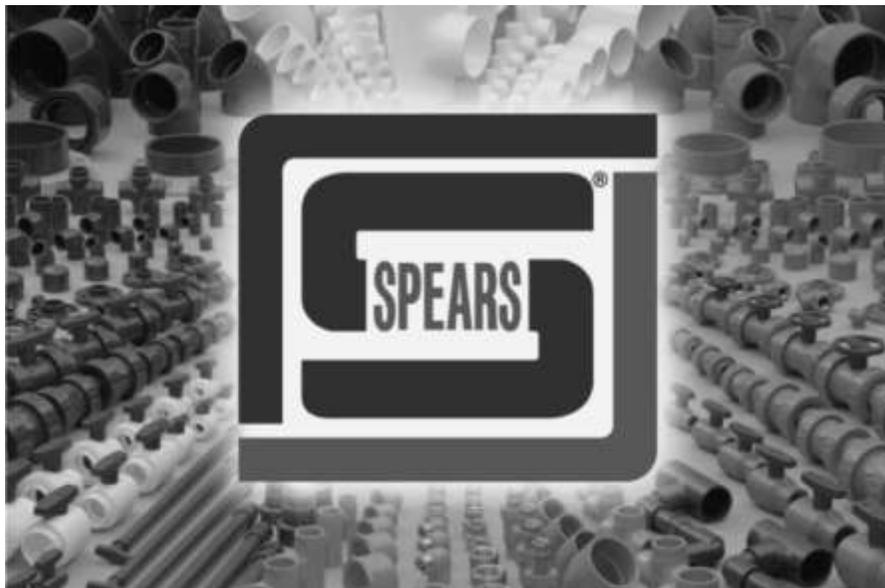


Process Pipe & Fitting Layout Software



Installation and User Guide

DSV - 3

Aug 2015

Contents

SPEARS® Software Licensing Agreement	3
Introduction	4
System Requirements and Installation	5
AutoCAD® 2005-2009 - Setup & Configuration	6
AutoCAD® 2010/2014 - Setup & Configuration	11
AutoCAD® 2015/2016 - Setup & Configuration	15
Pipe & Fitting Layout Software for AutoCAD® - User Guide	22
AutoCAD® LT 2D CAD library - Setup & User Guide	37
Microstation® 2D CAD library - Setup & Configuration	38
Pipe & Fitting Layout Software for Microstation® - User Guide	39

SPEARS® SOFTWARE LICENSING AGREEMENT

NOTICE: BY INSTALLING THIS SOFTWARE IN YOUR SYSTEM YOU HEREBY AGREE AND ACCEPT ALL TERMS AND CONDITIONS IN THIS AGREEMENT

SPEARS® Software for piping system layouts is provided free of charge for end user use as detailed in this agreement. The term “Software” includes any versions, modifications, or updates of this software package. You should carefully read the terms and conditions of this Agreement before installing and using the software. This agreement supersedes all previous licensing agreements. Upon acceptance of this agreement, **SPEARS®** grants you the nonexclusive license to use the Software, provided that you agree to the following:

1. Use of the Software

- You may install and use this Software on a hard disk, file server, or other storage device of one or more computers for a single company or individual to whom this Software is licensed.

2. Restrictions

- You agree not to modify, translate, adapt, reverse engineer, de-compile, disassemble, or otherwise attempt to discover or alter the source code or the database content of this Software other than by those means specifically provided for user customization of the **SPEARS®** program.

- You agree not to distribute this Software or any copies thereof.

3. Governing Law

This agreement shall be governed by the laws of the State of California, USA. This Agreement may be modified only by written permission from **SPEARS®** Manufacturing Company, Inc.

4. Copyright and Trademark Rights

This Software & the Library Blocks are owned by **SPEARS®** Manufacturing Company, Inc. and its structure, organizations and code are valuable trade secrets of **SPEARS®**. You may use the **SPEARS®** trademark (logo) only in printed output produced by this Software, in accordance with accepted trademark practices. Such use does not give you any right of ownership to the **SPEARS®** trademark. This Software is also protected by United States Copyright Law and International Treaty provisions.

5. No Warranty

THIS SOFTWARE AND ACCOMPANYING FILES ARE SUPPLIED TO YOU “**AS IS**” AND WITHOUT ANY WARRANTY, EXPRESSED OR IMPLIED, AS TO ITS PERFORMANCE, MERCHANTABILITY, OR FITNESS FOR ANY PARTICULAR PURPOSE.

SPEARS® Software Copyright © 1997-2015 **SPEARS®** Mfg. Company, Inc. All rights reserved.

AutoCAD® is a registered trademark of Autodesk Inc.

Windows® is a registered trademark of Microsoft Corp.

Viton® is a registered trademark of DuPont Dow Elastomers.

Microstation® is a registered trademark of Bentley System.

Introduction

SPEARS[®] Manufacturing Company now offers a complete Process Pipe and Fitting Layout Software add-on package for AutoCAD[®] and Microstation[®] used as a tool for any thermoplastic CAD piping layout design.

The **SPEARS**[®] most common product line of fittings and valves is represented graphically in AutoCAD[®] (2D and 3D) or Microstation[®] (2D). Various utilities allow for placement of pipe, querying fitting data, and bill of material (BOM) generation.

SPEARS[®] would welcome any input from the customer on what new features customers would like to see in software, what features can be enhanced, and identification of any bugs that might be encountered. This product is intended to be customer oriented, so all feedback or input is extremely important and very much appreciated.

If you have any questions regarding installation or usage of this product, please contact us at:

**Engineering Software Support
SPEARS[®] Manufacturing Company
15853 Olden Street
Sylmar, California 91342**

Toll Free Phone: (800) 862-1499

Phone: (818) 364-6766

Fax: (818) 364-5894

E-Mail: engineering@spearsmfg.net

System Requirements and Installation

System Requirements

SPEARS® Process Pipe and Fitting Layout Software add-on package software will function only on PC with Windows® Operating System and with full version of AutoCAD® based software. For non-AutoCAD® user, the SPEARS® fitting 2D Library block is available for Acad® LT and Microstation® V8/SE/J/POWERDRAFT.

If your CAD platform is AutoCAD® LT or Microstation®, you need to fill out and fax/mail the enclosed Block Library Distribution receipt to SPEARS® prior to the installation to receive your installation password.

Installation

The SPEARS® Installation program will automatically create a new subdirectory C:\SPEARS and its subsequent subdirectory corresponding to selected program of choice.

- Insert SPEARS® disk in CD Rom Drive and the program will start automatically or if your CD-ROM drive is not configured for Autoplay, Run the **Setup.exe** from where the SPEARS® CD is located and follow instructions as prompted.
- Read the SPEARS® Software Licensing Agreement.
- Fill-in your company / personal information as requested. No serial number is needed.
- Select the program of choice: Acad2005/06, Acad2007/09 and etc. For Acad LT® and Microstation® installation password is required. *Please fill out and fax/mail the enclosed Block Library Registration form to SPEARS® prior to the installation to receive your installation password.*
- Click Finish to finalize your installation and remove the SPEARS® CD from your drive and keep it in the safe place.
- The SPEARS® program is completely installed and you are ready to do the configuration setup according to the CAD platform of your choice.

If you have any problem or difficulty with the installation, please contact the following number for assistance:

Engineering Software Support
SPEARS® Manufacturing Company
Toll Free Phone: (800) 862-1499 Ext. 4409

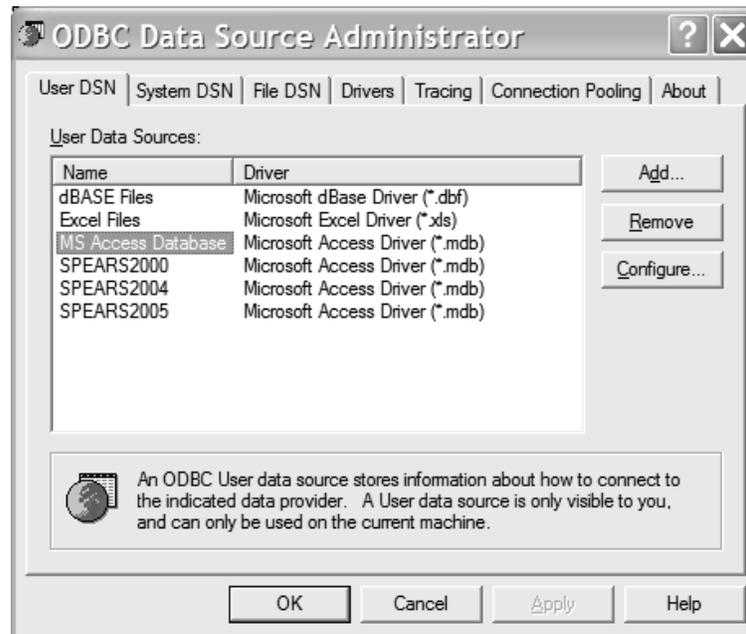
AutoCAD® 2005-2009

SETUP and CONFIGURATION

SPEARS® Piping Layout software must be configured after installation in order to be used with AutoCAD® Release 2005 through 2012. SPEARS® software is using an external database file that all pipe and SPEARS® fittings are linked to. The following four steps will guide through the setup process.

Step 1 : Setting up the Datasource for Windows® Xp/Windows® 7

- Open the Windows “**Control Panel**” → “**Administrative Tools** → “**Data Sources (ODBC) icon**. The ODBC Data source Administrator Dialog will appear. In standard Windows® 7 installation the Administrative Tools is grouped under **System & Security**.
- From the “**User DSN**” tab select “**Add**” and the “**Create New Data Source**” dialog will appear. (For installation under System Administrator account use the “**System DSN**” instead of User DSN)



- Select the “**Microsoft Access Driver (*.mdb)**” from the list.
- Then click the **Finish** button and the “**ODBC Microsoft Access Setup**” dialog now appear.
 - a. In the “**Data Source Name**” edit box of the type in **SPEARS2005**
 - b. In the “**Database**” section pick the “**Select**” button to navigate to the “**C:\SPEARS\COMMON** directory and select/highlight the “**SPEARS2002.mdb**”
 - c. Click “**OK**” to select it.
 - d. Click “**OK**” to close the “**Access Setup dialog**” and then another Click “**OK**” to close the “**ODBC Data Source Administrator Dialog**”

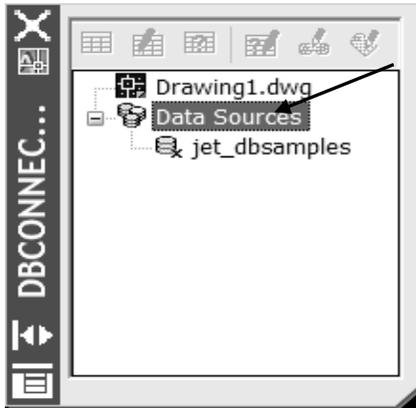
Step 2 : Setting up the DbConnect Manager in AutoCAD®

For Acad 2005/2006 users select from menu **Tools → dbConnect**

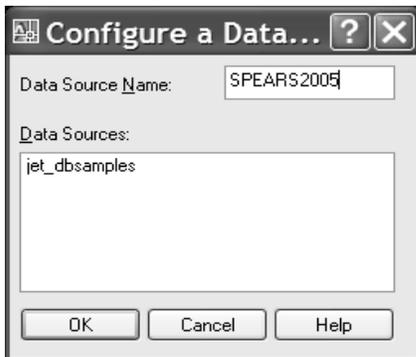
For Acad 2007/2009 users select from menu **Tools → Palettes → dbConnect**

Or alternatively just type in “**dbconnect**” at the Acad command line.

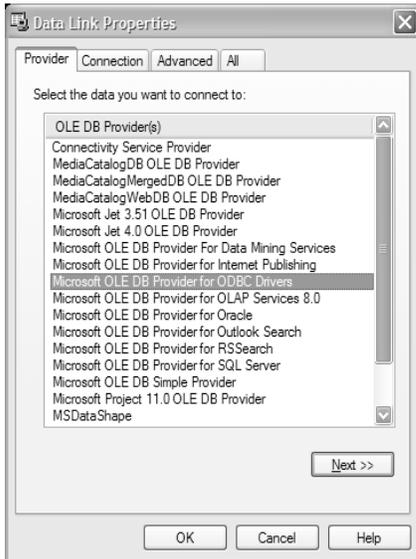
a DBCONNECT MANAGER dialog window will appear as shown.



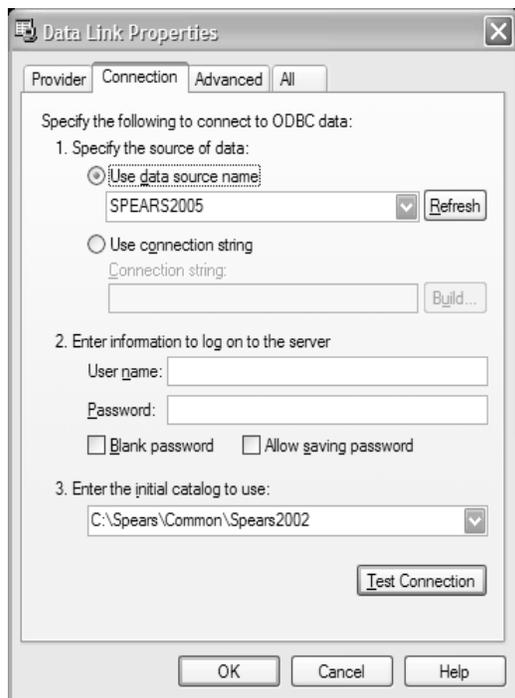
Select and **Right** mouse click mouse at the Data Sources Icon and select the Configure Data Source menu.



In the blank “Data Source Name” edit box type in **SPEARS2005** and click OK which will show the Data Link Properties Dialog



Under the Provider Tab select **Microsoft OLE DB for ODBC Driver** as the provider and click NEXT button.



Under **Connection** Tab :

Item # 1, Specify the source of data:

Use data source name, type in : **SPEARS2005** or select from list box by clicking the drop down arrow.

Item # 3, Enter initial catalog to use :

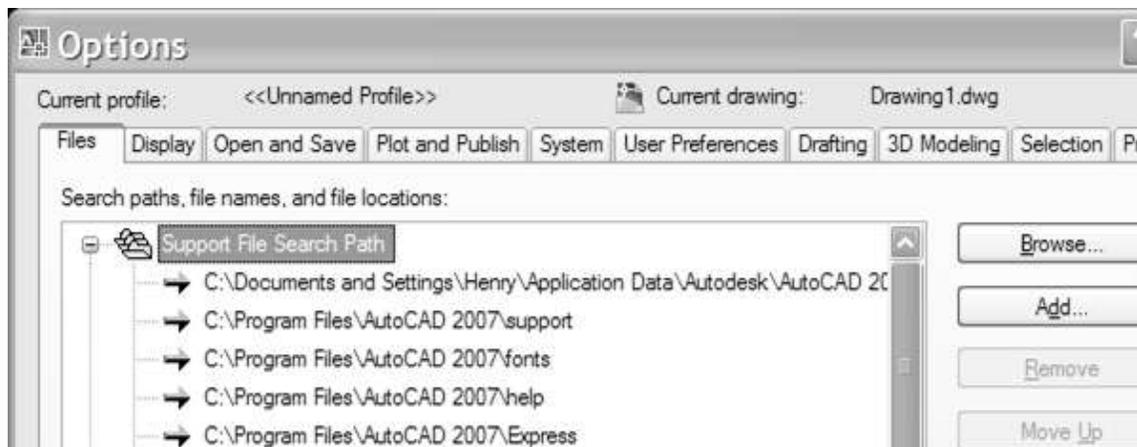
Type in **C:\SPEARS\COMMON\SPEARS2002.MDB** or use the drop down arrow to select from the list.

Click the **Test Connection** button to see if connection is correctly established.

Click OK to close the Data Link Properties dialog window and close the DBConnect Manager Window.

Step 3 : Adding SPEARS® search path directory in AutoCAD® environment path.

- From the Acad menu select “**TOOLS**” → “**OPTIONS**”.



- Under the Files tab, Select and expand the “**Support File Search Path**” option, Click the “**Add**” button and a new blank file path will appear and type in the path

C:\SPEARS\ACAD2005 for Acad 2005/06 user or
C:\SPEARS\ACAD2007 for Acad2007/08/09 user

alternatively, use the **Browse** button to navigate to appropriate directory.

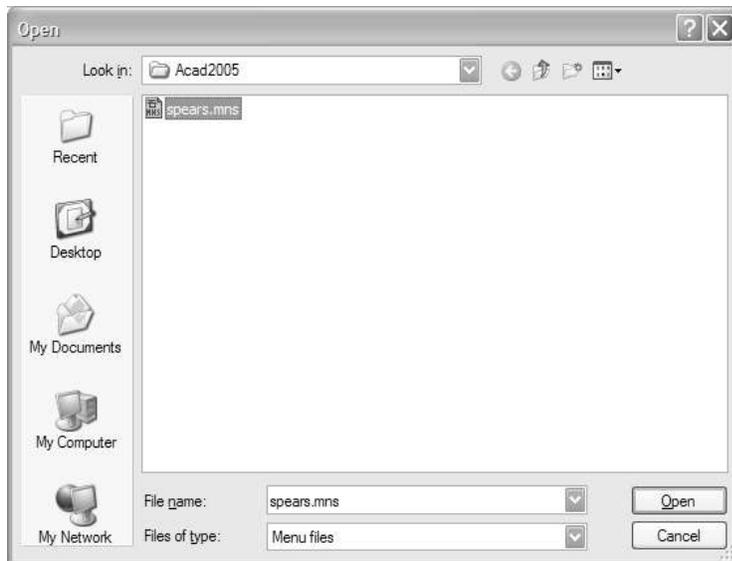
- Click the “**OK**” button to close the option dialog.

Step 4 : Setting up the Spears® Toolbar & Menu

A custom menu and toolbar has been supplied to execute all SPEARS® software commands. This menu file supplements any existing menu structure.

For AutoCAD® 2005 only :

- From the “**TOOLS**” pull down menu Select “**Customize**” and then **Menus**”.

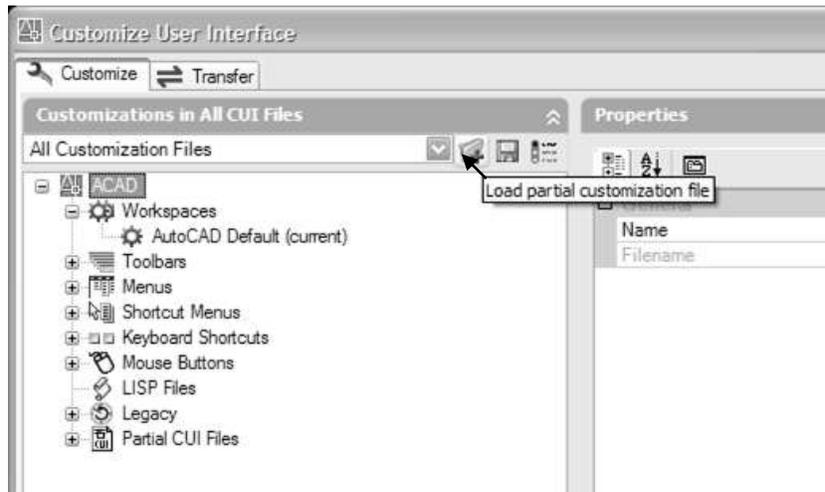


Use the “**Browse**” option to find and select the “**SPEARS.MNS** file under **C:\Spears\Acad2015** folder

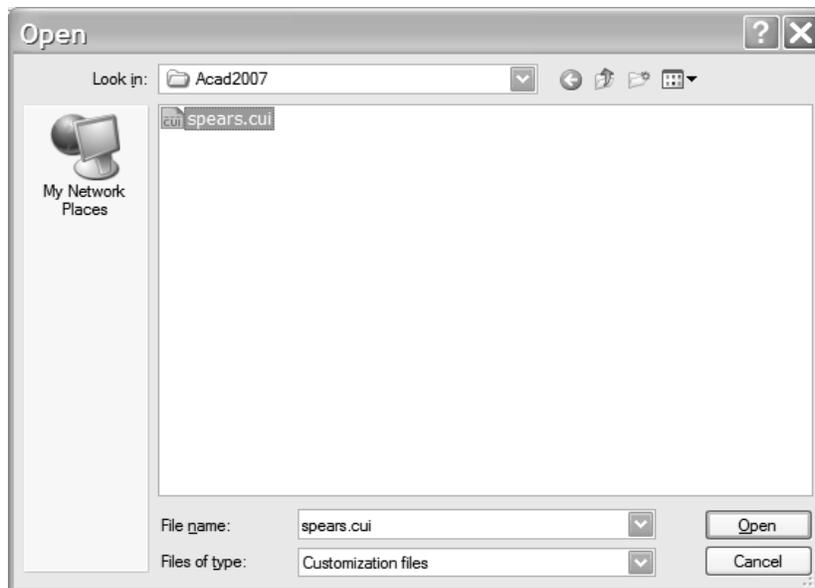
- The Spears Menu Group will automatically highlighted, then Click “**Load**” button.
- The SPEARS® toolbar will appear and dock into the AutoCAD® toolbar.
- Proceed to setup the SPEARS® menu system by Selecting the “**Menu Bar**” tab.
- Select “**SPEARS®**” from the “Menu Group” pull down.
- In the Menu Bar dialog selection box highlight the position you would like to place the SPEARS® pull down menu and select “**Insert**”.
- SPEARS® menu will now appear in the menu bar.
- Close the Menu Customization dialog box and restart the Autocad®.

For AutoCAD® 2006 through 2009:

- From the AutoCAD® menu, select: **Tools** → **Customize** → **Interface** to open the Customer User Interface dialog or issue a command “**cui**” at the Acad command line.
- From Customize tab click on the “**Load partial customization file**” icon



The open menu dialog will be opened as shown



Find the **Spears.cui** under the **C:\Spears\Acad2005** folder for Acad2005/06 user or **C:\Spears\Acad2007** folder for Acad2007/09 user

- Mouse click **Open** button to load the SPEARS® toolbar and setup is done.

AutoCAD® 2010/2014 (x64)

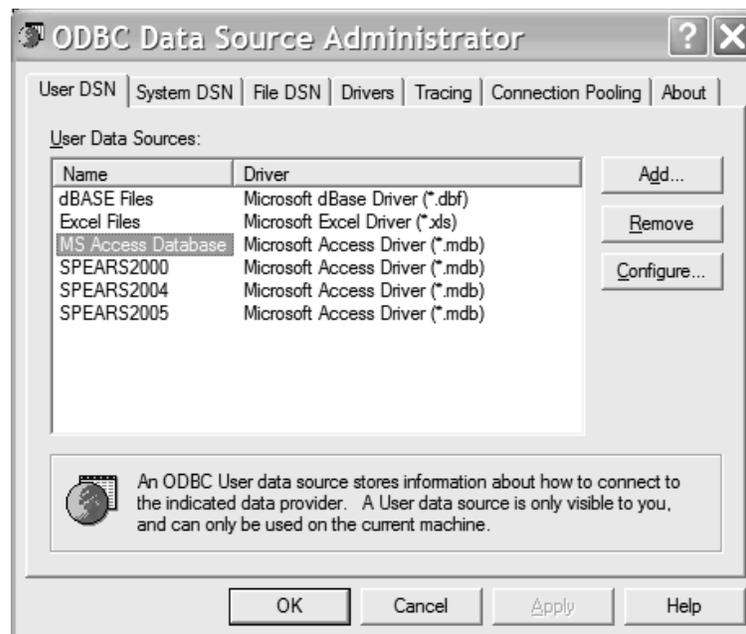
SETUP and CONFIGURATION

SPEARS® Piping Layout software must be configured after installation in order to be used with AutoCAD® Release 2013 64bit. SPEARS® software is using an external Microsoft Access database file that all pipe and SPEARS® fittings are linked to. The following four steps will guide through the setup process.

Note: In Windows 7(x64) installation the 64bit ODBC driver need to be installed prior to setting up the data source. It can be downloaded through the following link [Microsoft Access Database Engine 2010 Redistributable](#) and select **AccessDatabaseEngine_x64.exe** For user who has Microsoft Office 2010(x64) and beyond installed, the driver is already installed during the Office Installation.

Step 1 : Setting up the Datasource for Windows® 7(x64)

- Open the Windows “**Control Panel**” → “**System and Security**” → “**Administrative Tools**” → “**Data Sources (ODBC)**”. The ODBC Data source Administrator Dialog will appear.
- From the “**User DSN**” tab select “**Add**” and the “**Create New Data Source**” dialog will appear. (For installation under System Administrator account use the “**System DSN**” instead of User DSN)



- Select the “**Microsoft Access Driver (*.mdb)**” from the list.
- Then click the **Finish** button and the “**ODBC Microsoft Access Setup**” dialog now appear.

- a. In the “**Data Source Name**” edit box of the type in **SPEARS2005**
- b. In the “**Database**” section pick the “**Select**” button to navigate to the “**C:\SPEARS\COMMON** directory and select/highlight the “**SPEARS2002.mdb**”
- c. Click “**OK**” to select it.
- d. Click “**OK**” to close the “Access Setup dialog” and then another Click “**OK**” to close the “ODBC Data Source Administrator Dialog”

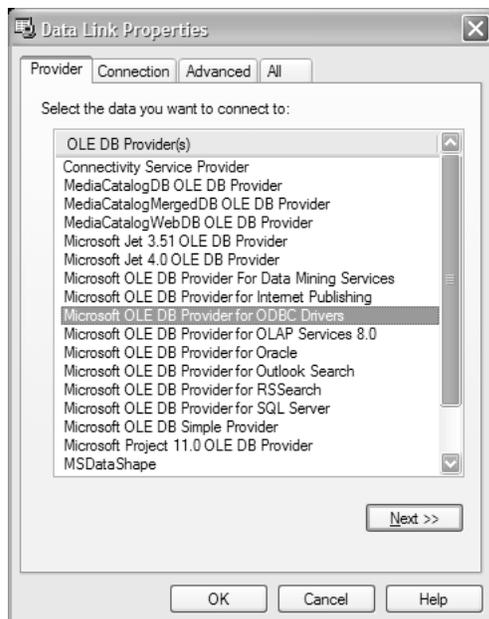
Step 2 : Setting up the DbConnect Manager in AutoCAD®

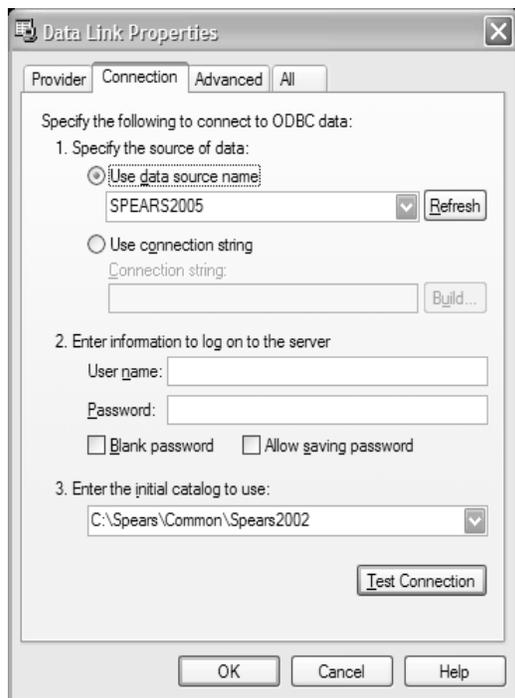
In Acad Command line issue a command “**dbConnect**”

a DBCONNECT MANAGER dialog window will appear. Select & Right mouse click at the **Data Source Icon** and select the **Configure Data Source** sub menu.



A Data Link Properties Dialog as shown will appear. Choose the “**Microsoft OLE DB Provider for ODBC Drivers**” and click Next button





Under **Connection** Tab :

Item # 1, Specify the source of data:

Use data source name, type in : **SPEARS2005** or select from list box by clicking the drop down arrow.

Item # 3, Enter initial catalog to use :

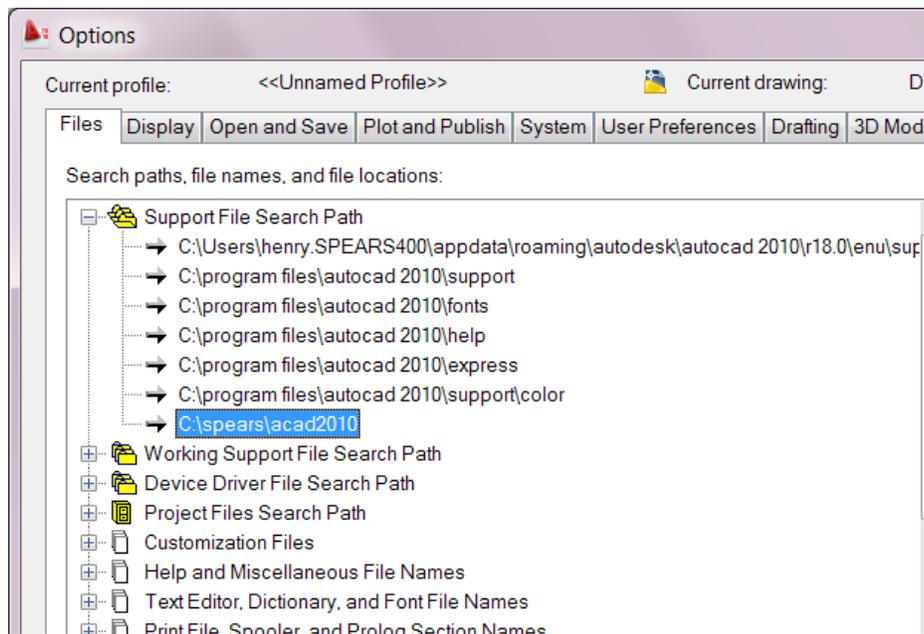
Type in **C:\Spears®\common\Spears2002.mdb MDB** or use the drop down arrow to select from the list.

Click the **Test Connection** button to see if connection is correctly established.

Click OK to close the Data Link Properties dialog window and close the DBConnect Manager Window.

Step 3 : Adding SPEARS® search path directory in AutoCAD® environment path.

- From the Acad menu select “**TOOLS**” → “**OPTIONS**”.



- Under the Files tab, Select and expand the “**Support File Search Path**” option, Click the “**Add**” button and a new blank file path will appear and type in the path **C:\Spears\Acad2010** for ACAD 2010 thru 2012 or **C:\Spears\Acad2013** for ACAD 2013 thru 2014.

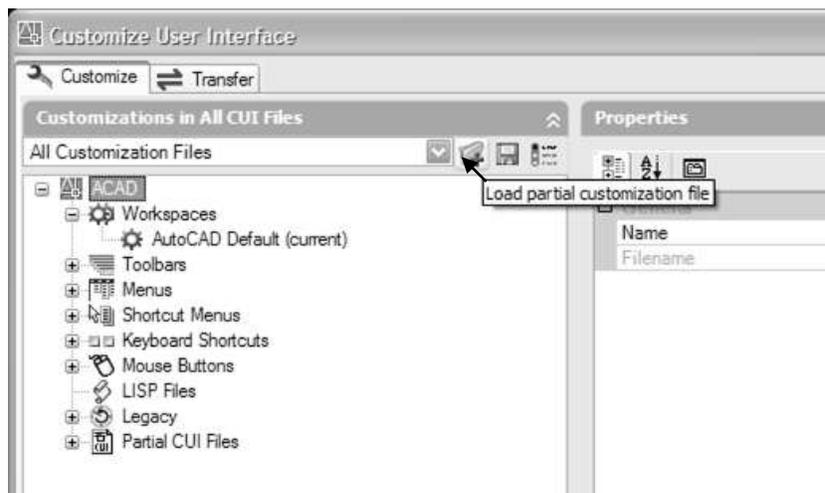
Note: to suppress New Security Message when starting Spears that appear starting with ACAD2014 release and later, type in the ACAD command line : **TRUSTEDPATHS** and type **C:\Spears\Acad2013 ...** it will eliminate the security messg when spears is loaded. Alternatively use **SECURELOAD <0>** at the command line to suppress the message.

- Click the “OK” button to close the option dialog.

Step 4 : Setting up the Spears® Toolbar & Menu

A custom menu and toolbar has been supplied to execute all SPEARS® software commands. This menu file supplements any existing menu structure.

- From the AutoCAD® menu or Ribbon, select: **Manage → User Interface** open the or issue a command “**cui**” at the Acad command line.
- From Customize tab click on the “**Load partial customization file**” icon



- Find the Spears.cuix under the C:\Spears\Acad2013 folder for ACAD2013/14 or C:\Spears\Acad2010 for ACAD2010 thru ACAD2012.
- Mouse click **Open** button to load the SPEARS® toolbar and setup is done, Spears® software is ready for use.

AutoCAD® 2015/2016 (x64)

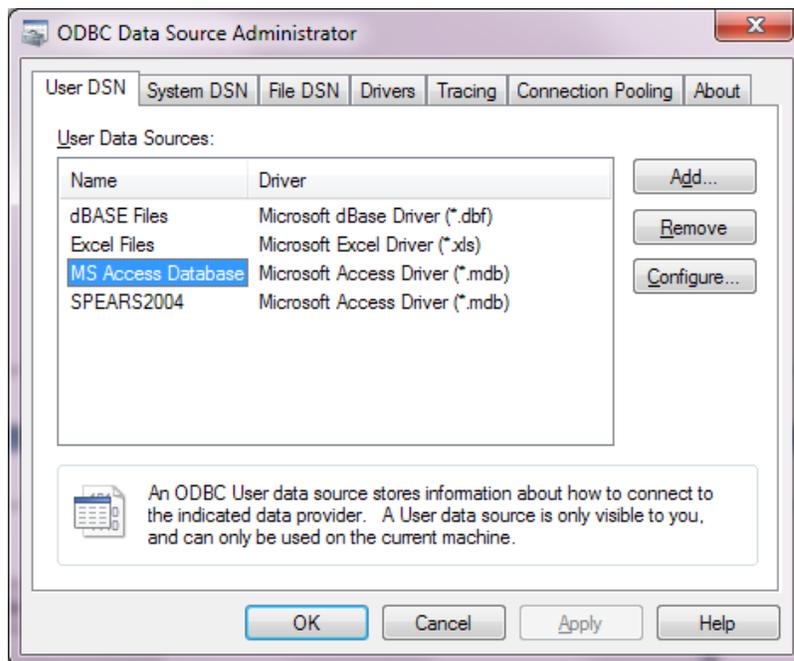
SETUP and CONFIGURATION

SPEARS® Piping Layout software must be configured after installation in order to be used with AutoCAD® Release 2013 (64bit). SPEARS® software is using an external Microsoft Access dimensional database file that all pipe and SPEARS® fittings are linked to. The following four main steps will guide through the setup process.

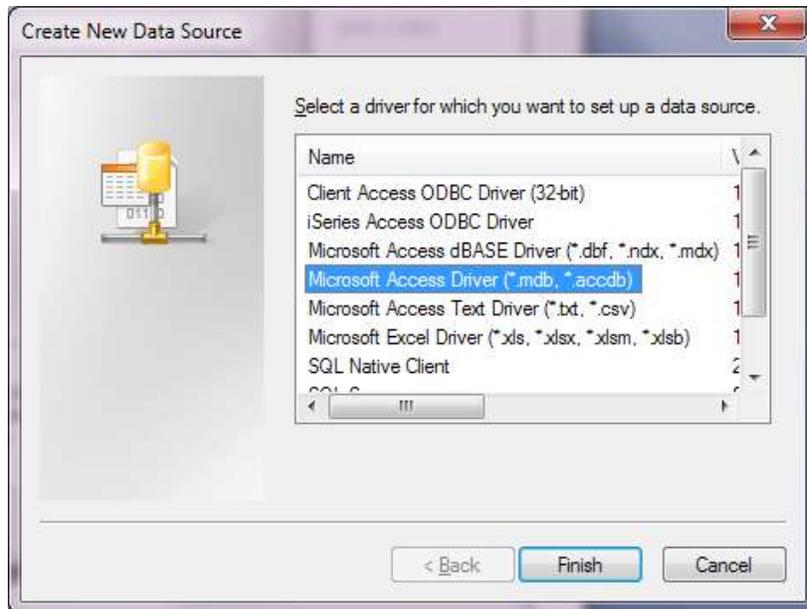
Note: In Windows 7(x64) or Windows 8 installation the 64bit ODBC driver need to be installed prior to setting up the data source. It can be downloaded through the following link [Microsoft Access Database Engine 2010 Redistributable](#) and select **AccessDatabaseEngine_x64.exe** For user who has Microsoft Office 2010(x64) and beyond installed, the driver is already installed during the Office Installation.

Step 1 : Setting up the Datasource for Windows® 7 or 8 (x64)

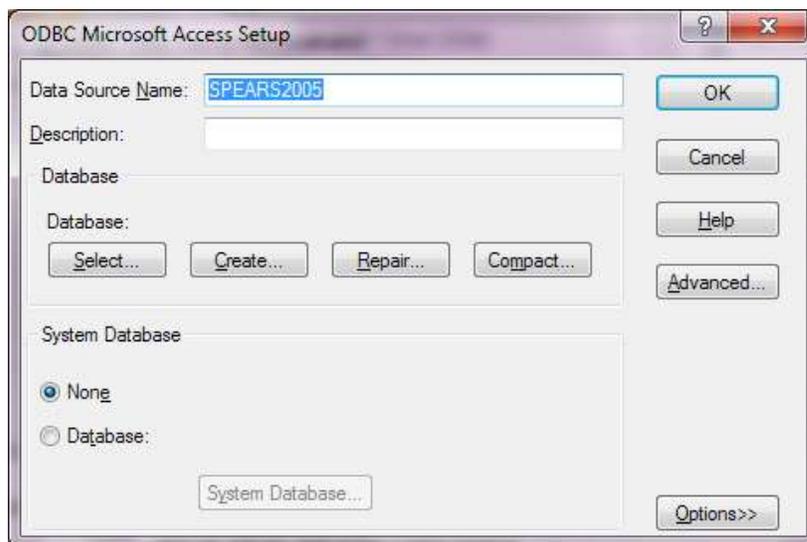
- Open the Windows “Control Panel” → “System and Security” → “Administrative Tools” → “Data Sources (ODBC). The ODBC Data source Administrator Dialog will appear.



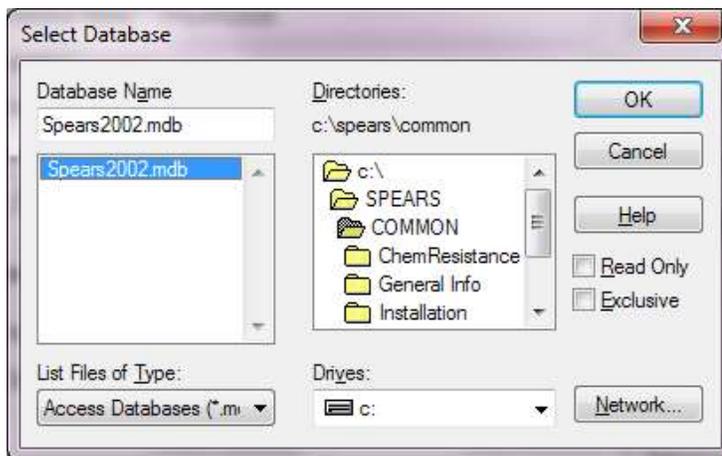
From the “**User DSN**” tab select “**Add**” and the “**Create New Data Source**” dialog will appear.
(For installation under System Administrator account use the “**System DSN**” instead of User DSN)



- Select the “**Microsoft Access Driver (*.mdb)**” from the list.
- Then click the **Finish** button and the “**ODBC Microsoft Access Setup**” dialog as below now appear.



In the “**Data Source Name**” edit box of the type in **SPEARS2005**

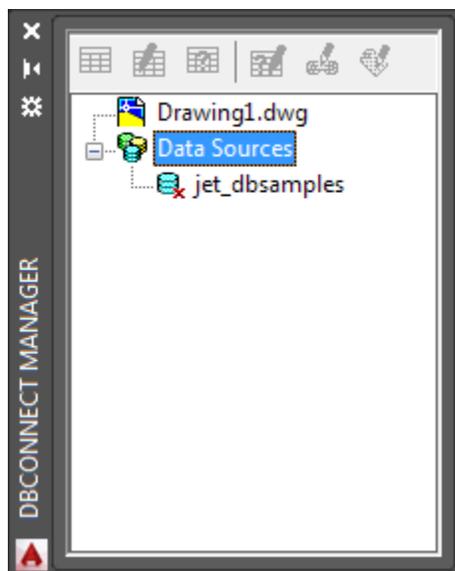


- e. In the “**Database**” section pick the “**Select**” button to navigate to the “**C:\SPEARS\COMMON**” directory and select/highlight the “**SPEARS2002.mdb**”
- f. Click “**OK**” to select it.
- g. Click “**OK**” to close the “**Access Setup dialog**” and then another Click “**OK**” to close the “**ODBC Data Source Administrator Dialog**”

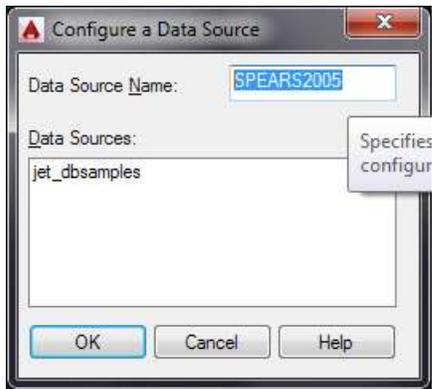
Step 2 : Setting up the DbConnect Manager in AutoCAD®

In Acad Command line issue a command “**dbConnect**”

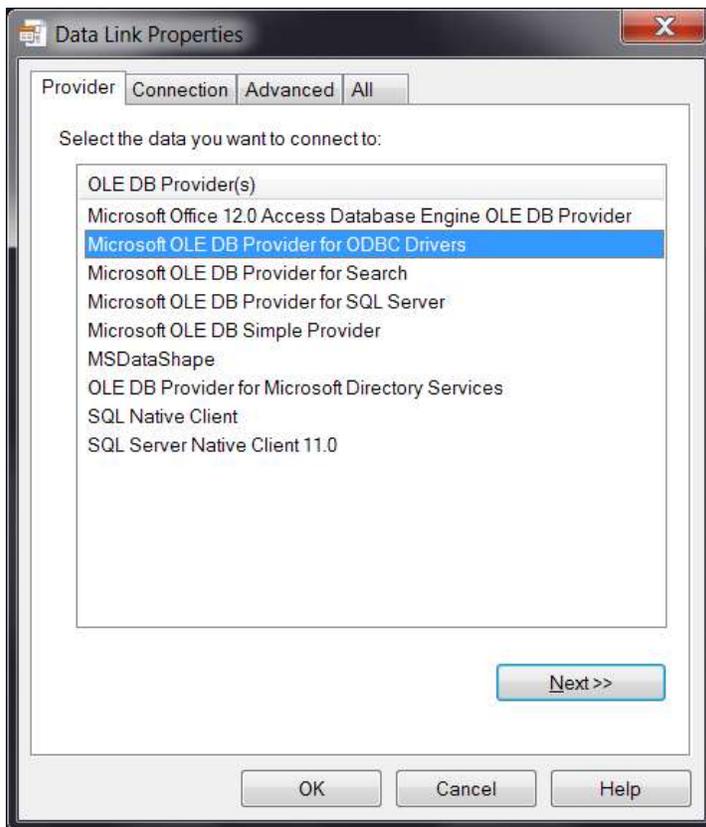
a DBCONNECT MANAGER dialog window will appear. Select & Right mouse click at the **Data Source Icon** and Select the **Configure Data Source** sub menu.

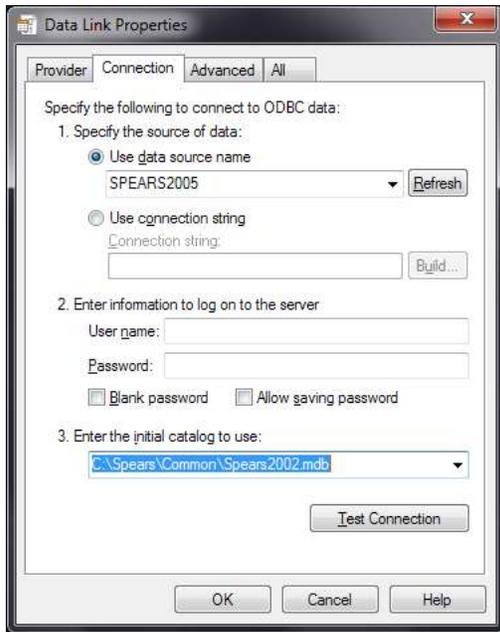


In the “Data Source Name” edit box of the type in **SPEARS2005** and click OK as below :



A Data Link Properties Dialog as shown below will appear. Choose the “**Microsoft OLE DB Provider for ODBC Drivers**” and click **Next>>** button





Under **Connection Tab** :

Item # 1, Specify the source of data:

Use data source name, type in : **SPEARS2005** or select from list box by clicking the drop down arrow.

Skip Item # 2

Item # 3, Enter initial catalog to use

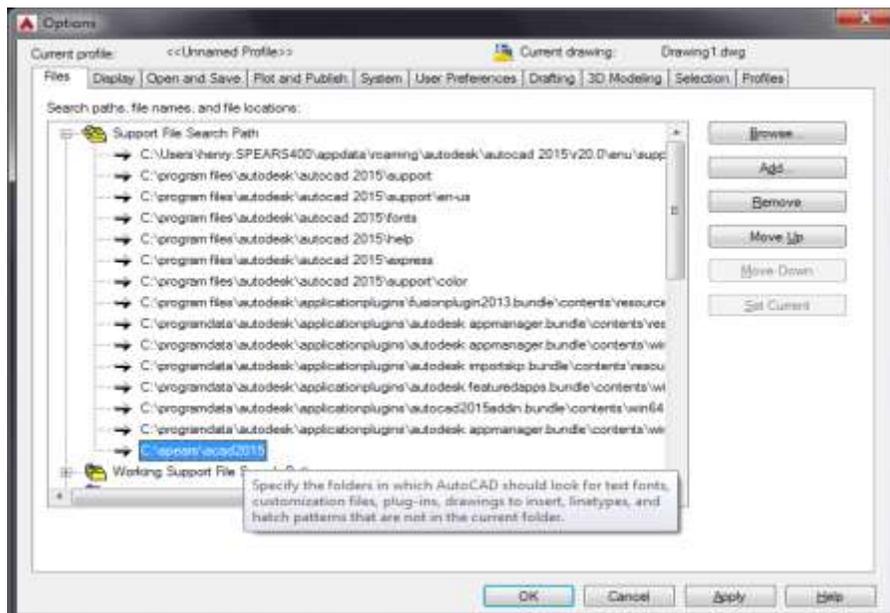
Select the drop down arrow to select from the list.

C:\Spears\Common\Spears2002.mdb

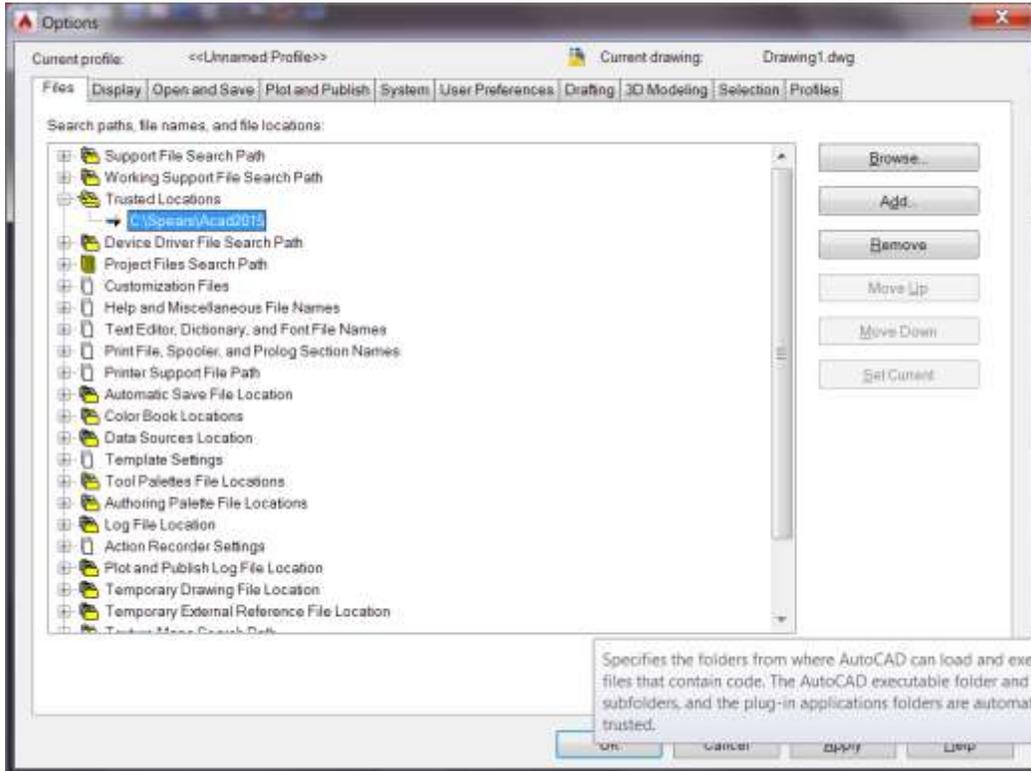
Click the **Test Connection** button to see if connection is correctly established. If the test succeeded proceed to close the Data Link Properties dialog window and the DBConnect Manager Window.

Step 3 : Adding SPEARS® search path directory in AutoCAD® environment path.

- From the Acad Main icon (top most left) menu select “**OPTIONS**”.
- Under the Files tab, Select and expand the “**Support File Search Path**”, Click the “**Add**” button and a new blank file path will appear and type in the necessary path **C:\Spears\Acad2015**



- Next, find the Trusted Location and also add **C:\Spears\Acad2015**

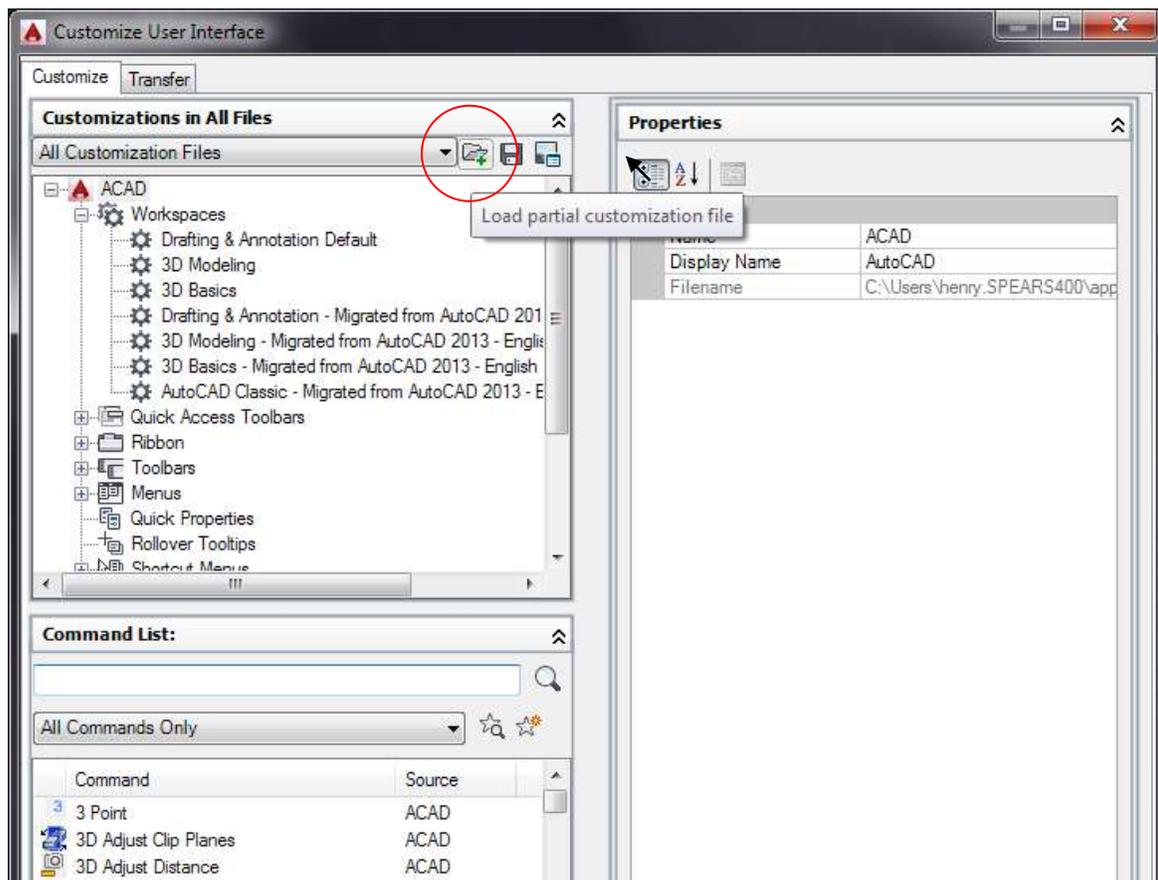


- Click the “OK” button to close the option dialog.

Step 4 : Setting up the Spears® Toolbar & Menu

A custom menu and toolbar has been supplied to execute all SPEARS® software commands. This menu file supplements any existing menu structure.

- From the AutoCAD® menu or Ribbon, select: **Manage → User Interface** or issue a command “**cuix**” at the Acad command line.
- From Customize tab click on the “**Load partial customization file**” icon. (folder with + Sign)



- Find and select the **Spears.cuix** under the C:\Spears\Acad2015 folder
- click **Open** button to load the SPEARS® toolbar to the ACAD.
- Setup is done and SPEARS® software is ready for use.

SPEARS® Pipe & Fitting Layout Software for AutoCAD®

User Guide

Initialization

SPEARS® software must be initialized before the add-on tools can be used. You can initialize from the SPEARS® pull down menu or from the SPEARS® toolbar. If you try to select an option from the toolbar other than “**initialize**” you will get an error message. Always initialize first when entering any AutoCAD® drawing or after opening an existing drawing.

Initialization will establish a connection between your drawing and the SPEARS® database. Select “**Initialize**” from the SPEARS® pull down menu or the SPEARS® toolbar. You will be prompted with “**About SPEARS®**” dialog that has information on the company and software version you are using (see illustration below.) You also can access this dialog by selecting the “**About**” submenu on the SPEARS® pull down menu or the “**SPEARS®**” icon on the SPEARS® toolbar. **Remember** you must initialize every time you enter a new AutoCAD® session or when a new AutoCAD® drawing is loaded.

There are four main configuration settings that need to be set for drawings when SPEARS® Software is initialized.

Most SPEARS® customers use **Schedule 80** fittings with **US** drawing units in a **2D** environment. **Maximum** pipe bend tolerance is also used.

The pipe tolerance tool allows you to set the “**Bend**” allowed when placing pipe to minimum or maximum. This prevents pipe from being placed incorrectly between two fittings that are not aligned horizontally or vertically. Minimum settings give very little bend while maximum allows some bending.

You can change these settings in other dialogs while using the software by clicking on the SPEARS® Icon on the toolbar, but the **saved** setting will always be restored when entering a different drawing.



About SPEARS® Initialization Dialog.

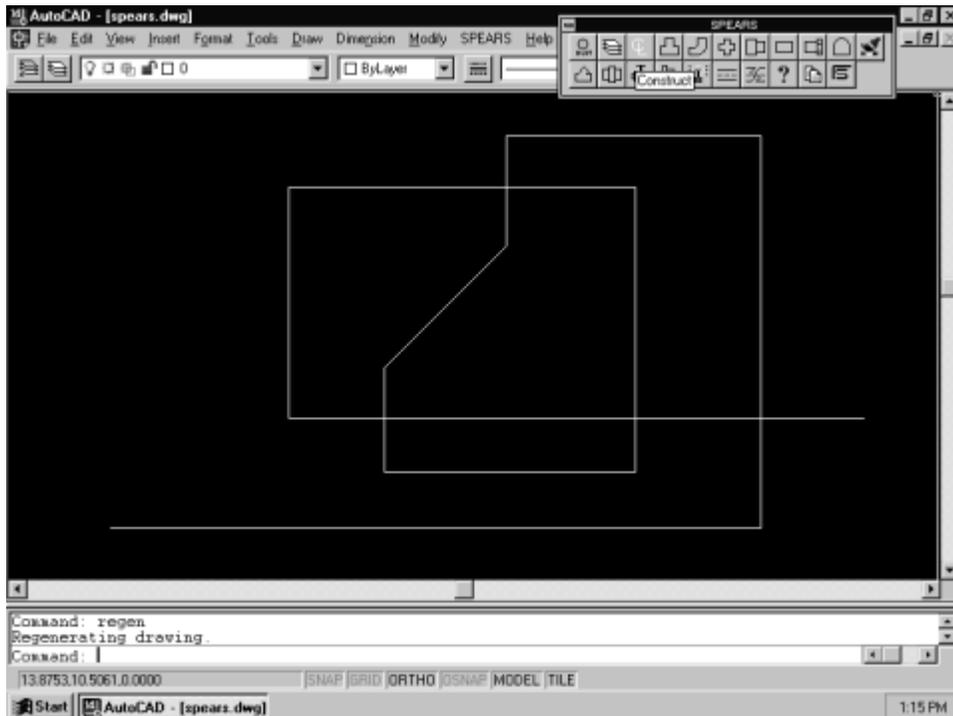
After you initialize the software for the first time the variables are kept permanently until you change them again. This way you will be consistent in drawing in U.S. units in 2D with maximum pipe tolerance until you wish to change the default.

Construction Lines

The following is a summary of the layers that SPEARS[®] software automatically creates as needed. These layers are not used for 3D piping layouts.

- SPEARS_X - Construction line layer***
- SPEARS_S - Fitting and pipe solid line layer***
- SPEARS_H - Fitting and pipe hidden line layer***
- SPEARS_C - Fitting and pipe centerline layer***
- SPEARS_L - Pipe label layer***
- SPEARS_N - Fitting nodes layer***
- SPEARS_LOGO - SPEARS[®] Fitting logo layer***

To create construction centerlines, select either the “Construct” option from the SPEARS[®] pull down menu or the centerline symbol from the SPEARS[®] toolbar. A prompt for “**First Point**” input will appear on the AutoCAD[®] command line. Select a starting point on the drawing. A prompt for “**Next Point**” will appear at the command line. Select the point on the drawing for termination of the first segment of the construction centerline. You will be continually prompted for additional “**Next Point**” input until the “**Enter**” key is pressed. Following this process, create the necessary construction centerlines to simulate the drawing shown below.



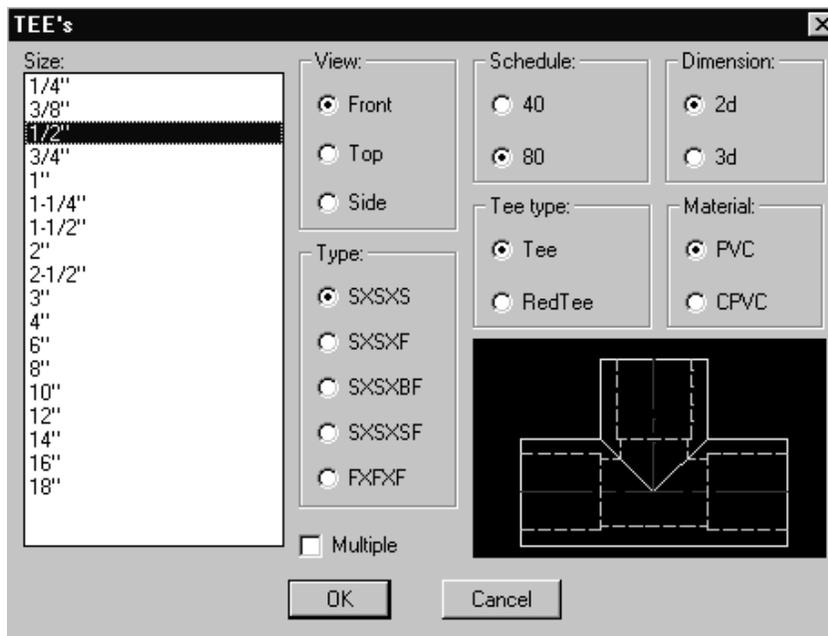
Construction centerline creation

Fitting Insertion

You are now ready to begin selection and insertion of SPEARS® fittings on the construction centerlines. Different fitting types (tee, elbow, union,...etc.) can be selected from either the SPEARS® pull down menu or toolbar symbols. On selection, a dialog box will appear with various options for selecting size, configuration type, material, etc., plus “View” options for initial orientation of the fitting in the drawing (3D drawing layout does not use views. See section on 3D layout). Grayed out selection buttons indicate that the option is either not applicable to the fitting type or not currently available within software.

The picture in the dialog box is a representation of how the fitting will appear on the drawing according to the selected options. The picture is updated whenever changes are made to the selected options, such as “View”. The “Multiple” option allows the user to make repeated placement of the same configuration without going through the dialog box each time.

To place a tee on the construction centerline of our sample drawing, select the “Tee” from the SPEARS® pull down menu, toolbar or by command line entry. Following the example below, choose the dialog box options for a PVC Tee, Front view, ½”, SXSXS, Schedule 80, 2D. On completion of the option choices, select “OK”.



Tee dialog box

A command line prompt to “Place Tee” will appear. The tee can be placed at any location on the construction centerline of the drawing. For our sample, place the tee at the left terminal end point of the lower centerline. The snap modes are automatically set for “INT, ENDP, NEAREST”, in that order. However, you can manually override this by selecting your own snap options.

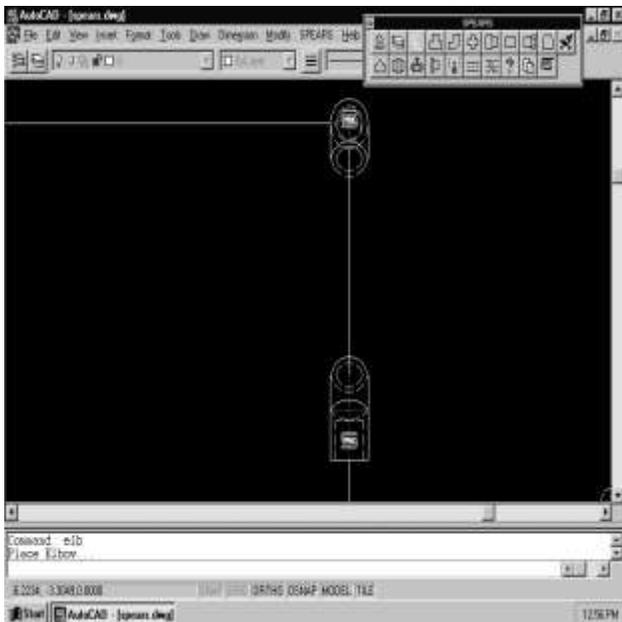
Once the tee is placed it is up to the user to select the desired rotation. Either type in a value at the command prompt or pick a point on the screen. When the command is finished, the fitting is automatically linked to the database.

Next, insert a few elbows on the construction centerline. Select the “Elbow” option from the menu or toolbar. In the Elbow’s dialog box, experiment with selecting different button options and observe how various options gray out and activate according to the selections you make. Try placing a few PVC, 90° Elbows, Front view, ½” SXS, Sch 80, 2D on the outer turns of our sample construction centerline.

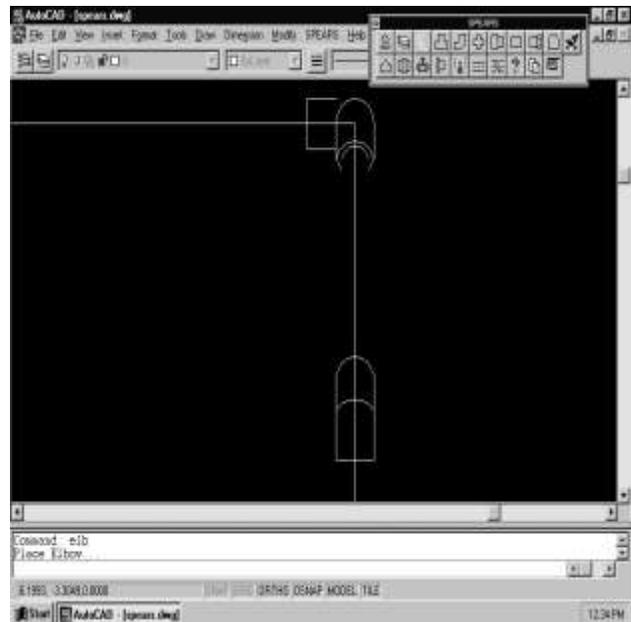
The 45° Elbow provides five views. Study each of these views in order to familiarize yourself with variations in line visibility and orientation. Having five views of 45° elbows allows emulation of different pipe slopes in the drawing. When finished, select a PVC 45° Elbow, Rear view, ½” SXS, Sch 80, 2D.

Notice the lines that are solid and those which are shown as hidden. Once the fitting is placed in the drawing, the hidden lines can be turned off for clarity and plotting. This rear view emulates a 45° fitting for a pipe sloping down. Again, it is important to become familiar with the view you select for use. Select “OK” and place the fitting approximately midway on the second vertical centerline from the right (inside loop) in our sample drawing. Once the elbow is placed, it is up to the user to select the desired rotation. Either type in a value at the command prompt or pick a point on the screen.

Now select the “Elbow” again with the same options, except this time, select the “Top” view. Select “OK” and place the fitting at the upper corner of the same vertical construction centerline and then we will add a “Side” view of a 90° elbow. This will show how the elbow branches off below the top view of the 45° elbow.

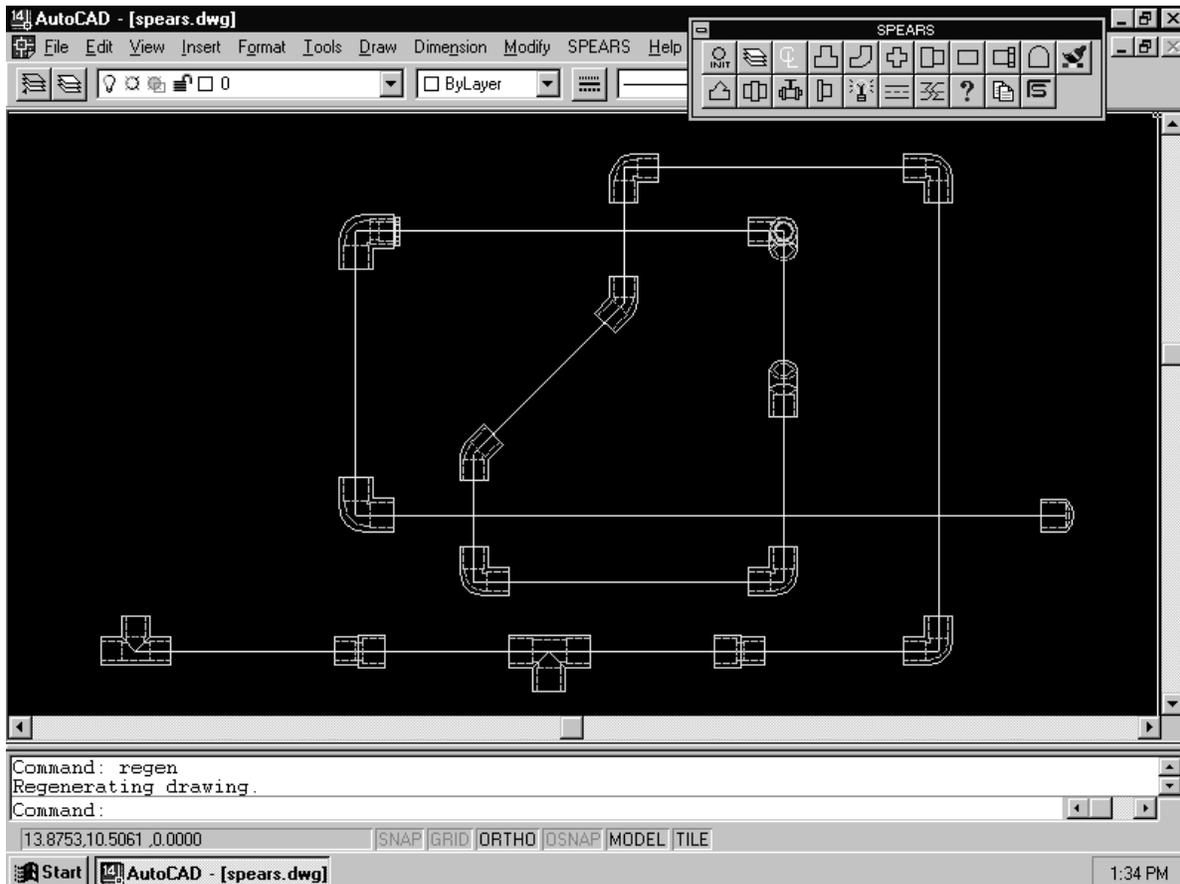


Rear and top view insertion of 45° elbow



Elbows Side view 90° elbow

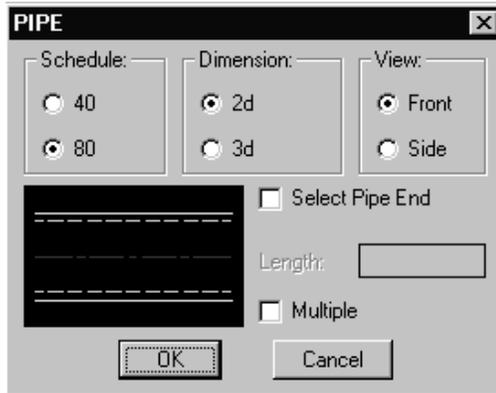
We will finish this drawing sample by inserting various fittings. Remember, the fitting that will be placed is based on what options have been selected. Also remember that you have the “Multiple” option to place more than one fitting. The figure below illustrates drawing with fittings placed.



Example of drawing with various fittings placed with all layers active.

Pipe Placement

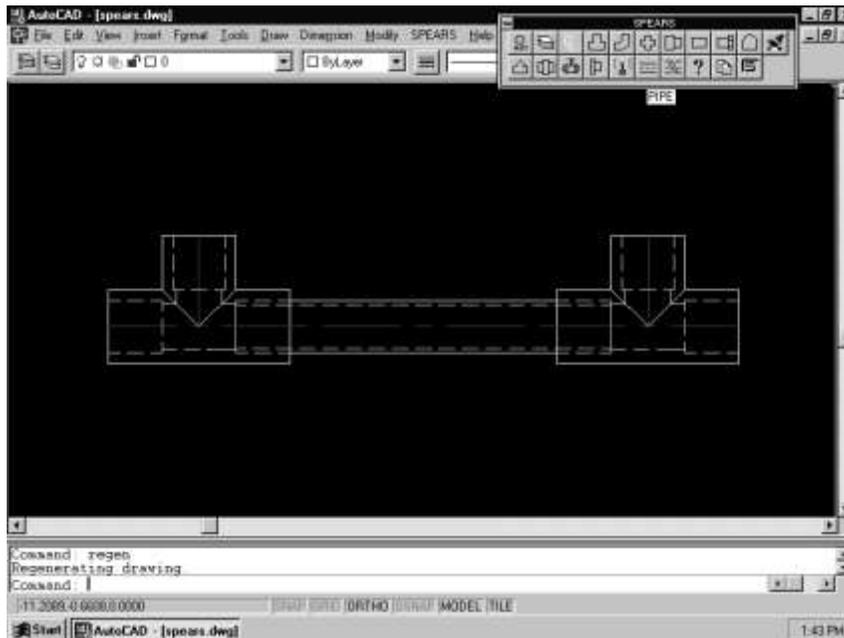
Now that the fittings have been inserted into the drawing, we can place pipe to connect them. Select the “PIPE” option from the SPEARS® pull down menu or select the “PIPE” icon from the toolbar.



Pipe dialog box

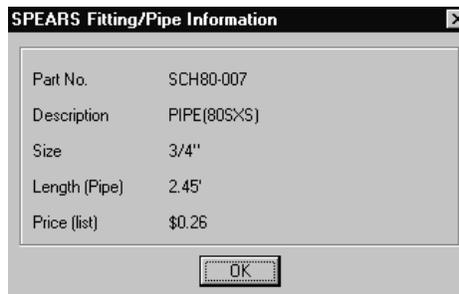
The “Front” option allows the user to simply pick two fittings that a pipe will join. The size will automatically be selected according to the fittings that were selected and the pipe will be drawn and linked to the database. If the user selects two fittings that do not match, a message will be returned stating, “**Fittings do not match, a reducing element is needed**”.

You may also choose the “Select Pipe End” option which allows you to select only one SPEARS® fitting and either enter a pipe length or select a point in space.



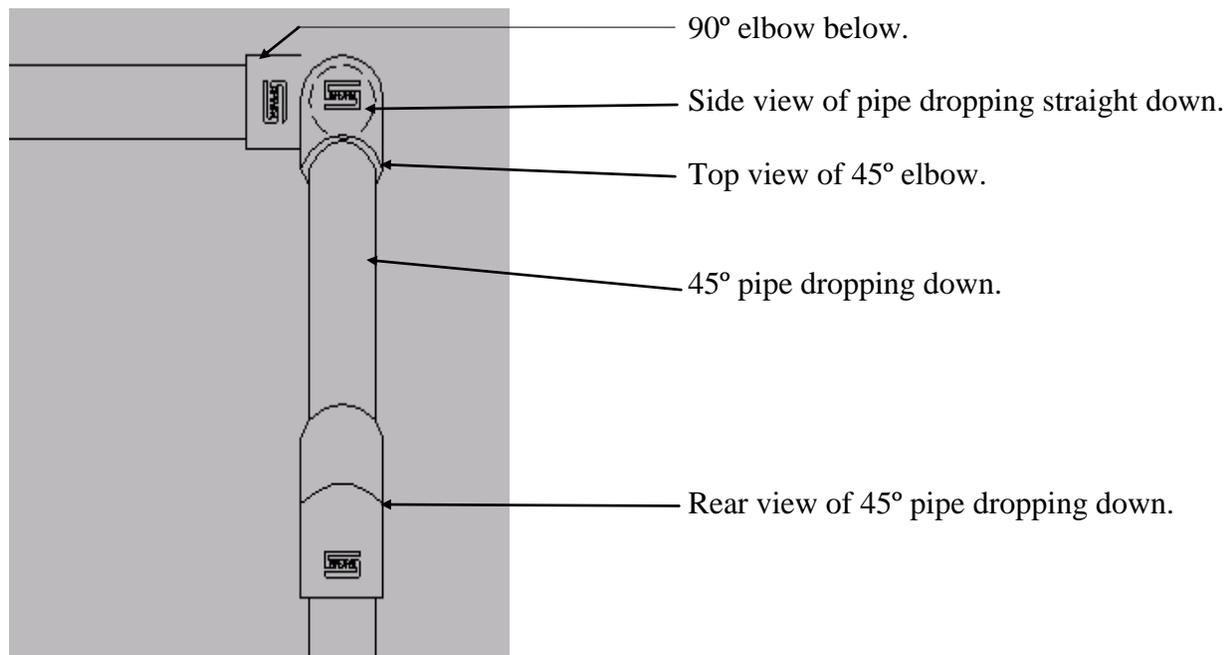
“Front View” pipe connected to two existing fittings.

The “Query” utility demonstrated earlier, also shows the cut length of a pipe when selected.



Query of a pipe which shows cut length

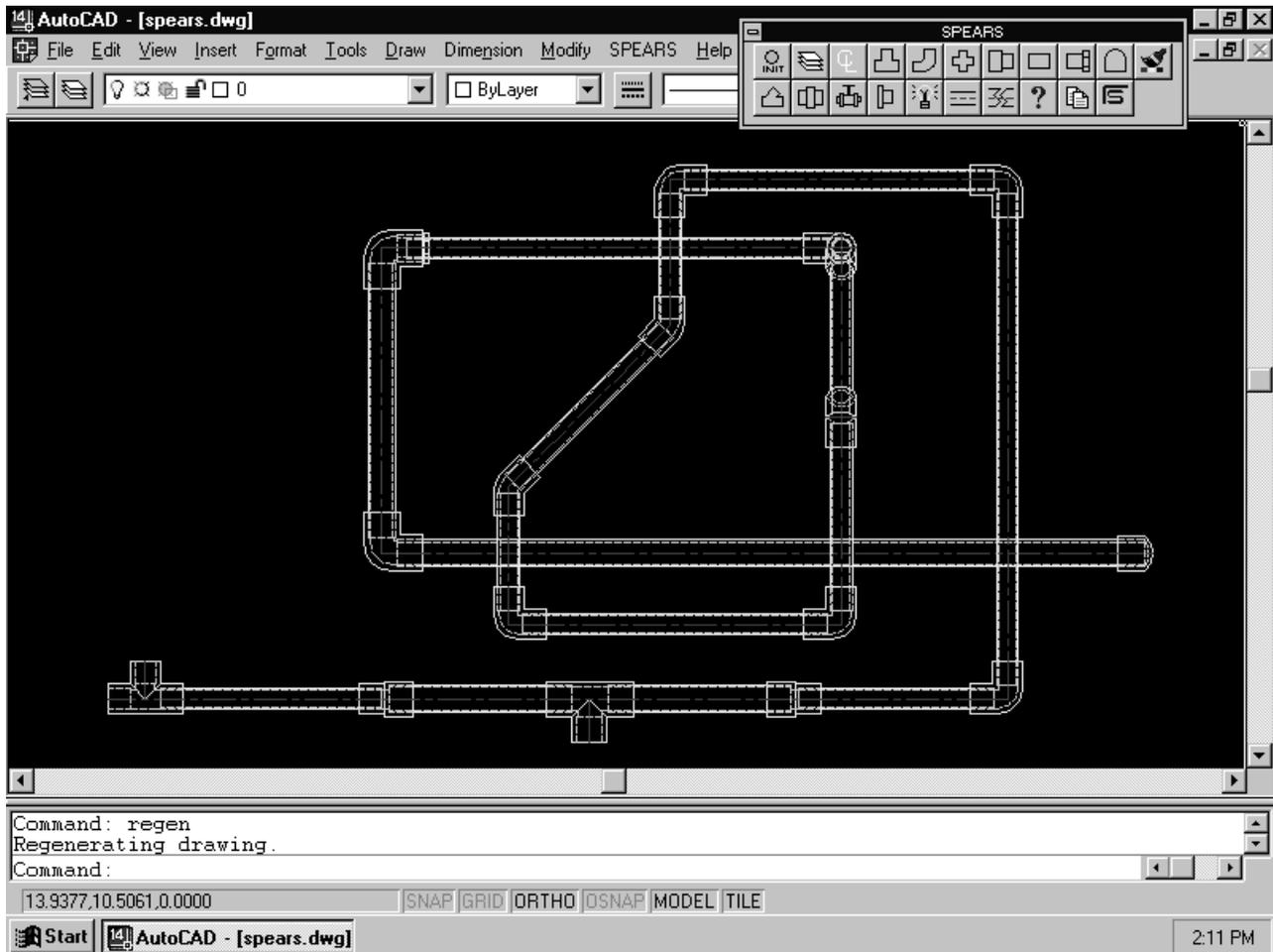
A side view of a pipe may also be placed by selecting the “Side” option, and length (The length is used for querying and report calculations). The following illustration shows an enlarged area where the 45° elbows and pipes were placed. Some of the layers have been turned off for clarity. After a 45° drop has been made you cannot branch off the 45° pipe with another fitting. This is due to the limited views of angled fittings available in a two dimensional drawing environment (The 3D drawing functions shown later, eliminate this limitation). Since pipe length is determined from centerline placement, this solid line irregularity has no effect on pipe length calculations in the Summary Report.



45° elbows and pipe drops

To erase fittings or pipe simply use the AutoCAD® “**erase**” command and select the fitting. Since the pipe entities are now represented as groups, they may be erased by selecting any entity within that pipe group, even if some layers such as the hidden line layer (**SPEARS_H**) are shut off. The grouping of pipe also allows for the AutoCAD® “**stretch**” command to be used to lengthen or shorten piping system layouts. See the AutoCAD® online documentation for “**stretch**” command.

The following illustration represents a completed sample drawing with all pipe and fittings.



Fittings and connecting pipe.

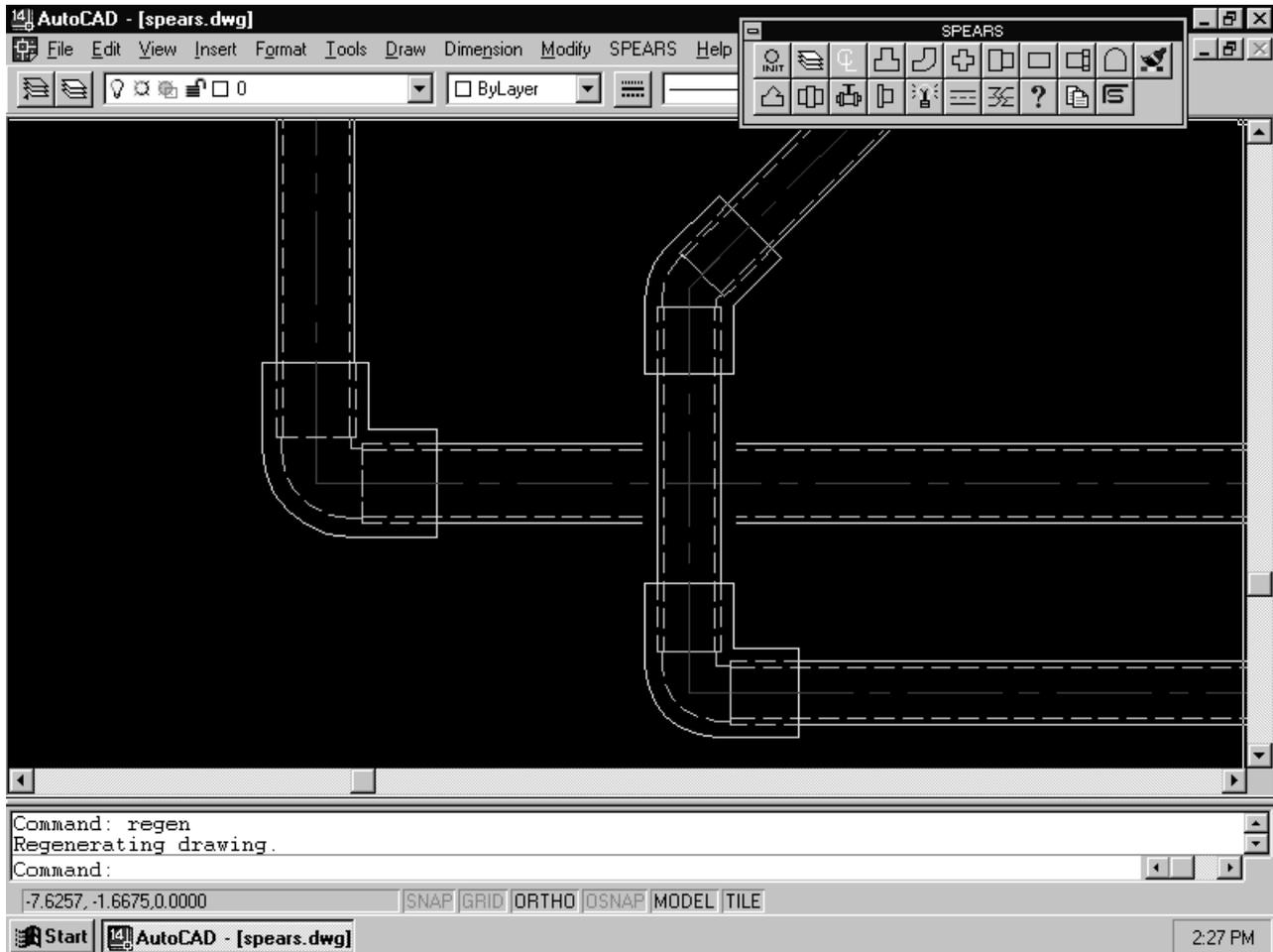
IMPORTANT:

SPEARS[®] pipe entities are now created as a single AutoCAD[®] Group entity. If the Group is exploded or Wblocked out to another file the Group status is lost. Some SPEARS[®] functions such as "Query" and "Break" only operate on Grouped pipe entities. It is not recommended to Wblock pipe entities.

Pipe Break Utility

In the previous fitting and connecting pipe sample drawing, it is difficult to determine intersecting pipe location. Which pipes are above and which pipes are below? The **“Pipe Break Utility”** will create a break between intersecting pipe lines and make the drawing easier to read.

Select the **“Break”** utility from the toolbar or pull down menu. The first pipe selected will be the pipe to be broken. The second pipe selected will be the overlaying pipe. The two pipes selected must be at 90° angles to each other. The following illustration shows an enlargement of the two pipes that were selected for the break.

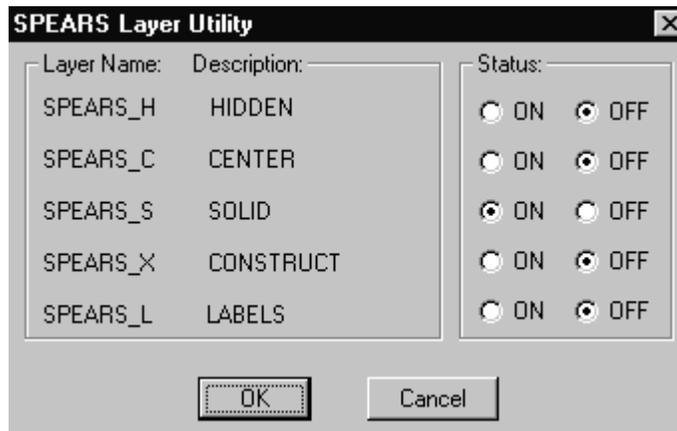


Results of the Pipe Break Utility

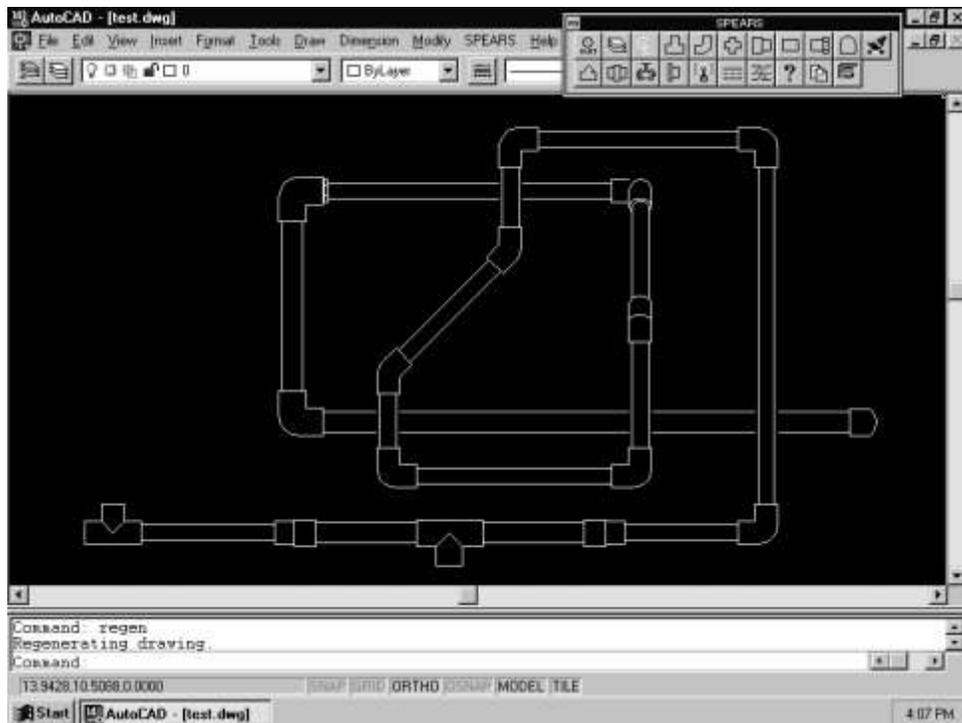
The Pipe Break Utility is only available for 2D drawing environments. 3D piping should not need to be broken.

Layer Utility

The Layer Utility allows the user to turn SPEARS® layers on and off as needed for 2D piping layouts. This allows for visual clarity when working on drawings or when construction drawing plots are desired. Certain functions turn required layers on and off automatically. It is recommended to keep all layers ON during drawing construction. The Layer Utility Dialog Box shown below illustrates selection of all layers OFF except for the solid line layer (SPEARS_S). The 3D version does not use a layer schema, therefore this utility has no effect.



Layer Utility dialog.



Complete drawing with appropriate layers off

Query Utility

The Query Utility allows the user to obtain specific information on any selected fitting or pipe in the drawing. A dialog box with “Part No.,” “Description,” “Size” and “Cost” will be returned. If the entity selected is a pipe, the length of the pipe will be shown. If price is not available or length is not applicable, NA will be displayed. See sample figures below.

Screenshot of the 'SPEARS Fitting/Pipe Information' dialog box. The window title is 'SPEARS Fitting/Pipe Information'. The data displayed is as follows:

Part No.	806-005
Description	ELBOW(SXS90)
Size	1/2"
Length (Pipe)	NA
Price (list)	\$1.53

An 'OK' button is located at the bottom center of the dialog box.

Screenshot of the 'SPEARS Fitting/Pipe Information' dialog box. The window title is 'SPEARS Fitting/Pipe Information'. The data displayed is as follows:

Part No.	SCH80-007
Description	PIPE(80SXS)
Size	3/4"
Length (Pipe)	2.45'
Price (list)	\$0.26

An 'OK' button is located at the bottom center of the dialog box.

View of Query dialog box from selecting fitting & pipe

If you receive the error message, “Not a SPEARS[®] linked pipe or fitting” you have probably selected an entity other than a SPEARS[®] generated pipe or fitting. If a fitting or pipe is not linked, you must delete and reinsert.

Reporting / Bill of Materials

The reporting function dynamically returns a summary part included in the drawing. A “Select” button on the report dialog allows user to select individual objects to be included in the report.

Screenshot of the 'Drawing Report' dialog box. The window title is 'Drawing Report'. It displays a summary of fittings and piping used in the drawing.

Fittings						
Part No.	Size	Qty.	Description	Weight(lbs)	Price (list)	
801-007	3/4"	1	TEE(SXSXS)	.17	5.28	
801-005	1/2"	1	TEE(SXSXS)	.11	5.04	
806-005	1/2"	6	ELBOW(SXS90)	.48	10.74	
817-005	1/2"	4	ELBOW(SXS45)	.24	13.52	
806-007	3/4"	2	ELBOW(SXS90)	.24	4.58	
829-101	3/4"X1/2"	2	RED-COUP(SXS)	.12	7.92	
837-101	3/4"X1/2"	1	RED-BUSHING(SFXS)	.02	1.04	
847-007	3/4"	1	CAP(SLIP)	.05	3.33	
Fitting Totals:		18		1.43 lbs	\$51.45	

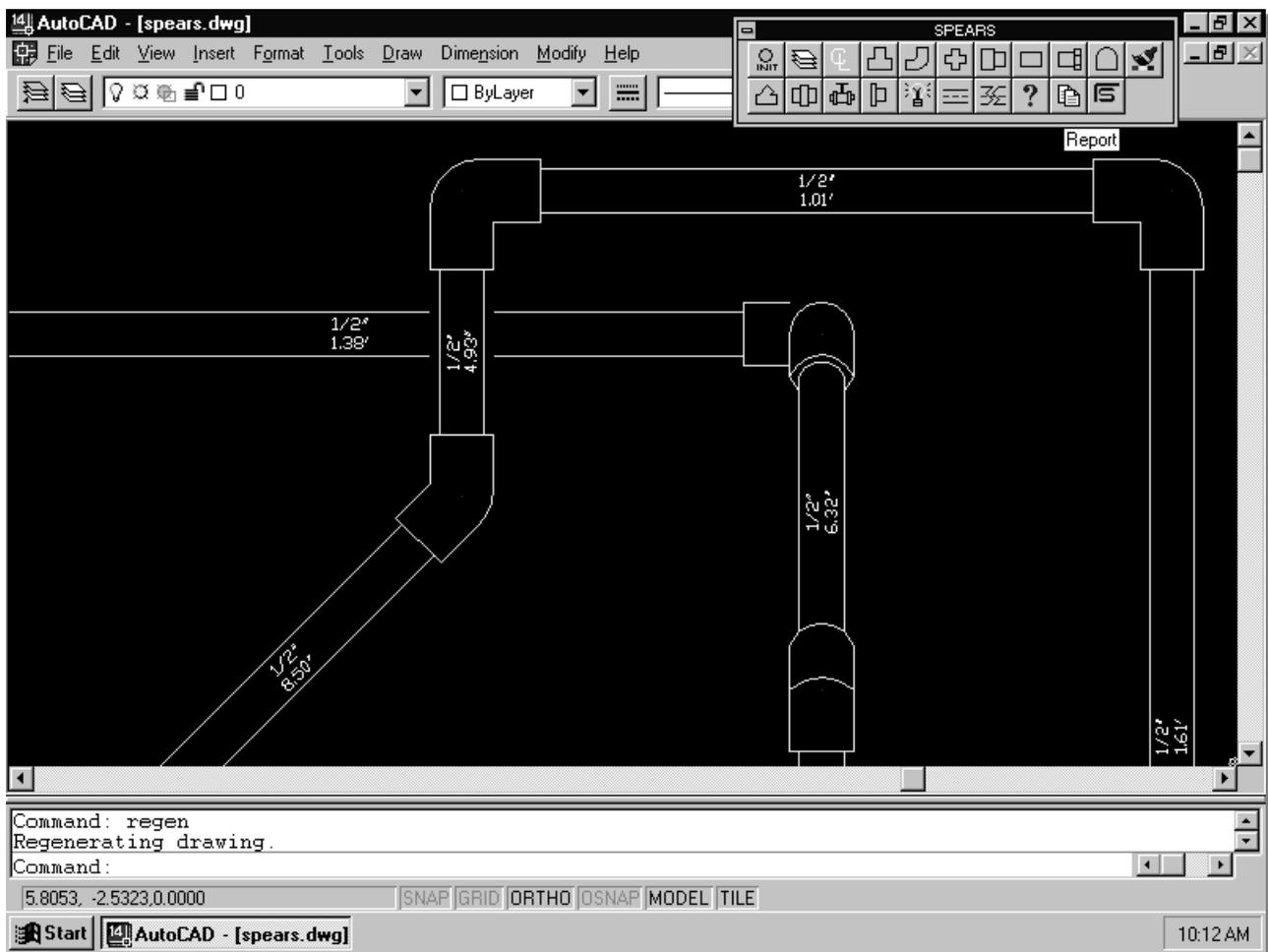
Piping						
Part No.	Size	Qty.	Length(ft)	Volume(gals)	Weight(lbs)	Price (list)
SCH80-007	3/4"	4	2.75	.06	.75	3.14
SCH80-005	1/2"	11	20.90	.25	4.22	17.76
Piping Totals:		15	23.65 ft	0.32 gals	4.97 lbs	\$20.90

Buttons: Pipe Labels, Erase Labels, Select, Overall Wt/Cost: 6.40 lbs \$72.35, U.S. (selected), Metric, \$VAL, OK, Print.

Report dialog

The report cost listings are based on the price-list database available and may **NOT REFLECT THE CURRENT ACTUAL PRICE**. Please contact a SPEARS® Representative for the actual, or the latest, price list.

The report dialog has a “**Pipe Label**” button that will create a text entity or label directly on the pipe group entity. The label shows the size and length of the pipe in both Metric or US system. This feature in conjunction with the pipe summary listed in the report dialog, gives the user a good idea of how much pipe will be needed for the piping system. The illustration below shows a partial area of a process piping layout with labels.



Partial piping system layout with pipe labels

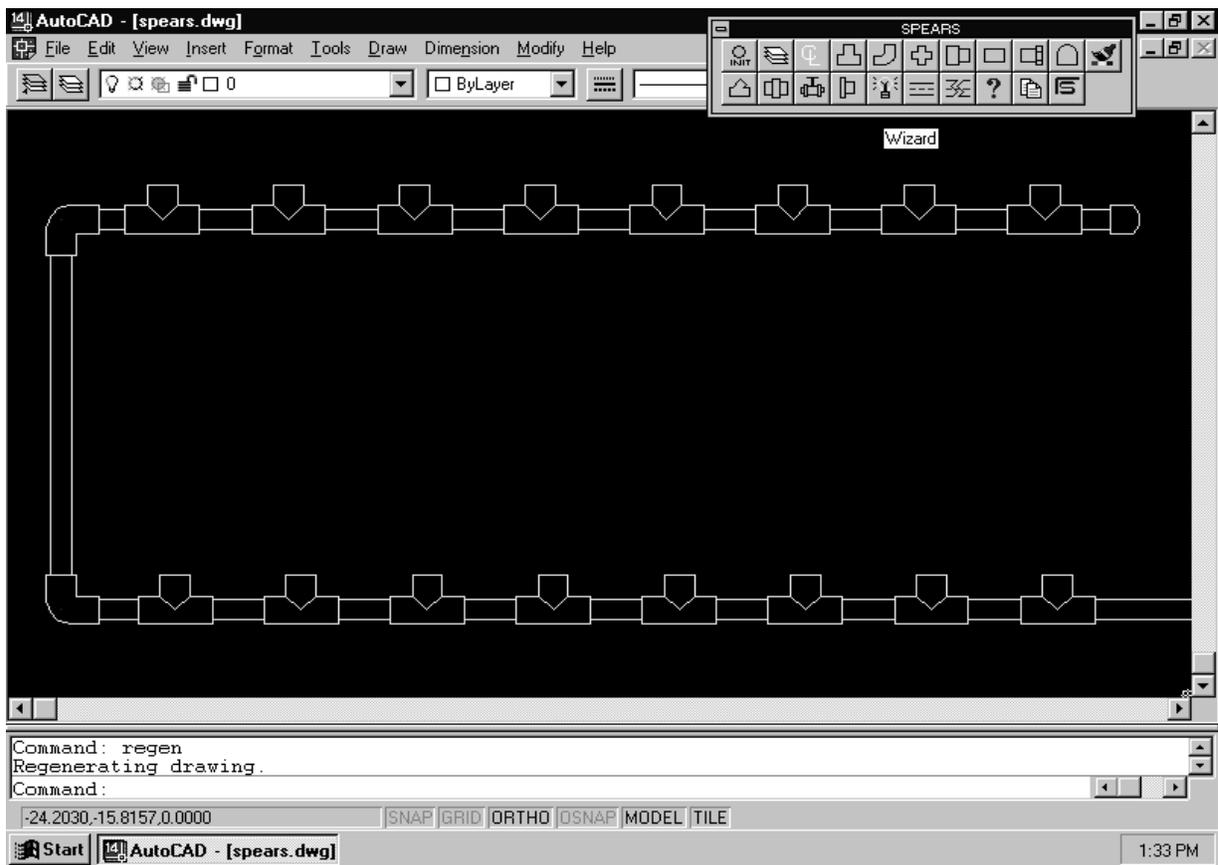
The report dialog also contains an “**Erase Labels**” button to delete/remove the pipe labels if they are not needed. A layer has also been created (**SPEARS_L**), which can be frozen or shut off. If the pipes are modified in length (stretched) or deleted from the drawing the “**Pipe Label**” utility **should be rerun** in order to have accurate size and lengths. The pipe label text entity is not part of the pipe group.

Drawing Wizard

A drawing “**Wizard**” utility has been provided to simplify the drawing of SPEARS® fittings and pipe. The drawing wizard allows user to place a series of fittings and connecting pipe automatically in one operation. So far, to create a SPEARS® fitting and piping schematic, construction lines are first drawn, then the fittings are placed along the construction lines. Pipe is then connected to the existing fittings. The Drawing Wizard allows you to select an existing fitting to become the default fitting. It will then prompt you in the command line “**Select fitting location (Enter to change fitting):**”. By placing the fitting, it will automatically copy the last selected fitting and connect pipe between the existing fittings. You may also select the “Enter” option which will allow you to change the default fitting. The fitting change can be selected from the SPEARS® toolbar. Now the new fitting will be placed and a pipe will be connected. This allows the user to place fittings and pipes dynamically and change the fittings on-the-fly.

This Wizard utility however can only be used in one UCS at a time when working in 3D mode. The Wizard must be re-started again when the UCS is changed or selected.

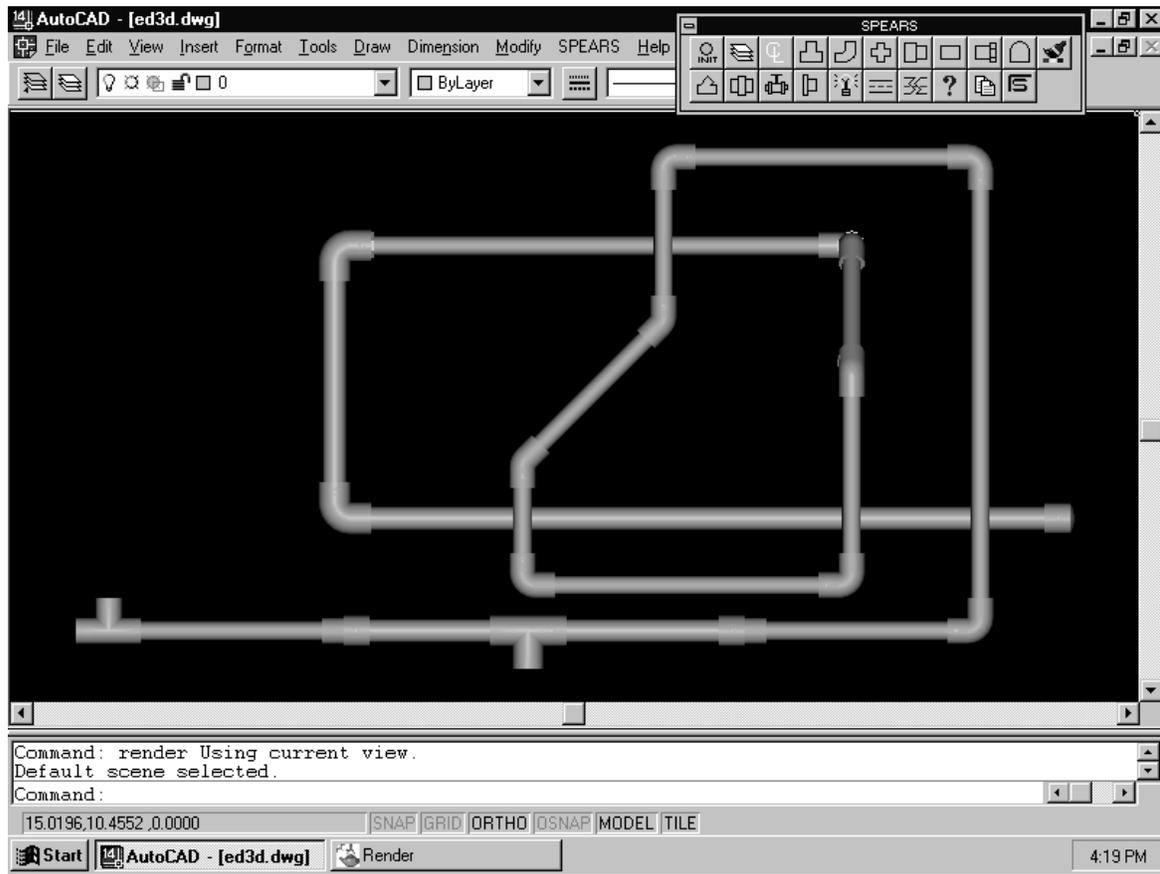
The following illustration below is an example of a fitting created by the “Wizard” button



Array of fittings created by Wizard

3D Pipe and Fitting Layout

The illustration below shows the previous 2D piping system layout drawn in 3D.



3D representation of pipe and fitting layout

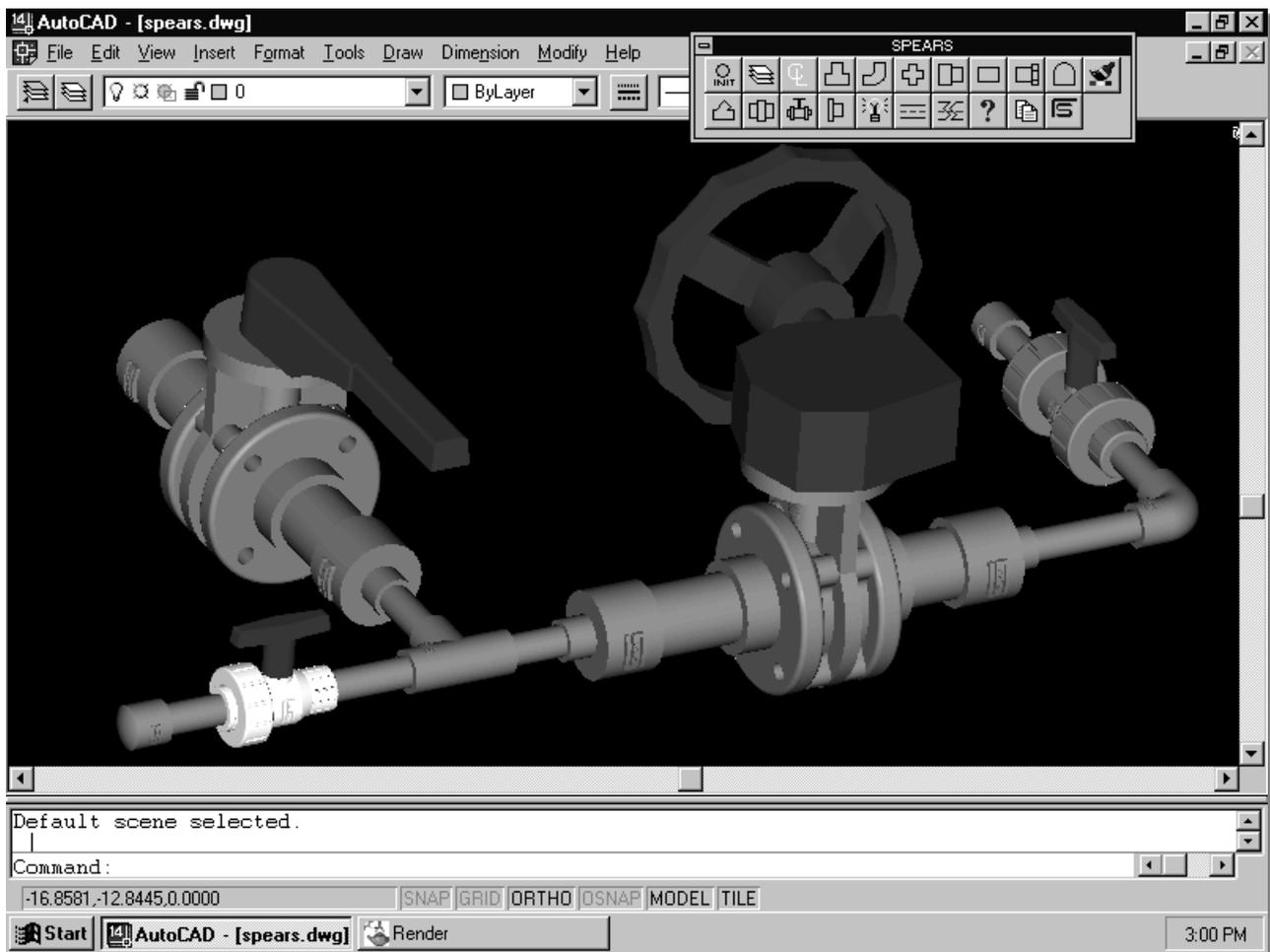
The SPEARS[®] toolbar has a Render button which activates the standard AutoCAD[®] Render command. This was used for the illustration above and printed in black and white. You will get a real life representation when viewing on your monitor or plotting with color capabilities.

Besides the rendering capabilities, the 3D layout offers space planning to be more accurate since you are working in true 3D space. You no longer need to develop separate plan, section and elevation drawings, as one 3D drawing layout can accomplish all views.

Laying out 3D fittings and pipe is essentially the same as the previous 2D demonstration. A 3D radio button on each SPEARS® dialog enables the placement of 3D fittings and pipe. Once selected, the 3D fittings may be placed anywhere on a drawing or on previously created construction lines. The fittings are represented as AutoCAD® blocks made up of 3D solid entities. Some valves have been assigned materials to represent the actual color of the valve parts, however most use the default rendering color of the layer the fitting resides on. In other words, when rendering the fittings, the pipe color will depend on what color has been assigned to the layer they reside on.

NOTE : *Since SPEARS® 3D fittings contain AutoCAD® 3D solid entities the drawing file size may become very large.*

Using the same tools as in the previous 2D demonstrations we can add any SPEARS® fitting available and have access to the “Query” and “Report” features shown earlier. This is the real power of the 3D environment. The illustration below expands on our previous example to show the advantages of a 3D drawing environment.



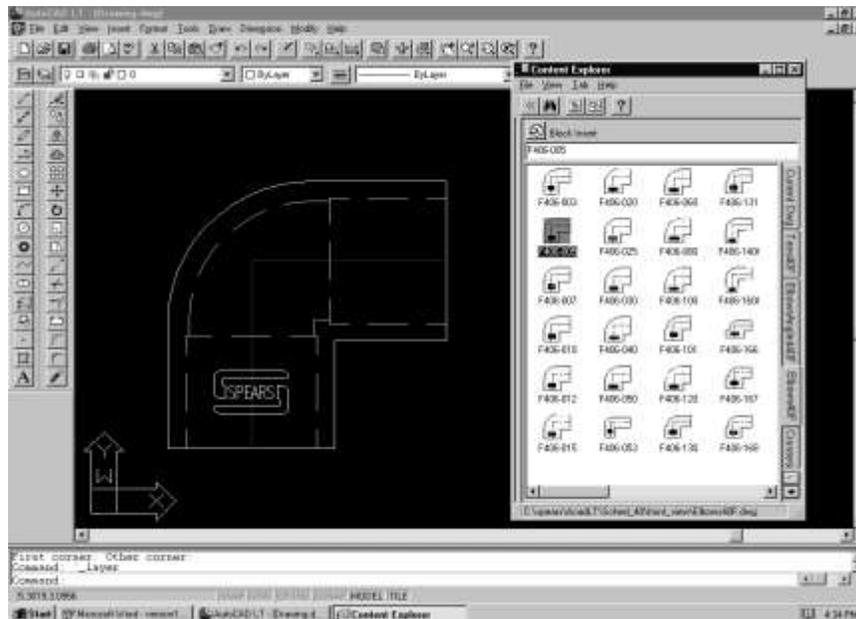
3D SPEARS® Process Pipe and Fitting Layout

AutoCAD® LT (All versions)

Setup and User Guide

SPEARS® has provided AutoCAD® drawing blocks which represent various SPEARS® products and sizes which can be used with AutoCAD LT series. These Blocks of library are supplied in *.SET files and can be accessed through the **Content Explorer** or **AutoCAD® Design Center** submenu which is part of AutoCAD® utility used to manage external blocks. To load the SPEARS® Block Library:

- Start **AutoCAD®** and select from the **INSERT** ribbon menu and find “**Design Center**” or issue a command **ADC** or **ADCENTER** at ACAD command line.
- A docking Content Explorer / Design Center dialog will open.
- Navigate to the **C:\SPEARS\AcadLT** directory and select the fitting product group.
- Select the required view: **Front**, **Side** or **Top** view by expanding the [+] symbol.
- Select the fitting of choice e.g. **Adapter**, **Bushing**, **Elbow**, etc.
- Expand the [+] symbol and select the **Blocks** icon. The block definitions will now be generated automatically on the right side windows.
- The tabs on the right side of the dialog represent the different size SPEARS® fittings. Selection of the appropriate tab will display the desired fitting view. The blocks are named according to SPEARS® part numbering system. A letter is placed before the part number to indicate view. For example the front view of a ½” Soc x Soc 90 degree elbow would be F406-005. Once the desired fitting block is selected it can be placed on a drawing by dragging it into the drawing. New Tab sets can be created or SPEARS® existing **Tabset** files can be modified as desired.



2D Library Block Fitting Placement Using Acad Design Center

MicroStation®

SETUP and CONFIGURATION

The SPEARS® Cell Library for Microstation® will work for Microstation® V8, SE, J and Powerdraft. Placement of SPEARS® fittings is accomplished by selecting the desired fitting from the various SPEARS® toolbars. Some basic configuration is required to obtain access to the SPEARS® fitting cell library toolbars.

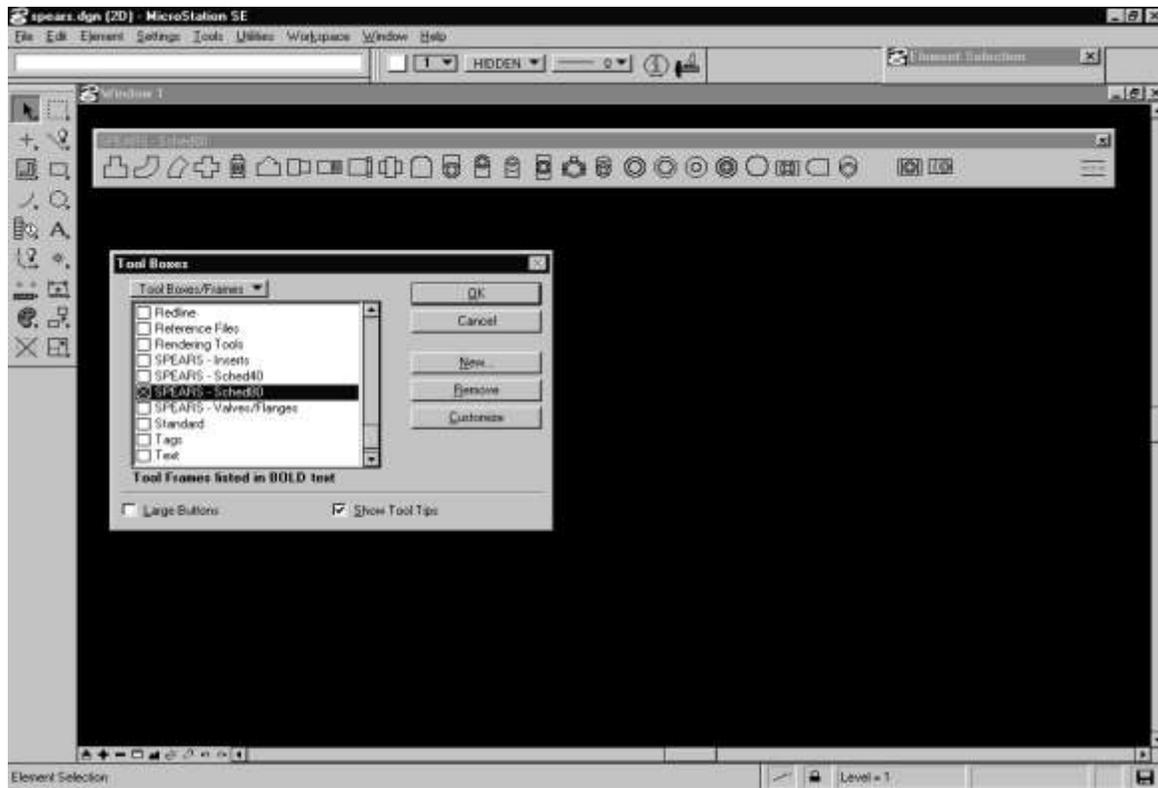
- Using Windows Explorer copy the folder **C:\SPEARS\MICROSTATION\SPEARS_CFG** to the WSUI directory where Microstation® was installed.
- For example, if Microstation® SE was installed using the default installation parameters on the C: drive of your computer, then you would copy the **SPEARS_CFG** folder to **C:\WIN32APP\USTATION\WSUI**. For Microstation® J User, the **SPEARS_CFG** file is copied to **C:\BENTLEY\WORKSPACE\INTERLACED\MICROSTATION**.
- If Powerdraft was installed using the default settings then you would copy the **SPEARS_CFG** folder to **C:\WIN32APP\DRAFT\WSUI**. Your installation may vary so check with your System Administrator.
- Copy the resource file **C:\SPEARS\MICROSTATION\SPEARS_CFG\SPEARS.RSC** to the directory **C:\WINAPP32\USTATION\WSMOD\DEFAULT\SYMB**. Again, the location and name may vary according to Microstation® product and directory path. For Microstation® J User, the resources file is copied to **C:\BENTLEY\WORKSPACE\PROJECTS\98001\SYMB**. (Please note that The 98001 subfolder has to be manually created.)
- Start Microstation® and from the “**Microstation Manager**” dialog select the “**Interface**” pull down button and select “**SPEARS_cfg**”. Open the desired drawing or create a new one.
- From the “**Element**” pull down menu select “**Attributes**”.
- From the “**Style**” pull down menu select “**Custom**”.
- From the “**Line Styles**” dialog click on “**CENTER**” and “**HIDDEN**”. This will enable the line styles that are used in the SPEARS® Fitting Cell Library.

Note: The SPEARS® Software Cell libraries are 2D drawing based on Working Unit settings of: “ft” for Master Units, “in” for Sub Units, 12 in per ft Resolution, and 8000 Pos Units per inch.

SPEARS® Pipe & Fitting Layout Software for Microstation®

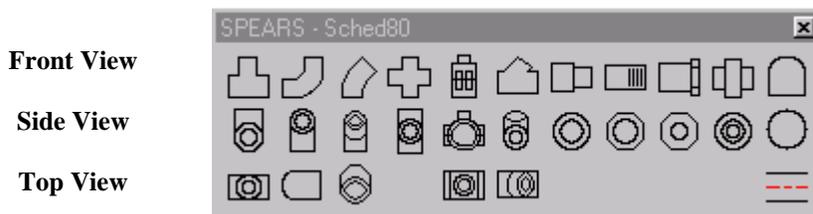
User Guide

A placement of SPEARS® fittings is accomplished by selecting the desired fitting from the various SPEARS® toolbars. The SPEARS® toolbars can be accessed by selecting “**Tool Boxes...**” from the Microstation® “**Tools**” pull down menu. Scroll down the “**Tool Boxes**” dialog to the SPEARS® section. You can then select the desired Tool Box. The illustration below shows the SPEARS® – Sched80” tool box selected.



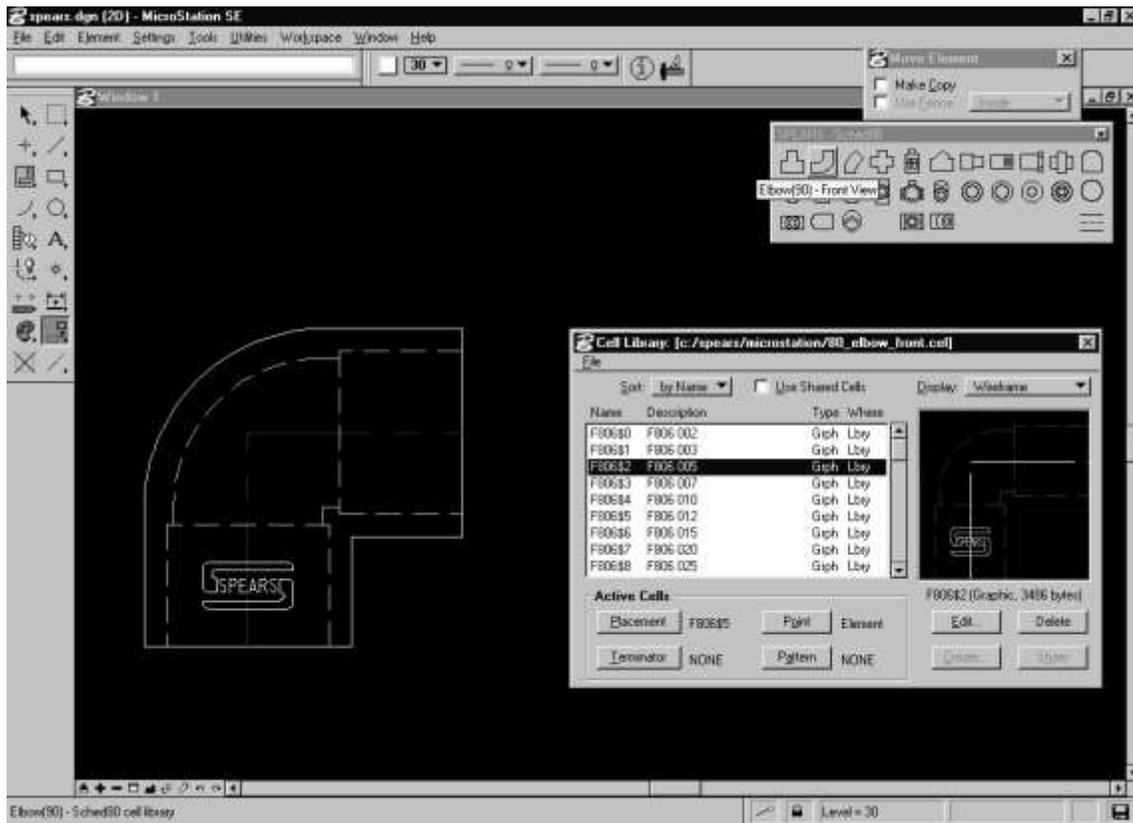
Selecting Schedule 80 Tool Box from Microstation® Tool Box Dialog

Notice in the example above the tool bar is shown horizontally across the screen. Since SPEARS® Cell Libraries represent 2D fittings, different views (Front, Side and Top) have been included. It is ideal to reshape the toolbar to three rows so each fitting’s Front, Top and Side View align.



Reshaping toolbar to align fitting views.

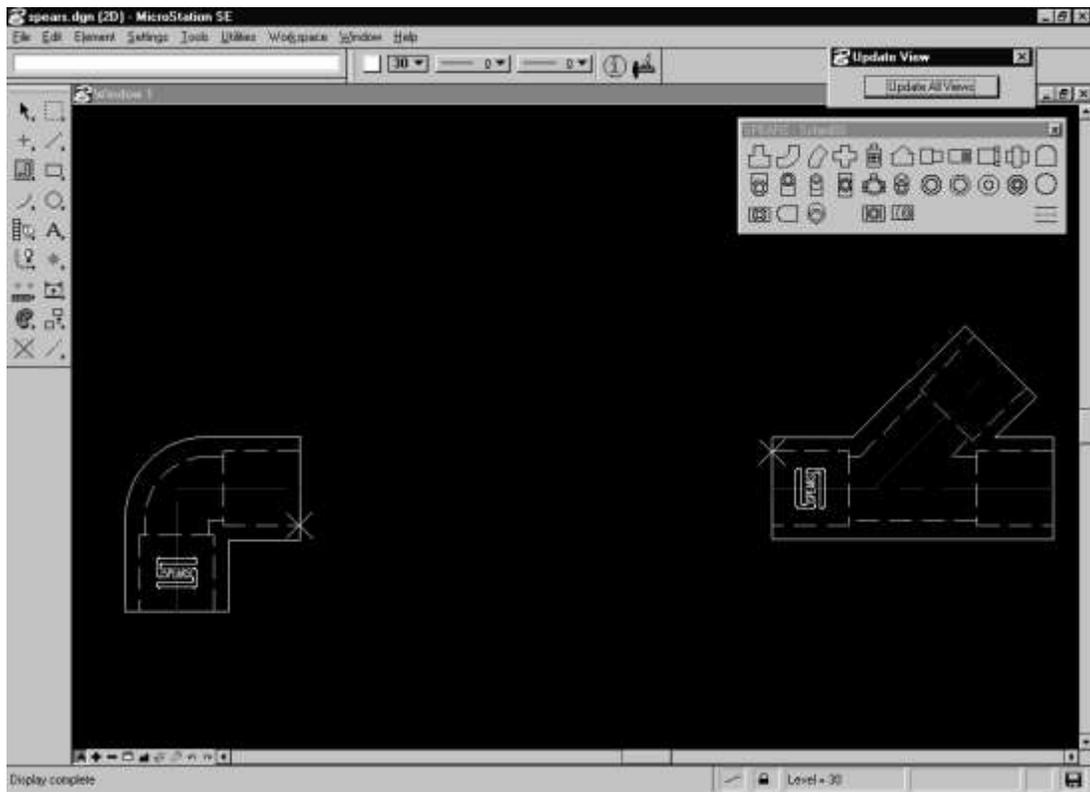
A placement of SPEARS[®] fitting is accomplished by selecting the desired fitting from the SPEARS[®] Toolbar. Once selected the Cell Library Management dialog will appear. You can then choose the appropriate fitting by double clicking the correct part number which is depicted in the “**Descriptions**“ column. Contact SPEARS[®] to get a product catalog which will facilitate selecting the correct type and fitting size.



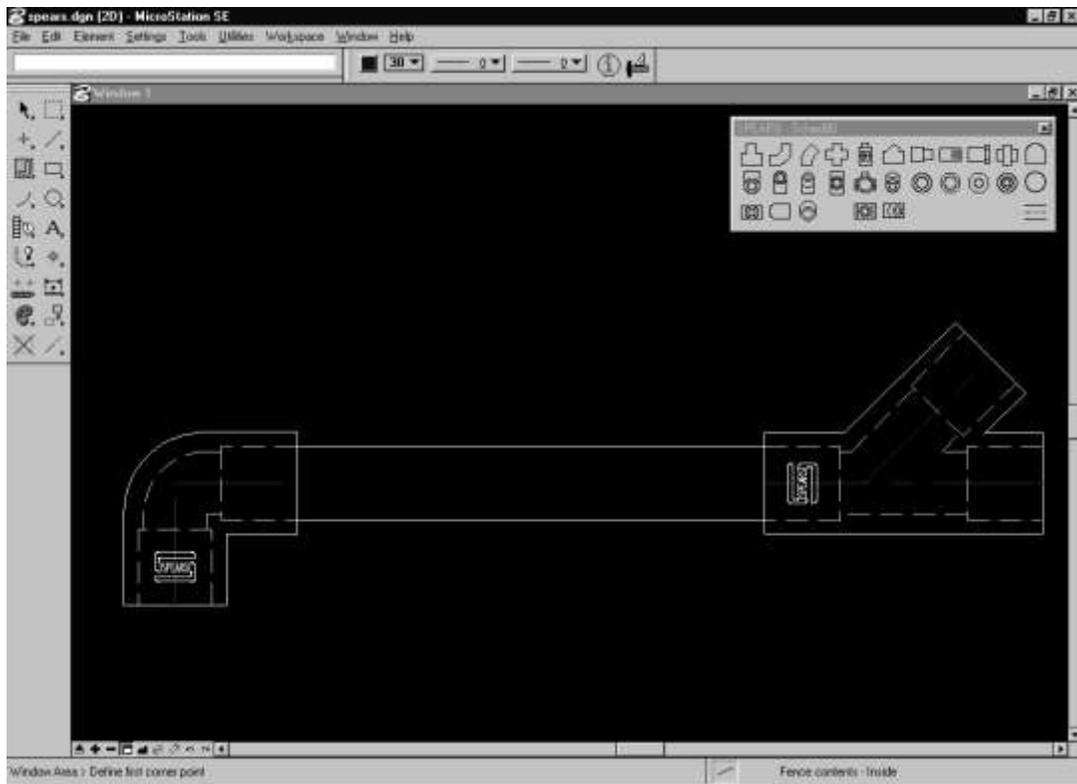
Placing SPEARS[®] Fitting Cell in Microstation[®]

Once SPEARS[®] fittings have been placed, pipe can be placed between fittings by selecting the Pipe Placement tool. This tool is actually referencing the native Microstation[®] Place Rectangular Block tool. Once selected, the diagonal corners of the pipe are selected at the SPEARS[®] fitting socket entry.

The next illustration shows two fittings that are to be connected with pipe. The “X” designations show the socket entry points the user will select when placing the pipe.



Placing pipe between SPEARS® fittings



Result of placing pipe between SPEARS® fittings

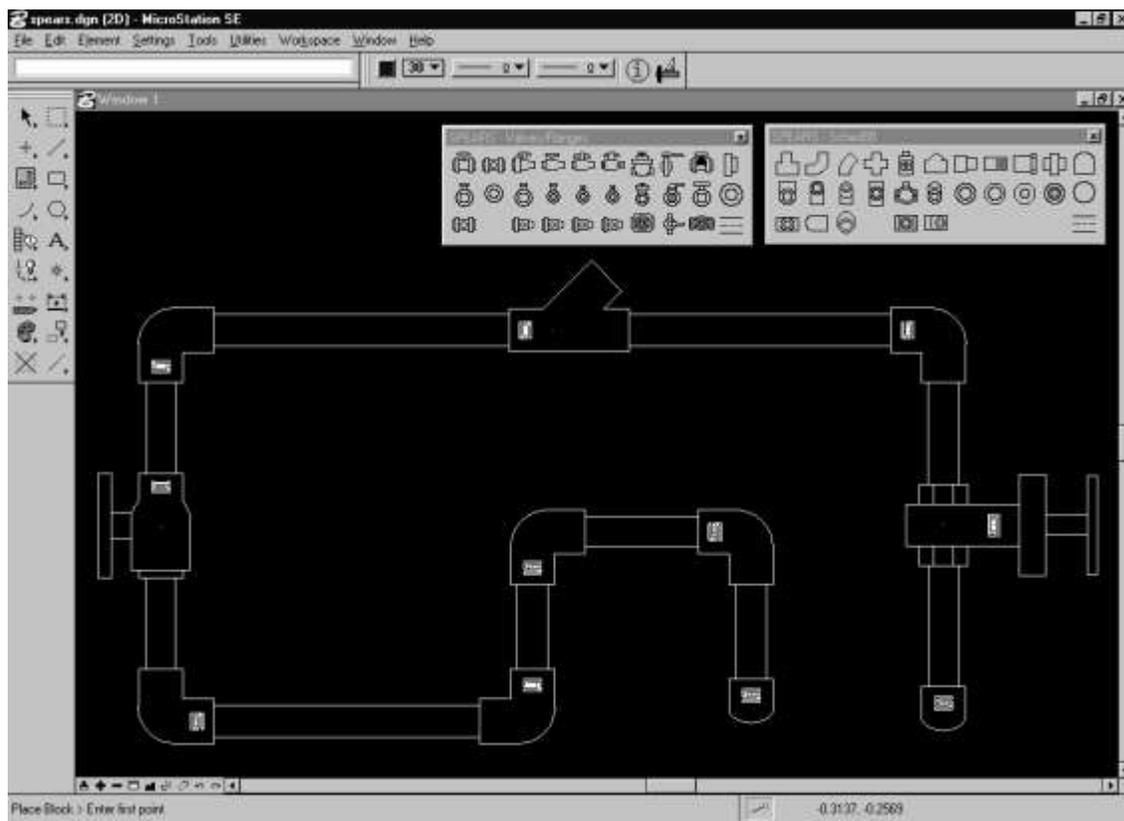
By using the standard Level Utility, the hidden socket lengths, waterways and centerlines can be turned off. The three levels mainly used for SPEARS® fittings are as follows:

Level 2 - Main Fitting outline

Level 3 - Fitting centerline designation

Level 4 - Socket depth/waterway hidden lines

A complete process piping system layout is shown below with fitting centerlines (level 3) and fitting socket depths/waterways (level 4) shut off.



Completed SPEARS® 2D Process Pipe and Fitting Layout



SPEARS® MANUFACTURING COMPANY • CORPORATE OFFICE

15853 Olden St., Sylmar, CA 91342 • PO Box 9203, Sylmar, CA 91392
(818) 364-1611 • www.spearsmfg.com



PACIFIC SOUTHWEST

15860 Olden St.
Sylmar (Los Angeles), CA 91342
(818) 364-1611 • (800) 862-1499
Fax (818) 367-3014

ROCKY MOUNTAIN

4880 Florence St.
Denver, CO 80238
(303) 371-9430 • (800) 777-4154
Fax (303) 375-9546

UTAH

5395 West 1520 South
Salt Lake City, UT 84104
(303) 371-9430 • (800) 777-4154
Fax (303) 375-9546

SOUTHEAST

4205 Newpoint Pl. Suite 100
Lawrenceville (Atlanta), GA 30043
(678) 985-1263 • (800) 662-6326
Fax (678) 985-5642

MIDWEST

1 Gateway Ct., Suite A
Bolingbrook (Chicago), IL 60440
(630) 759-7529 • (800) 662-6330
Fax (630) 759-7515

NORTHWEST

4103 C St. NE Suite 200
Auburn (Seattle), WA 98002
(253) 939-4433 • (800) 347-7327
Fax (253) 939-7557

SOUTH CENTRAL

4250 Patriot Dr. Suite 300
Grapevine (Dallas), TX 76051-2317
(972) 691-4003 • (800) 441-1437
Fax (972) 691-4404

NORTHEAST

590 Industrial Dr. Suite 100
Lewisberry (Harrisburg), PA 17339-9532
(717) 938-8844 • (800) 233-0275
Fax (717) 938-8547

FLORIDA

9563 Parksouth Court
Orlando, FL 32837
(407) 843-1960 • (800) 327-6390
Fax (407) 425-3563

INTERNATIONAL SALES

15853 Olden St.
Sylmar (Los Angeles), CA 91342
(818) 364-1611 • Fax (818) 898-3774