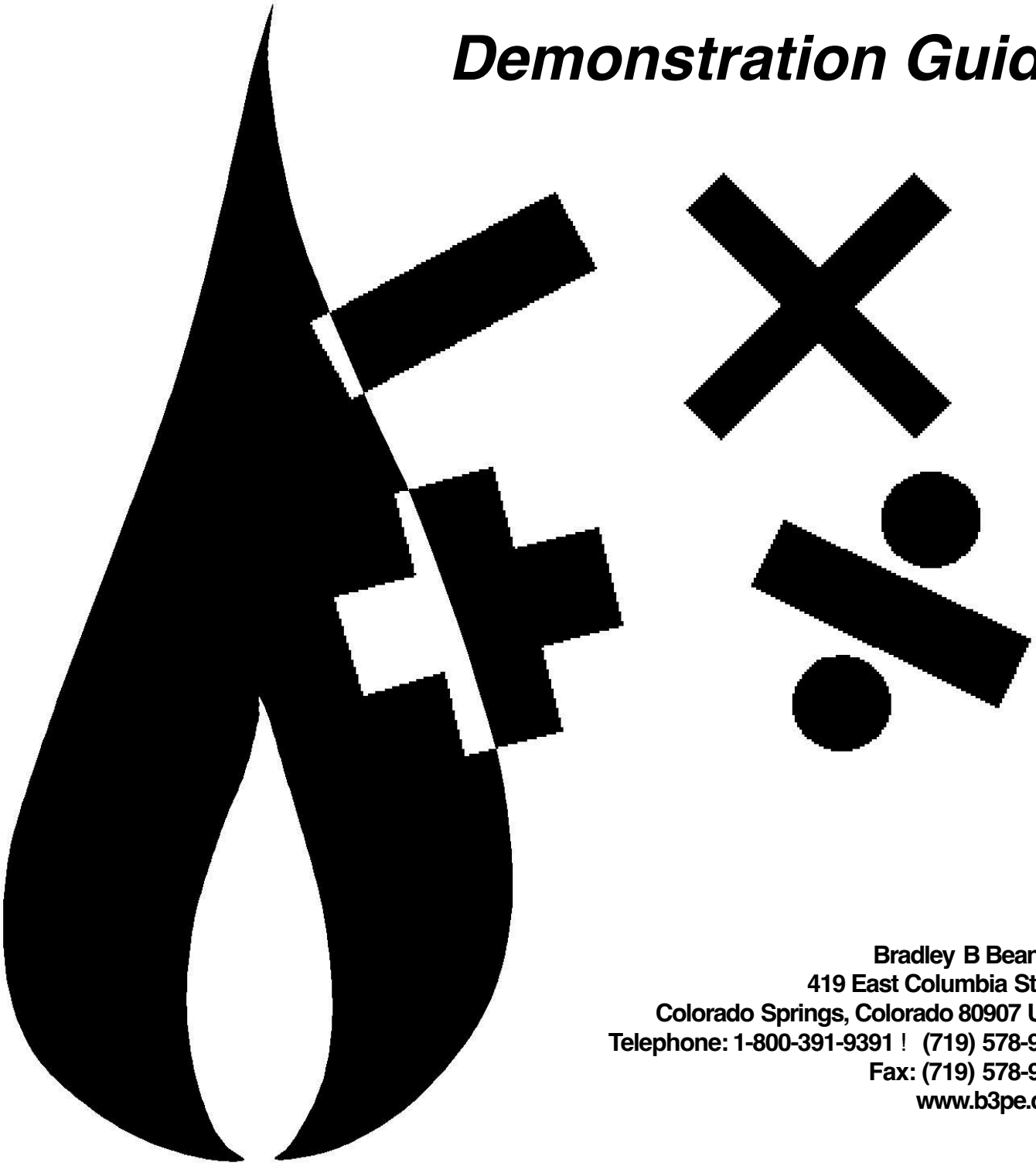
GASCalc™ 5.0

Demonstration Guide



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Thank you for your interest in our products, and for taking the time to view our demonstration software. We hope that you will be pleased with what you see during the demonstration. We are truly committed to providing products that ensure your success. If you have suggestions which might help improve GASCalc to better meet your needs- *please,* let us know your ideas. Again, thank you for your interest...

Bradley B. Bean

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Revision 004

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GASCalc™ 5.0 *Demonstration Guide*

The information contained in this guide is provided to allow you to install and use the demonstration version of the software. The demonstration software is a full featured, time limited version of GASCalc. Working the example contained in this guide should give you a good introduction to the software's features and ease of use. If you wish to explore the software further, we suggest reviewing the examples contained in the individual calculation references.

Getting Help - Contact Us

Hours - Our normal work hours are 8:00 A.M. to 5:00 P.M. Mountain Time, Monday through Friday. However if you have a problem, please try at any time, we may be in.

By Telephone - Telephone: (719) 578-9391 Toll Free (US Only): 1-800-391-9391

By Email - help@b3pe.com **By Website -** www.b3pe.com

Hardware/Software Requirements

GASCalc will operate on any personal computer (PC) configured to run the Windows XP and newer operating system, through Windows 10. The *Demonstration* version of the GASCalc software will require a minimum of 23 MB of free hard disk space when installed.

Installing GASCalc

An appropriate version of Windows must be running in order to install GASCalc. If it is not, start Windows now, then proceed with the installation process described below.

Note...

- On Windows Vista and newer machines, you will need to be logged on as the Full Administrator or use the "*Run as administrator*" option when executing the installation file.

- In the following steps it is assumed that the compressed folder ("zip" file) containing the demonstration software has already been downloaded to your machine. If it has not been downloaded, go to our website, www.b3pe.com, to download it before continuing.

! Find the location where the downloaded folder is saved on your machine, open the folder using Windows File Explorer.

! Double-click the executable setup file contained in the compressed folder. If a Windows Security warning message appears, allow your machine to install the file.

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! The main setup screen will appear. Proceed by following the *General Installation Instructions* described below.

General Installation Instructions

After the setup program has been started, several screens will appear during the installation process. Read the contents of each screen carefully and respond appropriately.

Note...

On the License Agreement screen, read the terms of the License carefully and select the "*Agree to*" option. If you do not wish to accept the License Agreement, you will not be able to continue with the installation process.

A message will appear when the installation process is complete. The message will indicate whether the installation was successful or whether it failed. Select the appropriate option to clear the message.

Starting GASCalc

Note...

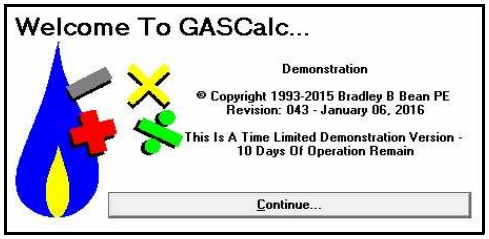
• An appropriate version of Windows must be running before GASCalc may be executed. If Windows is not running, begin its execution now.

• On Windows Vista and newer machines, you will need to be logged on as the Full Administrator or use the "*Run as administrator*" option the first time you execute the GASCalc software.

! From the Windows Desktop select the *GASCalc 5.0* shortcut icon.

! The GASCalc software will be started.

! After the software has been loaded into memory, the GASCalc *Copyright Notice* will be displayed. Select the *Continue* command button.



! The Demonstration Notes screen will be displayed. Read carefully and select any desired options, then select the *Continue* command button.

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Once installed and executed, the use of GASCalc is virtually self explanatory. To perform a calculation, choose the appropriate calculation routine from one of the menu lists, on the calculation screen click the label for the item to be calculated so that it is underlined, enter the desired values in the data fields, then select the *Calculate* command button.

Using The Help System

The GASCalc "Help System" consists of various Portable Document Format (PDF) documents. A suitable PDF document viewer or reader is required to view and print the documents. When associated with a calculation screen, the associated help file is referred to as a "calculation reference".

The calculation references may be accessed from the *Help* menu or from the individual calculation screens.

! To view a calculation reference from a calculation screen, open the desired calculation screen by selecting the appropriate menu item. When opened, select the *Help* command button or icon on the associated calculation screen.

! To view a calculation reference using the *Help* menu, select the associated topic from the appropriate section of the *Calculation References* submenu of the *Help* menu list.

Generally, the help documents are installed when the software is installed. If one or more of the documents are missing, they are available for download from our website, www.b3pe.com.

Example

The following example will guide you through the general steps involved with performing a GASCalc calculation. Although the example guides you through several pipe flow related calculations, the general steps involved with the calculation can be applied to perform nearly any of the other calculations. Because of the length of this topic, it might be beneficial to print the topic before proceeding with the example.

Note... In this example, two values are listed where a data value is given. The first value represents the value in **English/US** dimensional units. The second value, enclosed in brackets [ ], represents the value in Metric units. Use the appropriate values.

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For this example, we will start by determining the pressure drop associated with the flow of **10 Mcfh** [250 m3h] through **1000 Feet** [305 Metres] of two inch plastic pipe. The inlet pressure to the pipe segment is **40 Psi** [2760 mBar]. The average geographic elevation of the line is **300 Feet** [90 Metres] above sea level, and the average gas flowing temperature is **60 Fahrenheit** [15.6 Celsius]. We will neglect the effect of fittings for this first calculation. After we have calculated the pressure drop, we will determine the minimum pipe size or sizes required to maintain a specific outlet pressure. Start by using the following steps to calculate the pressure drop associated with these conditions.

If GASCalc is not running, start it now.

Open The Pipe Flow Calculation Screen

! From the *Pipe* menu list, select the *Pipe Flow* menu item. The Pipe Flow calculation screen will be displayed. Select the *Clear* command button.

Note... You will notice various data items, dimensional units, and calculated values listed on the screen. Data values are entered by typing the desired value into the associated data field, or for some items like pipe diameter, by selecting an item from the associated drop-down list. Dimensional units are set by selecting the desired item from the associated drop-down list. Several of the data values have a colored label next to them. For example, the labels for the Diameter, Length, Efficiency, Flow Rate, In Pressure, and Out Pressure items are colored red on this calculation screen. These represent the individual data items that can be "unknown" - can be calculated during the calculation. The "unknown" value will be underlined. To change the "unknown" value, click on the associated red label. Only one of the red item labels can be underlined per calculation.

Note... When multiple images are displayed, the first image displays the calculation results in US Dimensional Units. The second screen image displays the calculation results in Metric Dimensional Units.

Set The Base Conditions

Before performing any pressure or flow related calculations, the base conditions for the calculation must be established. This involves setting the base pressure, temperature, and gas property values. Set the base conditions as follows:

! Select the *Base Conditions* command button on the Pipe Flow calculation screen. The Base Conditions screen will be displayed.

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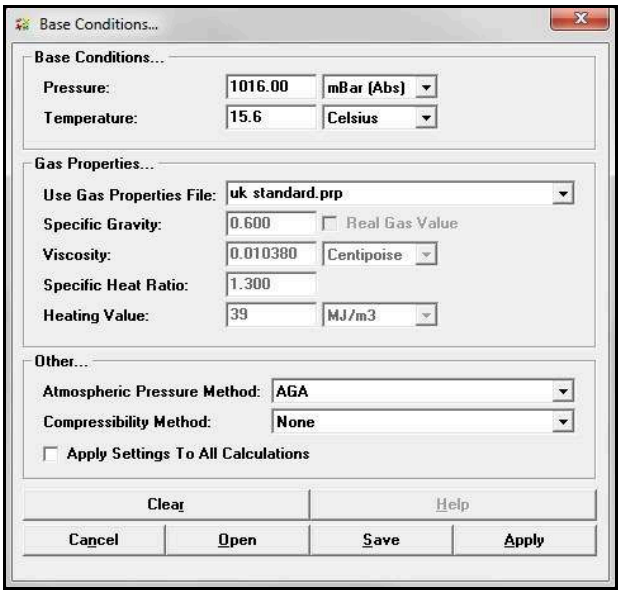
! Set the following data values:

Pressure= **14.73 Psi (Abs)** [1016 mBar (Abs)]
Temperature = **60 Fahrenheit** [15.6 Celsius]

Use Gas Properties File = **us standard.prp** [uk standard.prp]
Atmospheric Pressure Method = **AGA**
Compressibility Method = **None**

! After all the values have been set, select the *Apply* command button to save the changes.



Set The Heat Loss/Gain Data

For this example, we will not be performing any temperature calculations. Ensure that the temperature calculation methods are turned off. To check the settings:

! On the Pipe Flow calculation screen, select the *Heat Loss/Gain Data* tab. Set the following values:

Calculation Method = **None**
Include Joule-Thomson Cooling = **Unselect** (Uncheck)

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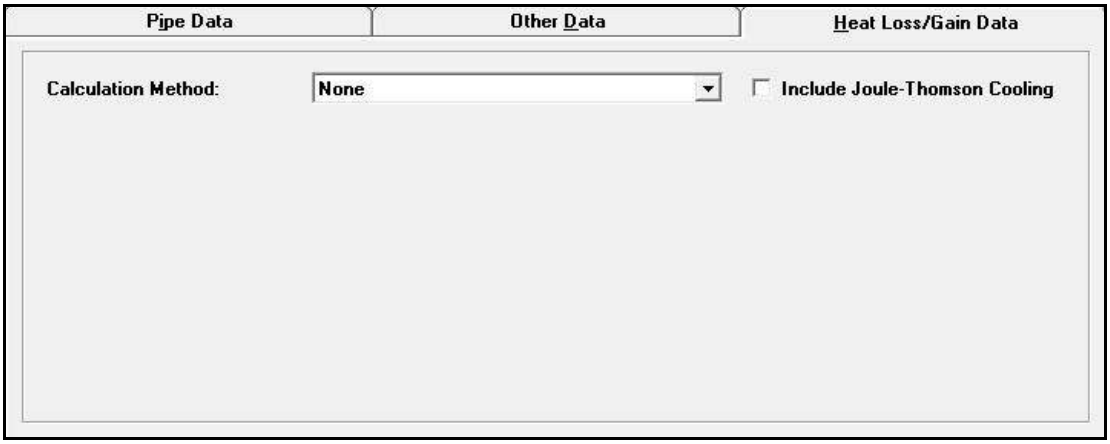
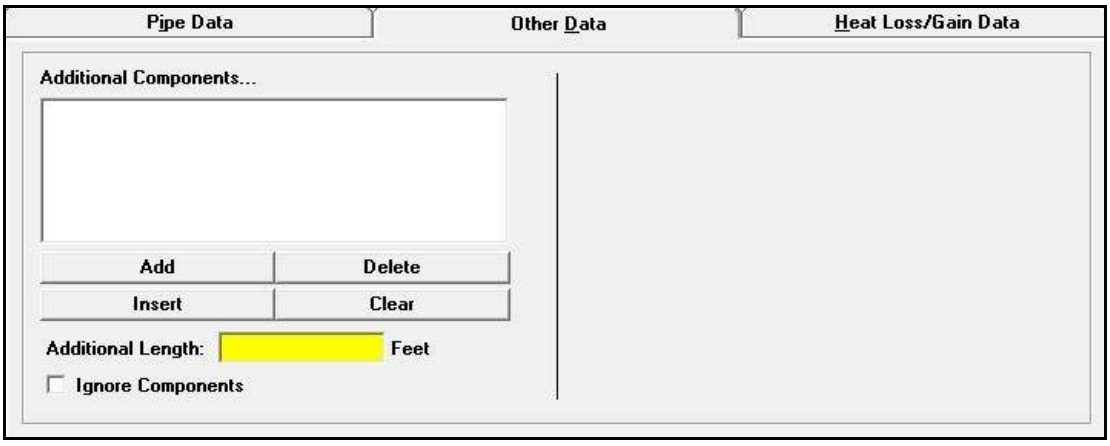


Set The Other Data

! If the *Other Data* tab has a number following the label, it is indicating that fittings or additional pipe segments are attached. If a number is shown, select the *Other Data* tab and select the *Clear* command button to remove the attached fittings or segments.



Enter The Pipe Data

! Return to the *Pipe Data* tab by clicking on the tab heading.

! Indicate that the outlet pressure value is to be calculated by clicking on the red *Out Pressure* label until it is underlined.

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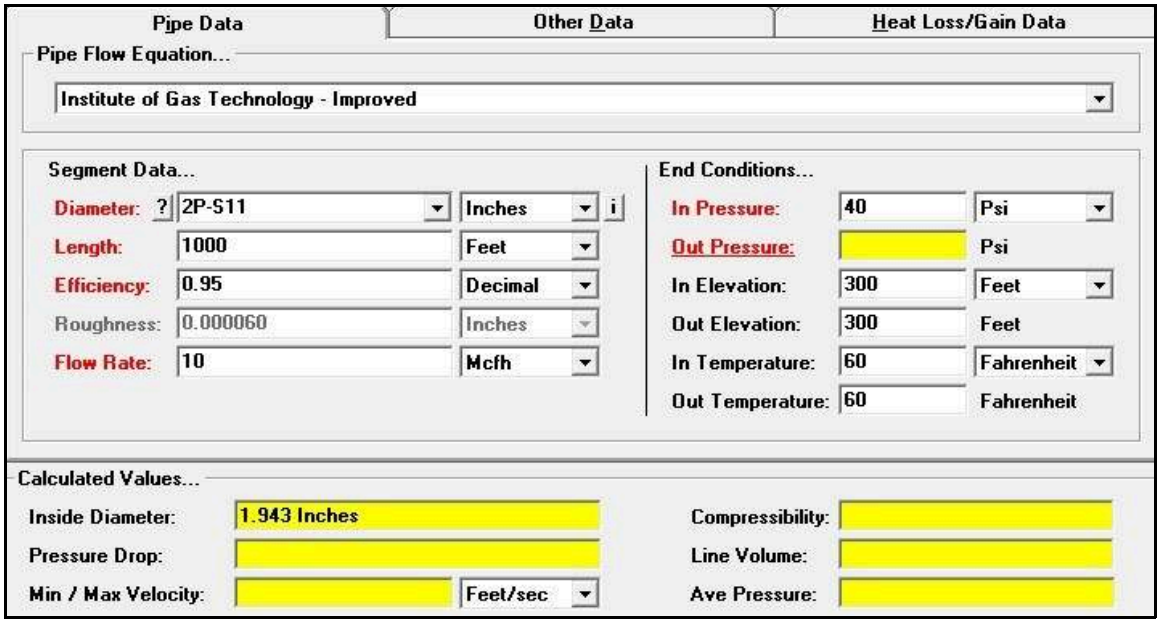
! Set the following values:

Pipe Flow Equation = **Institute of Gas Technology - Improved** [Institution of Gas Engineers Recommendation 3 - Medium Pressure]

Diameter = **2P-S11 Inches** [63P-S11 Millimeter]
Length = **1000 Feet** [305 Metres]
Efficiency = **0.95 Decimal**
Flow Rate = **10 Mcfh** [250 m3h]

In Pressure = **40 Psi** [2760 mBar]
In Elevation = **300 Feet** [90 Metres]
Out Elevation = **300 Feet** [90 Metres]
In Temperature = **60 Fahrenheit** [15.6 Celsius]
Out Temperature = **60 Fahrenheit** [15.6 Celsius]

Min/Max Velocity = **Feet/sec** [Metres/sec]



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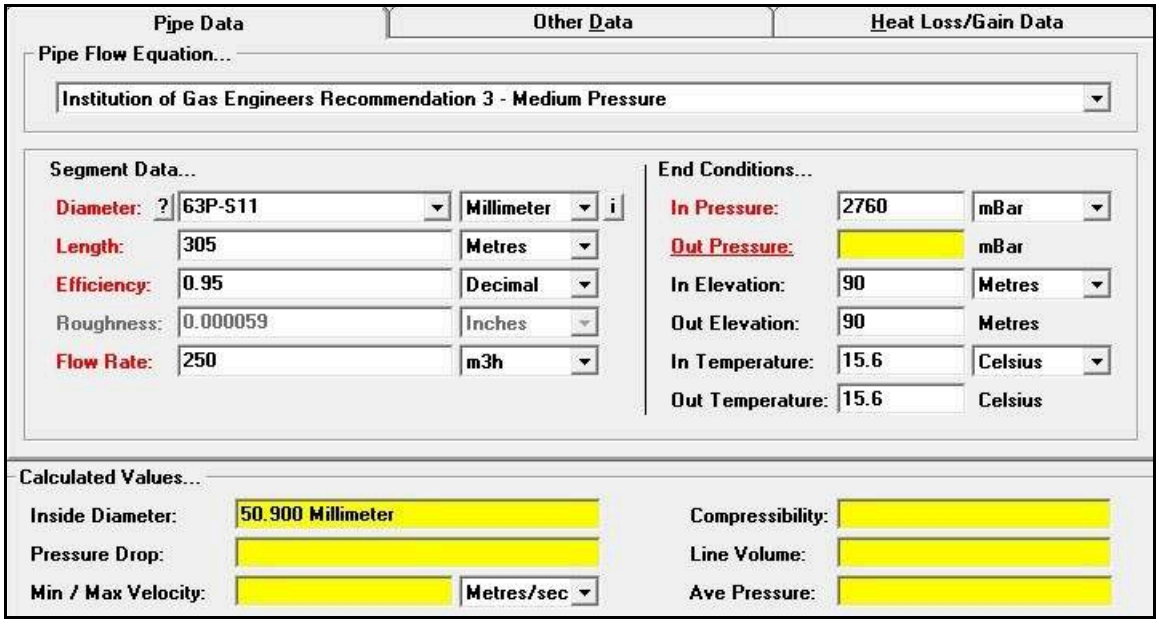

Calculate The Outlet PressureValue & The PressureDrop

! Selectthe *Calculate* commandbutton. The results should look similar to oneof the following images.

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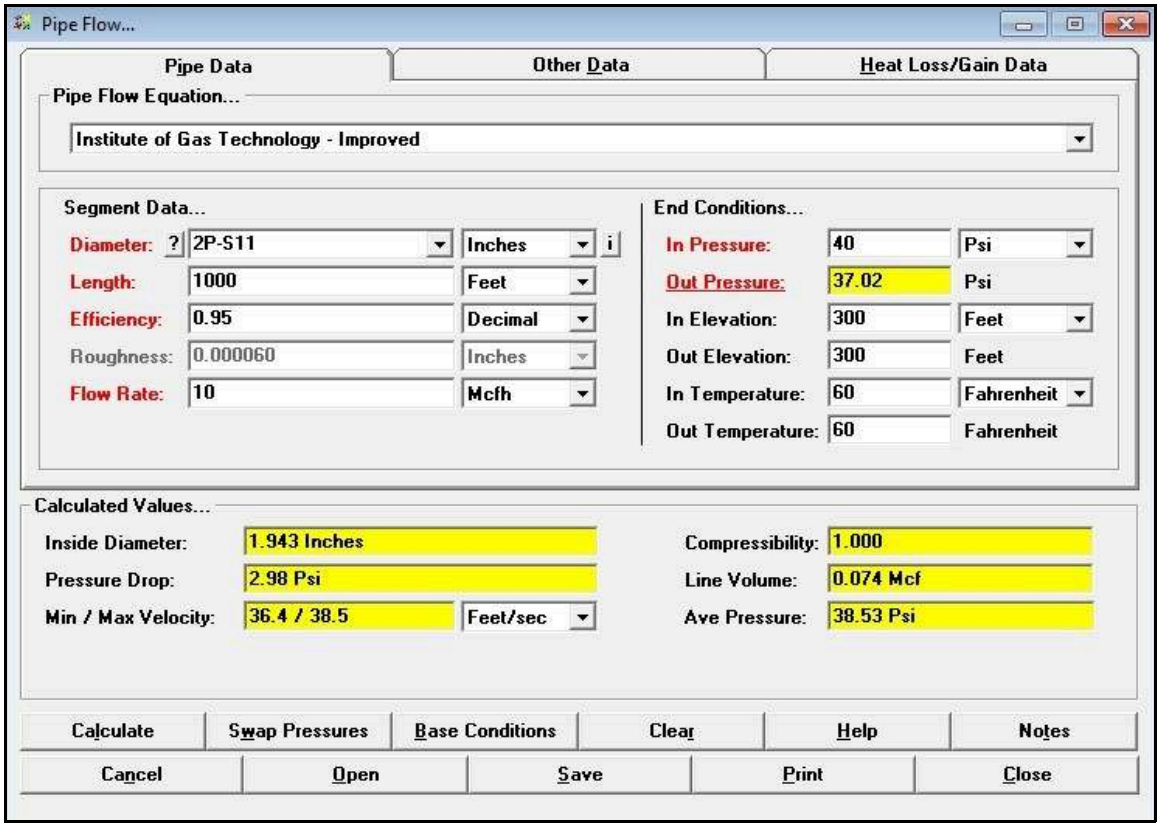

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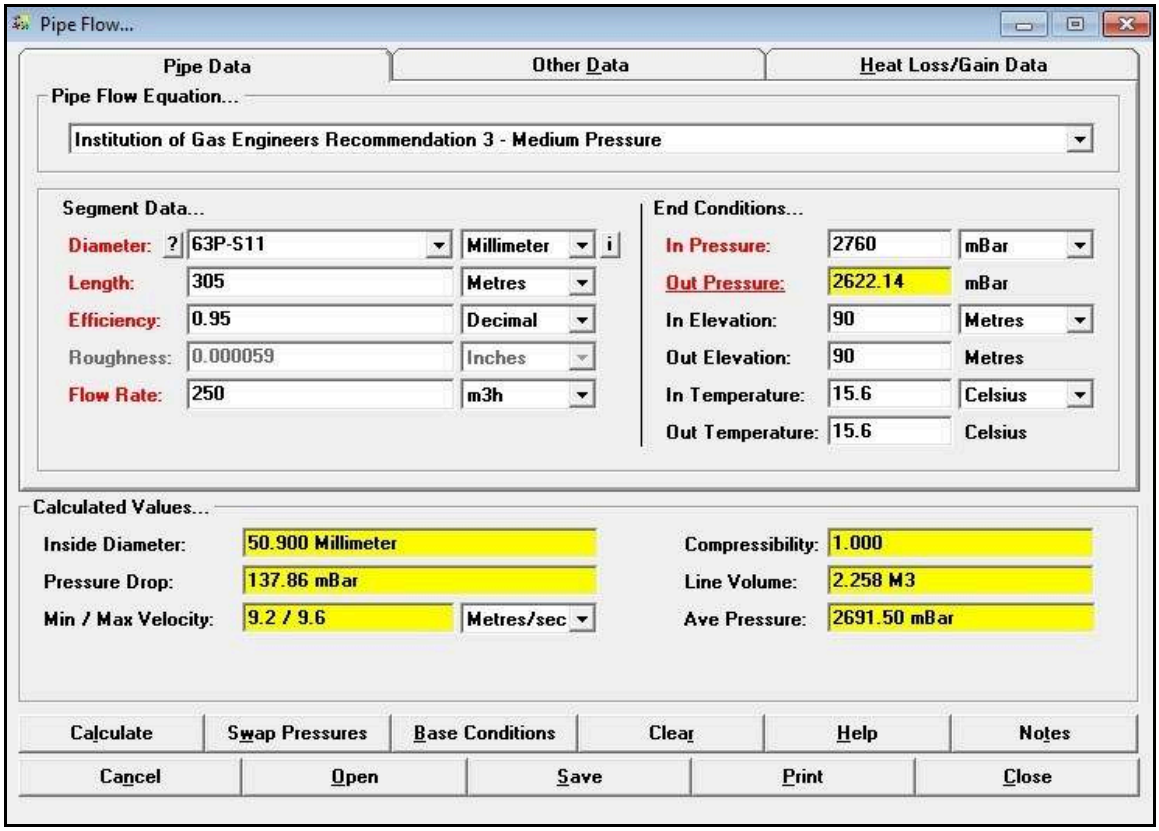

Note... The results indicate that the Pressure Drop for these conditions is approximately **3 Psi** [138 mBar] resulting in an Outlet Pressure of about **37 Psi** [2620 mBar]. For illustration purposes, let's say that it is acceptable for the Outlet Pressure to be as low as **35 Psi** [2410 mBar], then let's calculate the pipe size required to produce that value with the other specified conditions remaining the same.

Calculate The Pipe Size

! Indicate that the *Diameter* value is to be calculated ("unknown") by clicking on the *Diameter* label until it is underlined. Set the *Out Pressure* to **35 Psi** [2410 mBar].

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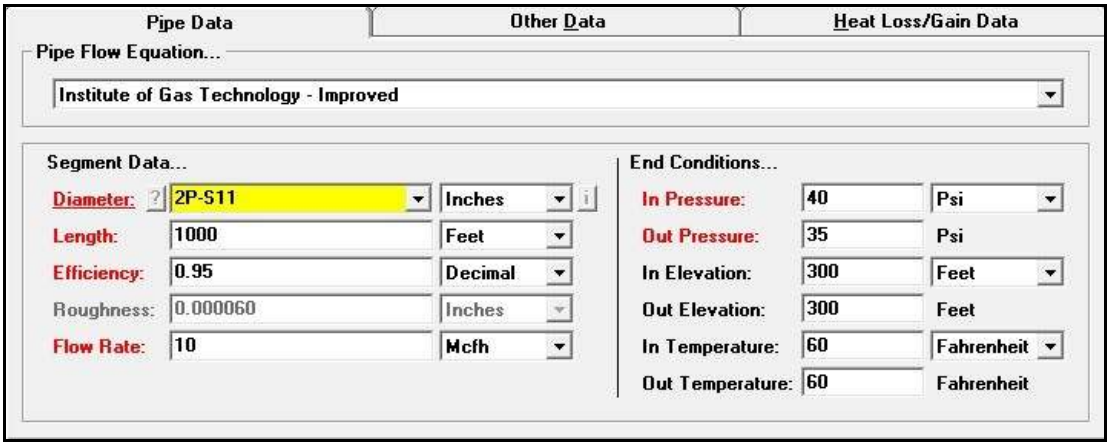

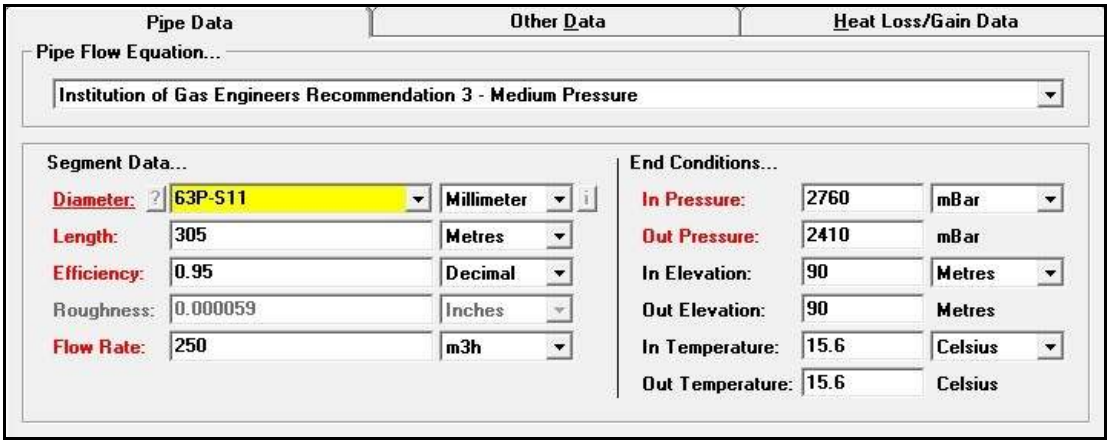

Note...

When calculating a diameter value, GASCalc will calculate both an exact Inside Diameter value, and will select a combination of pipe sizes that will produce the exact Outlet Pressure value. The pipe size selection requires the User to indicate which sizes and types of pipes that GASCalc can select from. This is done using the *Sizing Group* item on the *Other Data* tab. The Sizing Group represents a group of preselected pipe sizes and types from the Pipe Property Table. The Pipe Property Table lists information about the various pipes available for use in the pipe related calculations. The values and settings in the Pipe Property Table can be modified by the User by selecting the *Edit Pipe Properties* menu item from the *Pipe* menu list. For this example we will use the standard settings.

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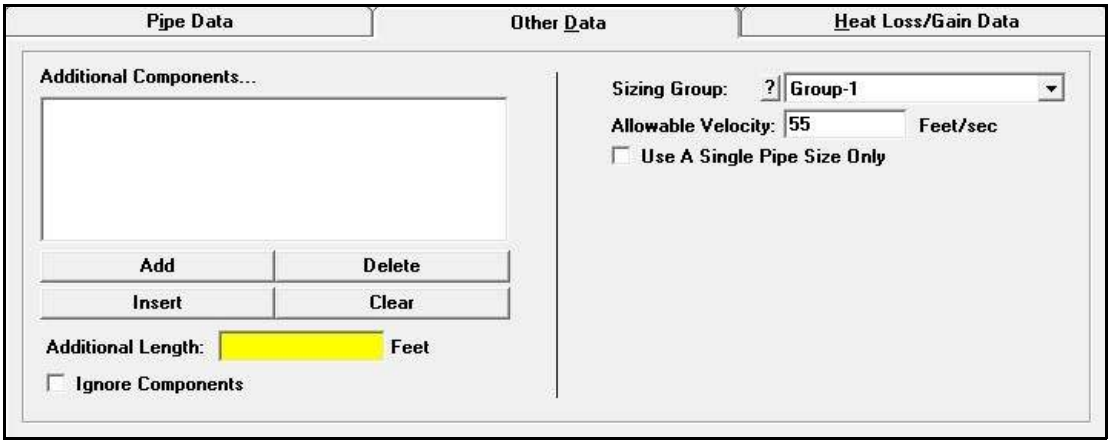
! Select the *Other Data* tab. Set the following values:

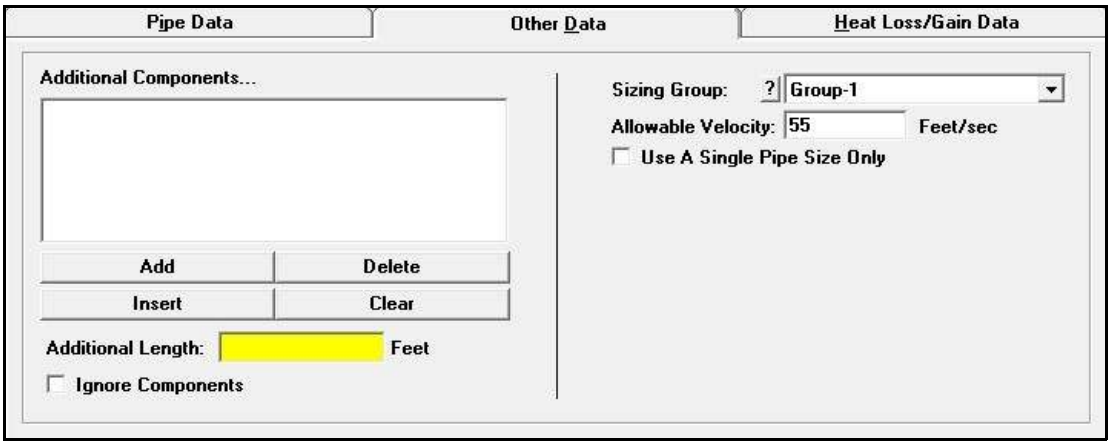
Sizing Group = **Group-1** [Group 3]
Allowable Velocity = **55 Feet/sec**[20 Metres/sec]

Note...

• The Group-1 sizing group consists of common size Medium Density Polyethylene Plastic Pipe.

• For various reasons, sometimes specific design criteria will limit the velocity of the gas in a pipe segment. When calculating a Diameter value, GASCalc initially calculates the size based on the specified inlet and outlet pressure values, it then checks whether the pressure based size meets the specified allowable velocity criteria. If it does not, the size is then recalculated based on the specified allowable velocity value.





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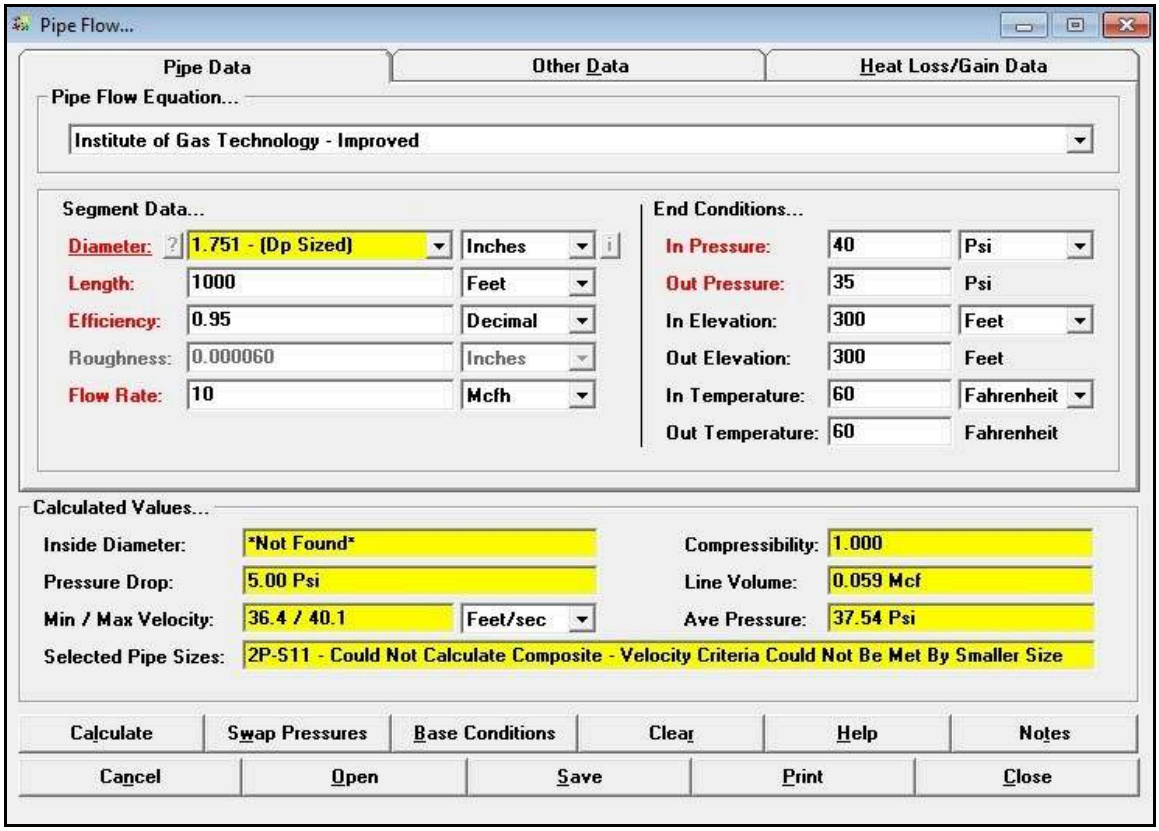
! Return to the *Pipe Data* tab. Select the *Calculate* command button. The results should look similar to one of the following figures.

Note...

• The Diameter value represents the required inside pipe diameter to produce the specified pressure drop (difference in inlet and outlet pressure). The *Selected Pipe Sizes* item represents the sizes within the specified Sizing Group, whose inside diameter is closest to but not less than the calculated inside diameter value. In this case, only one size is shown with a note stating that the next smaller size in the Sizing Group cannot meet the allowable velocity criteria. The note means that the velocity is too high in the next smaller pipe size.

• In some cases, more than one size will be shown for the *Selected Pipe Size*s. Lets increase the allowable velocity and see if a combination of sizes can be selected.



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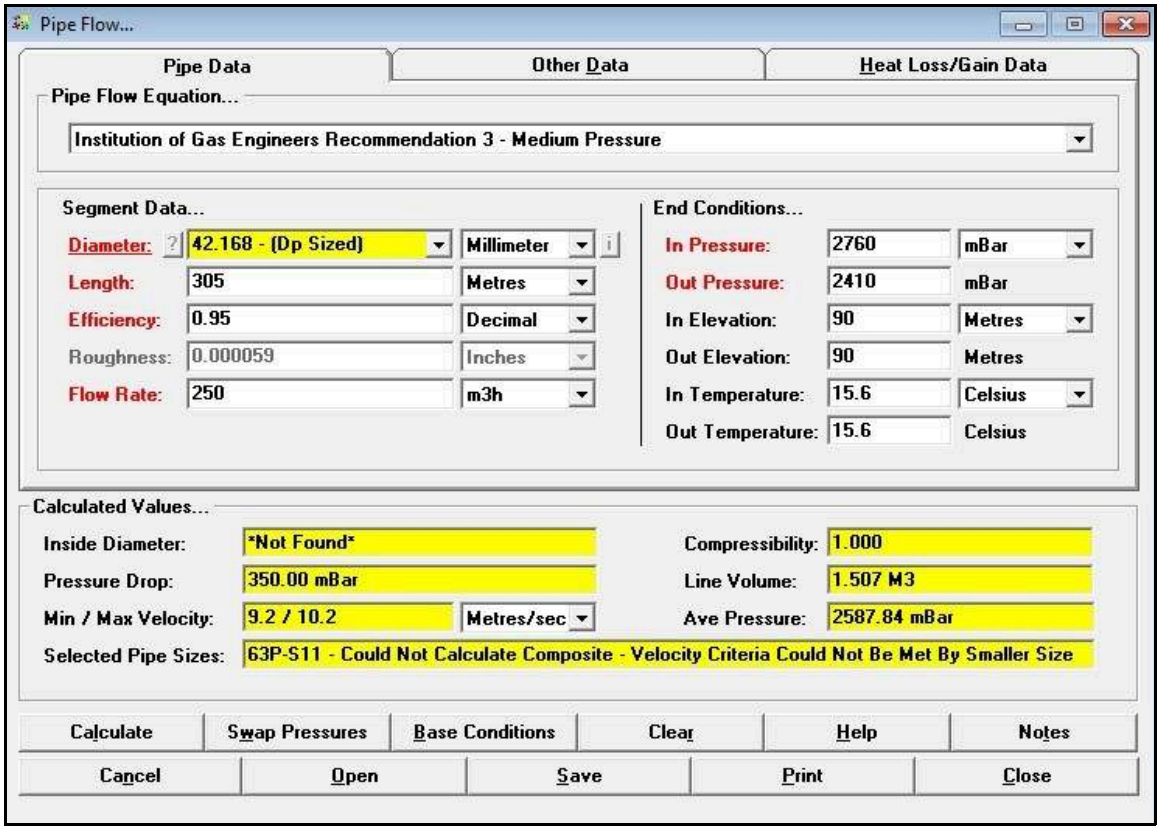
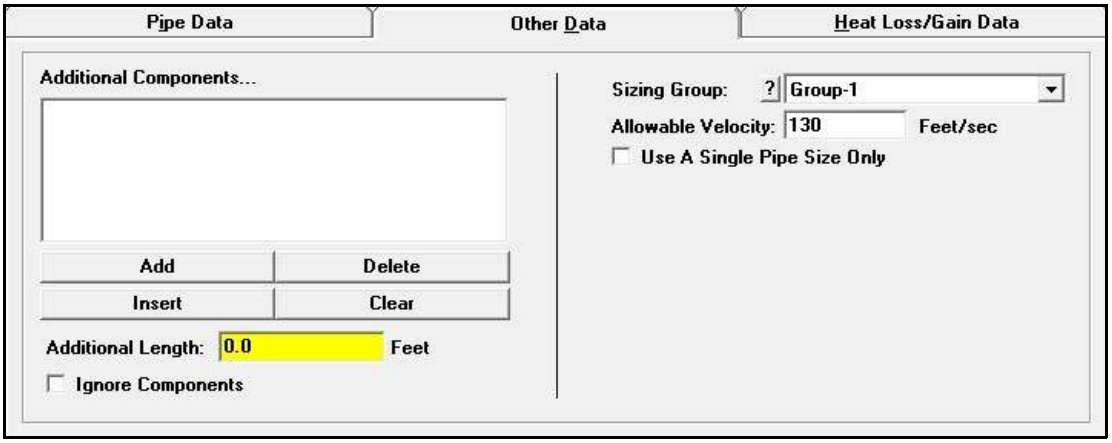


Re-Calculate The Pipe Size

! Select the *Other Data* tab. Set the following values:

Allowable Velocity = **130 Feet/sec**[40 Metres/sec]



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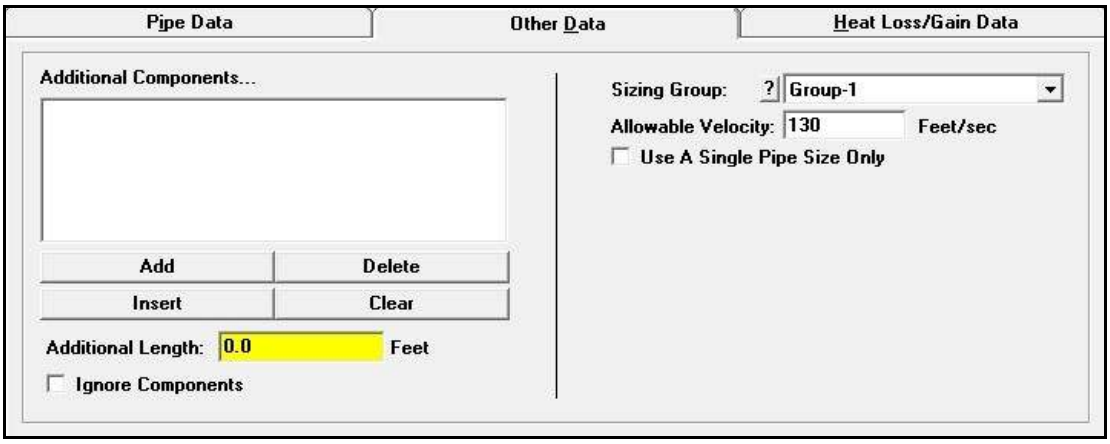

! Return to the *Pipe Data* tab. Select the *Calculate* command button. The results should look similar to one of the following figures.

Note...

Notice that the calculated Diameter value is the same as in the previous calculation, however the *Selected Pipe Sizes* item now shows two pipe sizes. The value shows a combination of pipe sizes and associated lengths which if used would result in the specified outlet pressure for the specified conditions. Notice that the calculated Maximum Velocity value is greater than the previously specified allowable value, that is why the smaller pipe size could not be selected in the previous calculation.

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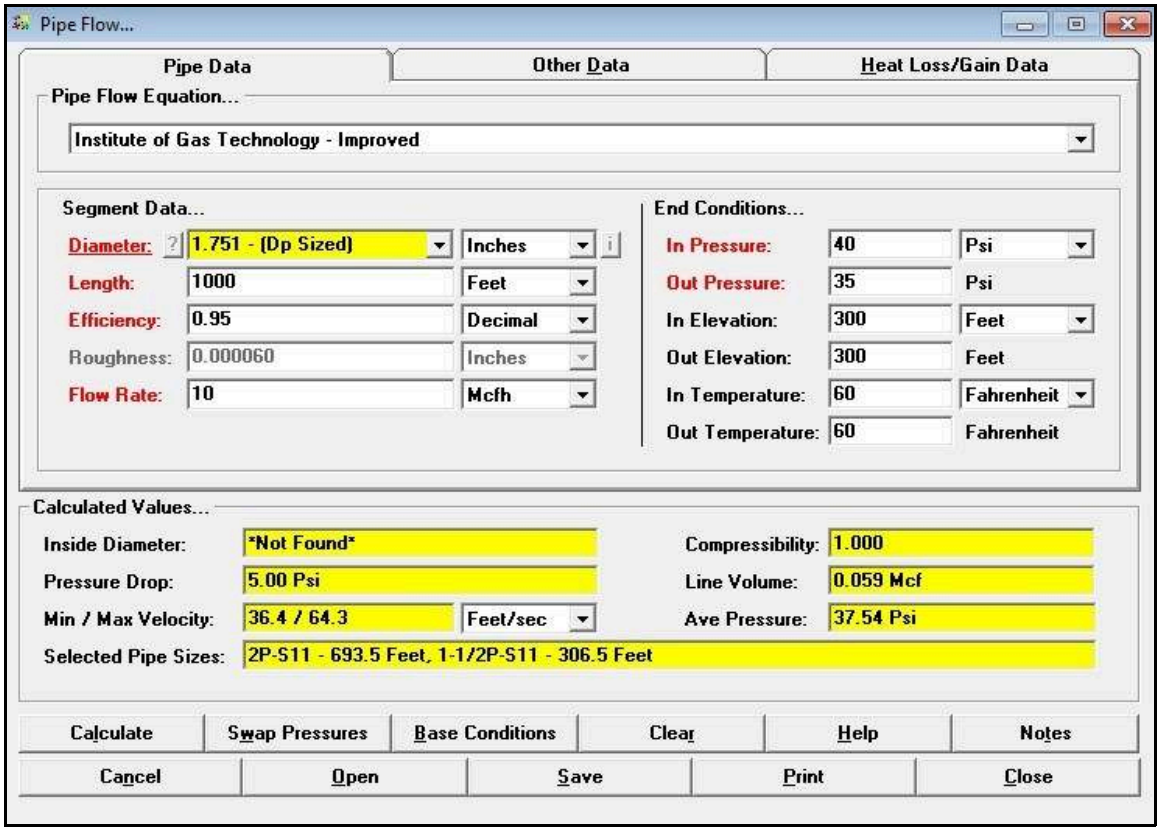

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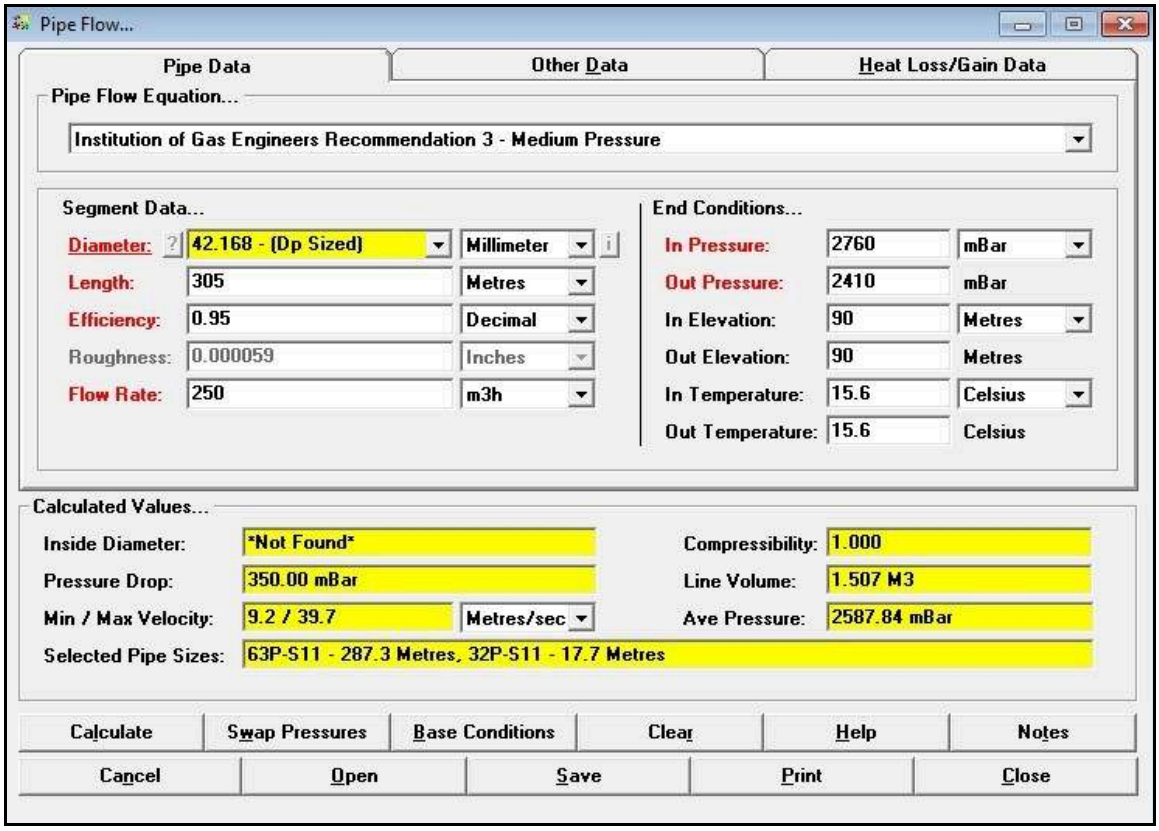

Conclusion

The last step concludes this example. The entered data can be saved by selecting the *Save* command button. A previously saved calculation can be retrieved by selecting the *Open* command button. The calculation data and results can be printed by selecting the *Print* command button. To exit the calculation screen without saving the changes made during the example as the default data, select the *Cancel* command button. To exit the calculation screen and save the changes made during the example as the default data, select the *Close* command button

The skills used in this example – entering data, setting dimensional units, selecting the unknown item, moving between data tabs, and performing the calculations – can be used to perform nearly any of the other calculation routines.

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Additional Example Calculations

In an effort to reduce the size of the demonstration setup file, not all of the GASCalc documentation may be installed. Additional information and documentation can be downloaded from our website, www.b3pe.com. The full GASCalc documentation contains an example calculation for each calculation routine. When installed, the documentation can be viewed by selecting the *Help* command button on the associated calculation screen, or by selecting the desired document from the *Calculation Reference* submenu of the *Help* menu list.

Uninstalling GASCalc

If after using the GASCalc software you wish to remove it, select the *Uninstall GASCalc5.0* menu item from the *GASCalc* menu list. In Windows 8, right-click on the *GASCalc5.0* tile on the start screen, then select the Uninstall option.

! After the Uninstall Program has been started, read the contents of each screen carefully and respond appropriately.

Note... If the *Uninstall Program* asks to remove any shared system files, select the *No* command button.

! A message will appear when the uninstall process is complete. The message will indicate whether the uninstall process was successful or whether it failed. Select the appropriate option to clear the message.

Note... On some machines, the uninstall routine will not be able to remove any directory or file that has been created after the initial installation.

! Some of the files and/or folders created by GASCalc after the installation may include files in the initialization directory (ini), files in the default calculation file directory (files), and/or files in the application directory (app).

! To remove these files and/or folders, use *Windows File Explorer* to find and delete the remaining files and folders. An example of the path for the initialization folder is shown below. The other folders have similar path locations.

- 32-bit machines- **C:\Program Files\GASCalc 5\ini**
- 64-bit machines- **C:\Program Files (x86)\GASCalc 5\ini**

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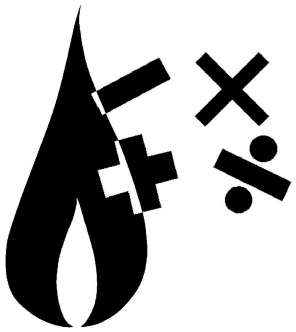

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