A/R for “As Required”. It would be better to alter the attribute type here to **Text** so “As Required” could be used. This was not done. The primary focus is meant to demonstrate the concepts behind using the tools. If this type of function is needed a set of different BOM attributes could be created on a different Layout.

## **CONGRATULATIONS!**

This concludes the *B.O.M. Tool, Symbols, and Graphite* tutorial. The tutorial was prepared and written by members of the Ashlar Technical Support team. Reproduction in whole or in part of this document for commercial purposes is strictly prohibited without the express written consent of Ashlar-Vellum, Inc.

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**Thank You!**