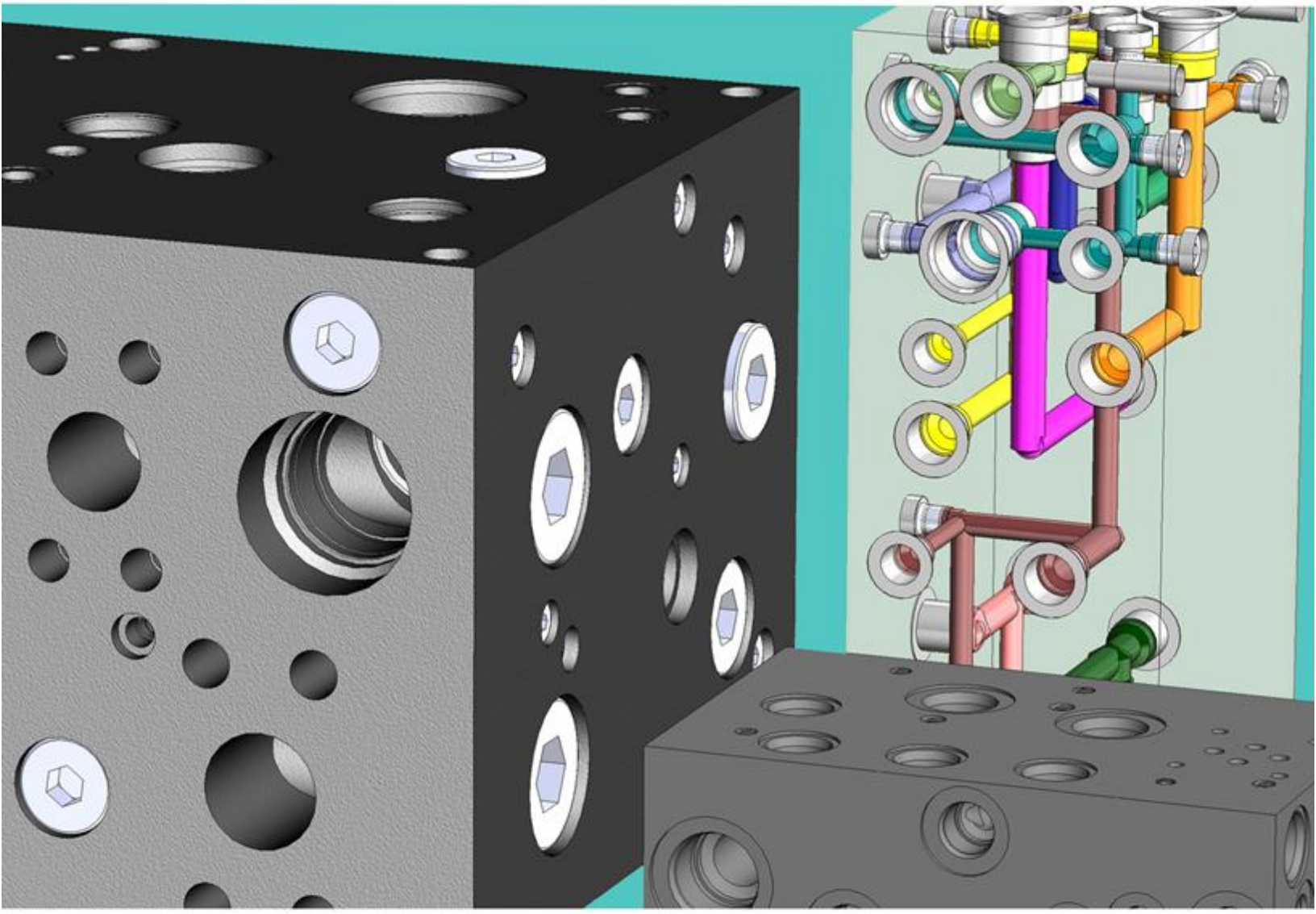
MDTools®
Library Manager 2016
User Manual



VESTA

MDTools® Library Manager 2016

manifold design database

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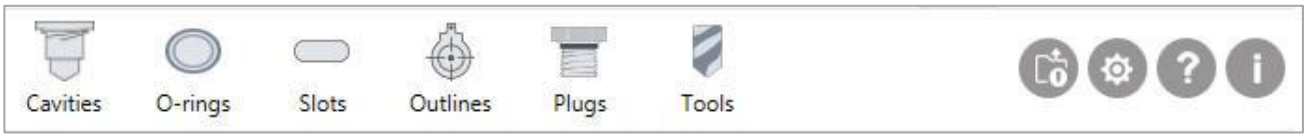
Contents

1. Introduction

MDTools® Library Manager enables you to create and manage Cavities, Libraries, O-rings, Slots, Outlines, Plugs and Tools.

MDTools Library Manager 2016



MDTools Library Manager 2016 Ribbon

Cavities: Customize the cavity data in MDTools® libraries, per your specific requirements.

O-rings: Add, edit, or delete the O-ring, O-ring groove and Counterbore data, per your specific requirements.

Slots: Add, edit, or delete the slot data, per your specific requirements.

Outlines: Create, modify, and store valve assembly outlines.

Plugs: Assign the Valve model for cavities in your library to facilitate automatic assembly in MDTools.

Tools: Add, edit, or delete the standard tool data, per your specific requirements.

Import Cavity: Import cavities or footprints from other MDTools Cavity libraries into your library.
Import new cavities added in the MDTools Cavity library into your cavity library.

Options: Define MDTools Cavity library path, Units and Plug Model Library location and path.

Help: Open the MDTools Library Manager 2016 user manual in .pdf format.

About Library Manager: The About MDTools® Library Manager dialog box displays the current MDTools Library Manager's release and build number.

2. Installation

Install MDTools Library Manager 2016 using the installation program.
The installer creates all required directories and installs the MDTools® Library Manager on your system.

1. System Requirements

- Microsoft Windows XP/Windows Vista Business/Windows7/Windows 8/Windows 10 (64 Bit).
- Microsoft .NET Framework 4 or higher.

2. Software Installation

1. Insert the MDTools CD-ROM (Inventor/SolidWorks version) in the CD drive of your system.

If Auto-run is not set, then:

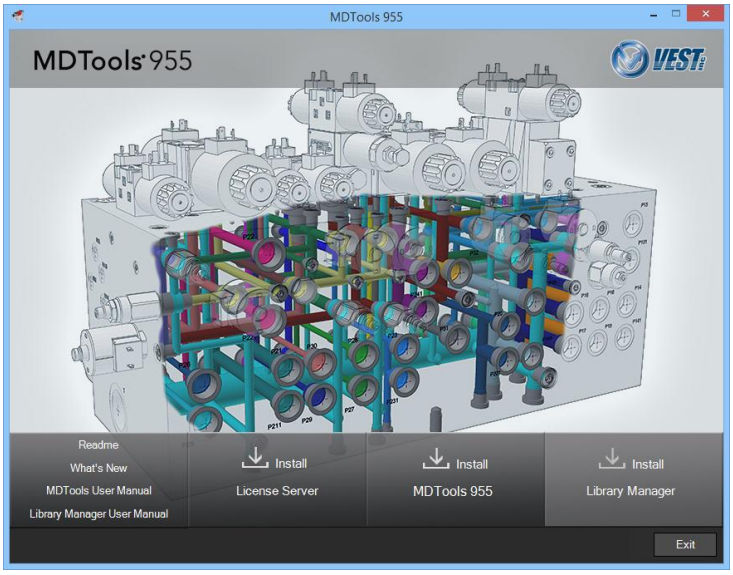
1. Launch the Setup program. Windows **Start**>**Run...**> Browse**...** (Browse to E:\ MDToolsStart.exe assuming E is your CD drive).

2. Select **MDToolsStart.exe**.

3. Click **Open**.

4. Click **OK**.

   The MDTools dialog box displays.



MDTools 955(64-Bit Edition) Installation Wizard

Install MDTools Library Manager 2016

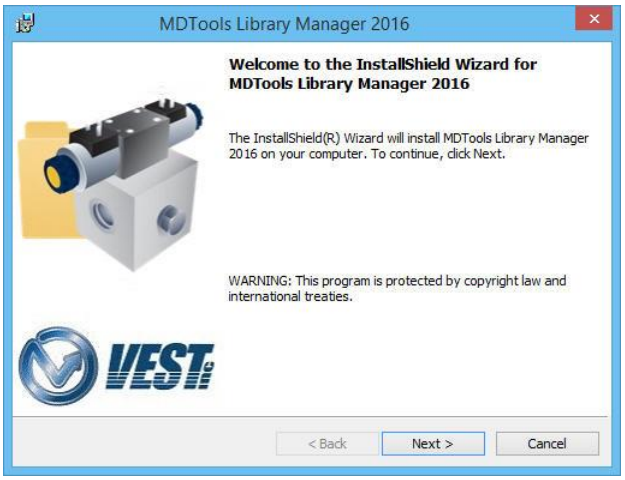
1. Click **MDTools Library Manager 2016**.

   The MDTools Library Manager 2016 Installation dialog box displays.

2. Respond to all the setup program prompts.

   The MDTools Library Manager is installed on your system.

2. The installation program automatically creates the required directories in your system.



MDTools Library Manager 2016 Installation dialog box

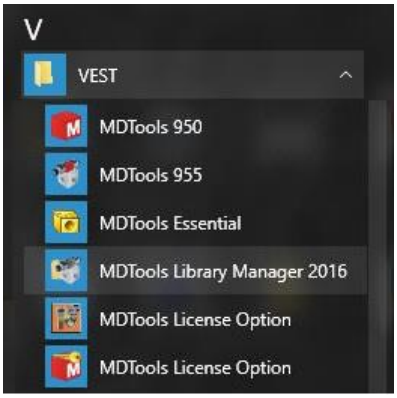
3. Open MDTools Library Manager 2016

1. Click the MDTools Library Manager 2016 icon on your desktop to run the program.

   You can also run the program by selecting the MDTools Library Manager 2016 option from the Windows Start Menu program.

2. Start > All Apps
   > VEST
   > MDTools Library Manager 2016
   The MDTools Library Manager 2016 displays.

MDTools Library Manager 2016 Icon

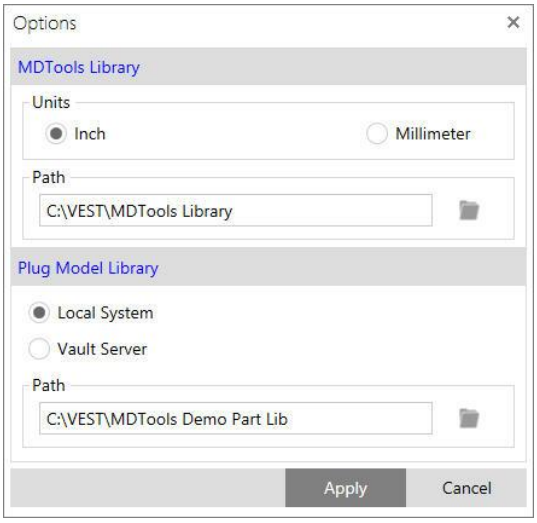


MDTools Library Manager 2016 in Programs Menu

NOTE:
MDTools Library Manager 2016 can run independent of MDTools, i.e. you can run this program without installing or running MDTools.

4. Options

Define MDTools Cavity library path, Units and Plug Model Library location and path.



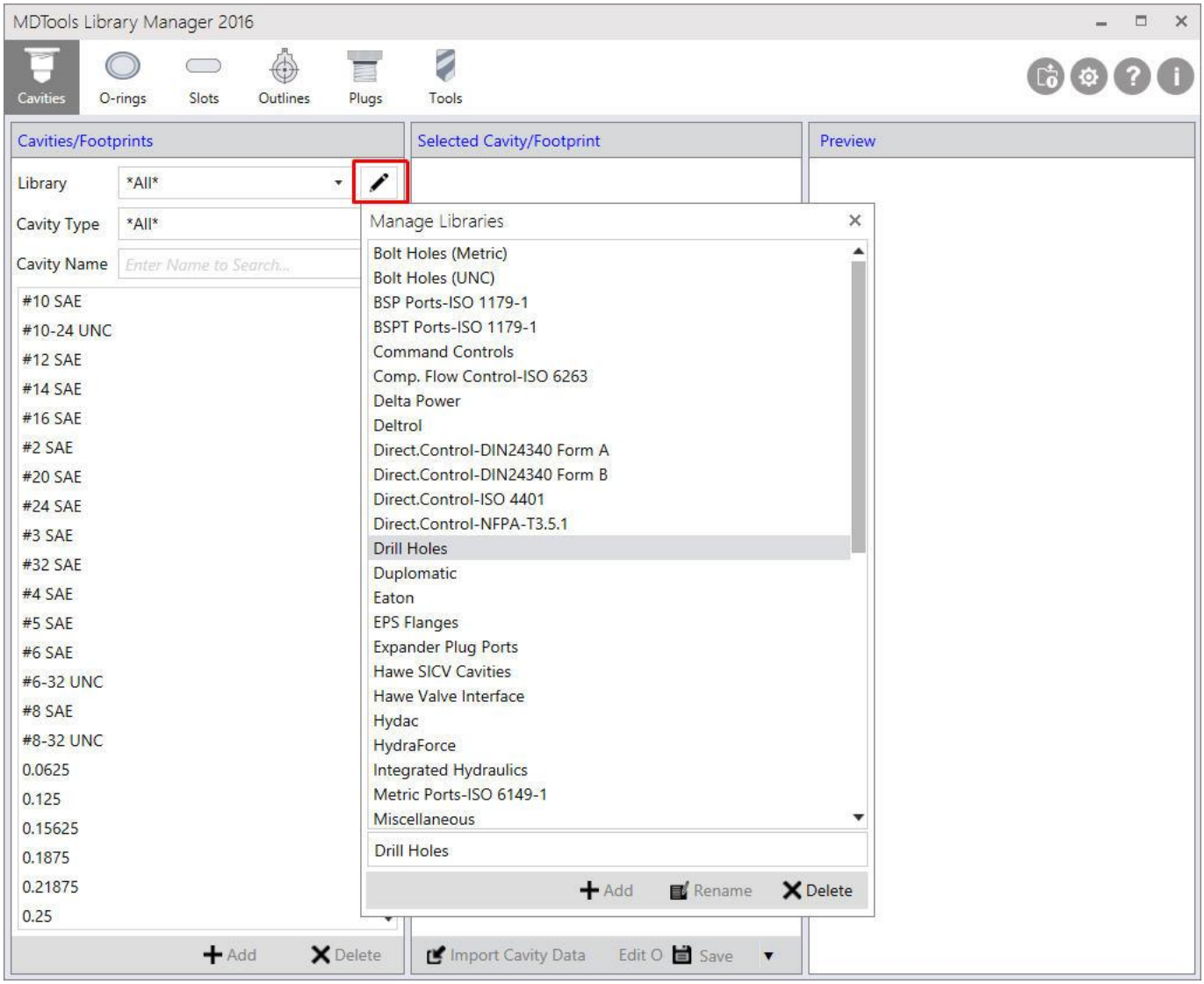
MDTools Library Manager Options

3. Manage Libraries

1 Add a Library

2 Rename a Library

3 Delete a Library



1 Adding Library

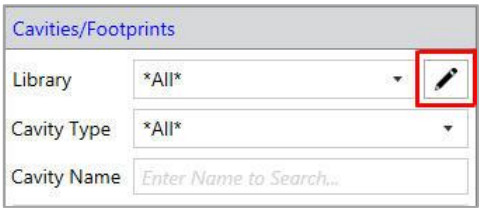
1. MDTools® Library Manager ribbon
   > **Cavities**
   > ***Manage Libraries*** *option*

   The Mange Libraries dialog box displays.

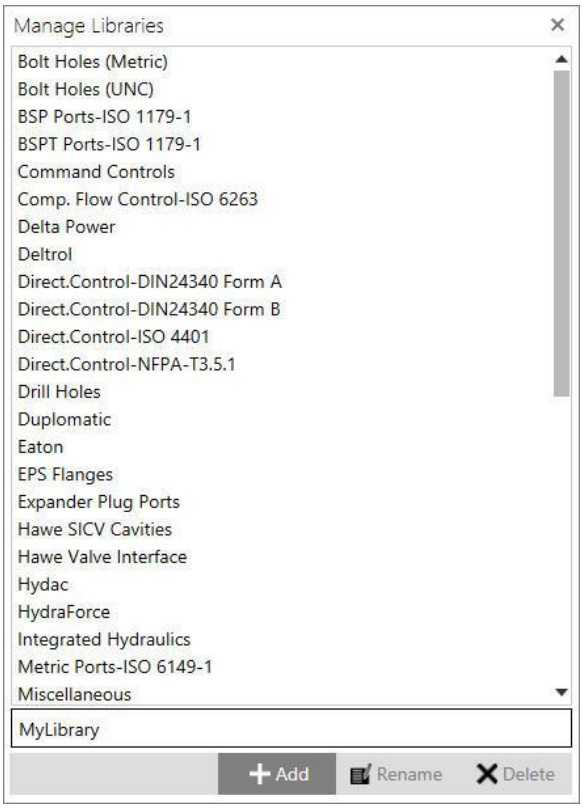
2. Enter the new library name in the text box provided below the Libraries' list.
3. Click **Add**.

   A new library is added to the existing libraries.

   The new library name displays in the Manager Libraries listing.



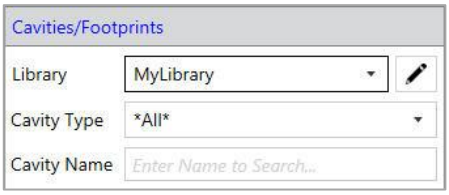
Manage Libraries option



Manage Libraries dialog box

NOTE:

- If the unit setting is Inches in Options, then the library is added to the Inch libraries (InchVESTMDToolsLibrary.mdb).
- If the unit is set to MM in Options, then the library is added to the Metric libraries (MMVESTMDToolsLibrary.mdb).
- When the library is added, you can add cavities/footprints into the library using the **Add** option in the Cavity/Footprint section.
- Added library automatically appears in the Library dropdown in the Cavity/Footprint section.



Cavities/Footprints section

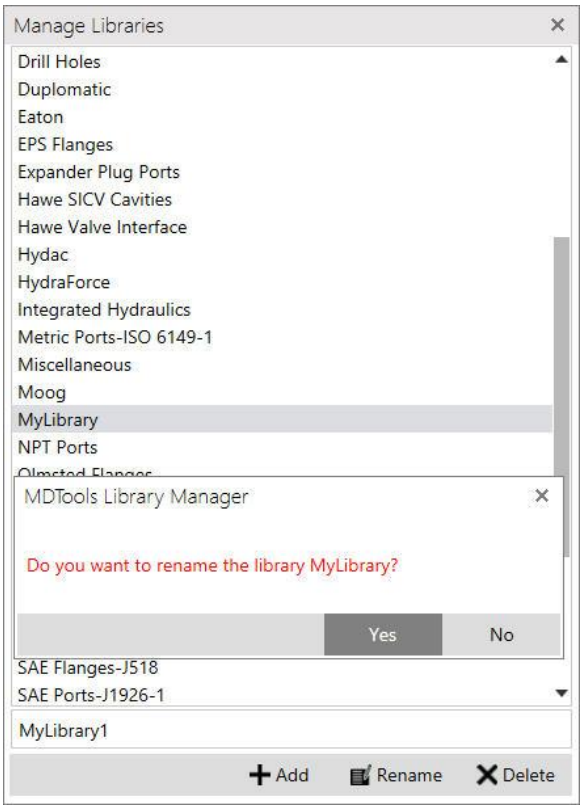
2 Renaming Library

1. MDTools® Library Manager ribbon
   > **Cavities**
   > ***Manage Libraries*** *option*

   The Mange Libraries dialog box displays.
2. Select the library you want to rename.
3. Enter the new name in the text box below the list of library names.
4. Click **Rename**.

   A message box displays.
5. Check the library name mentioned in the message box to make sure that the correct library is selected for renaming.
6. Click **Yes** to rename the library.

   The library is renamed and the new name displays in the Manage Libraries list.



Renaming the library

3 Deleting Library

1. MDTools® Library Manager ribbon
   > **Cavities**
   > Manage Libraries option

   The Mange Libraries dialog box displays.

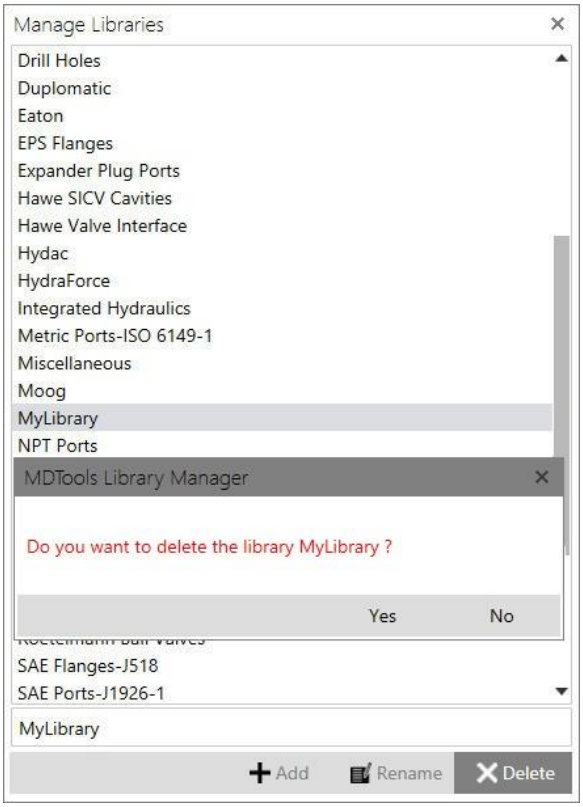
2. Select the library you want to delete.
3. Click **Delete** to delete the library along with all its contents.

   A message box displays.

4. Check the library name mentioned in the message box to make sure that the correct library is selected for deletion.
5. Click **Yes** to delete the library.

CAUTION!

A library, once deleted, cannot be recovered



Deleting the library

4. MDTools Cavities

*In MDTools®, all types of holes used in a manifold are called **Cavities**.*

An MDTools cavity can be a drill hole, a port (SAE ports, BSP ports, NPT ports, etc), a cartridge valve cavity, a bolt hole, locating pin hole, or an undercut.

Modeling Cavities

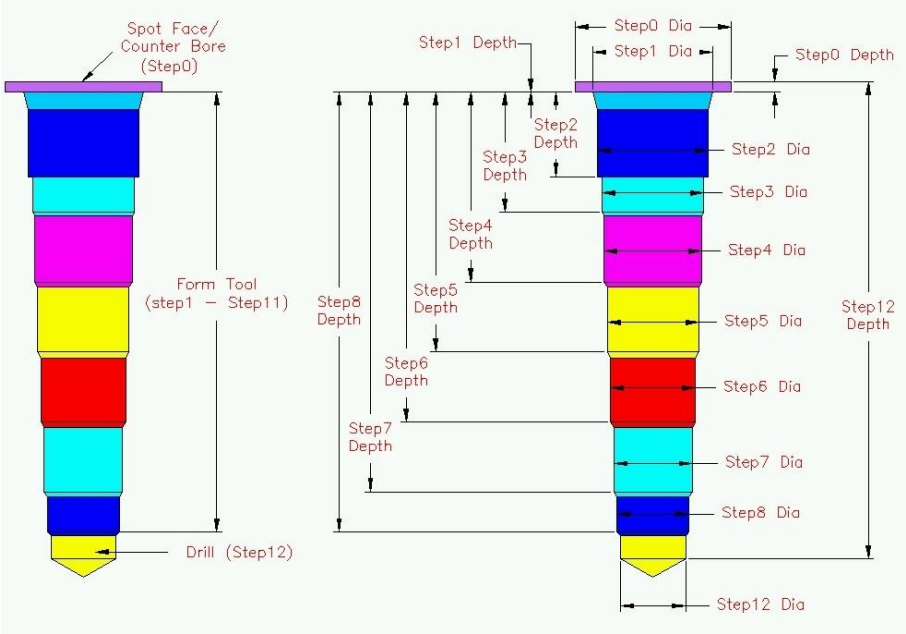
Geometry of a cavity is defined in terms of its dimensions, and its relationship with the step number and step dimensions.

Each step, which consists of cylindrical and/or a conical pair, in the cavity profile is denoted by the term 'Step' in MDTools.

Step information is analogous to a drill tool, which has the drill diameter, drill depth, and bottom cone angle of the drill.

Note:

- Depth for Step1 through Step11 is measured from Step0.



MDTools Cavity Geometry

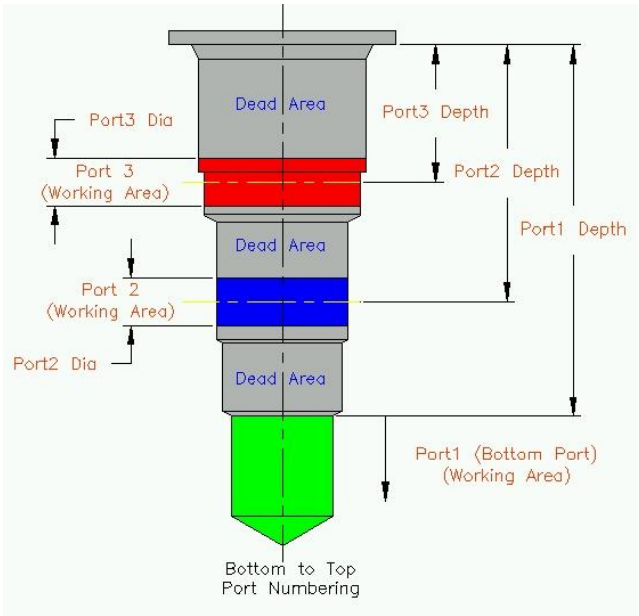
1. Cartridge Valve Cavities

Cartridge valve cavities are divided into working areas (port areas) and dead areas.

All parts of a cavity other than the port areas are considered as Dead Areas.

Note:

- Bottom port depth of a cartridge valve cavity is the starting depth of the bottom port from the spot face.



Typical 3-port Cartridge Valve Cavity

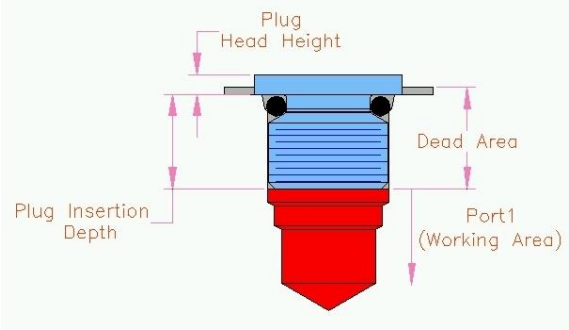
2. Ports

Cavities of ports are divided into working and dead areas.

Area of a cavity below the insertion depth of plug/fitting is considered as Working Area. Area of a cavity down to the insertion depth is considered as Dead Area.

Note:

- For port cavities, the plug insertion depth must be specified.
- If not specified, the complete cavity is included in the working area during connectivity and wall thickness checks.

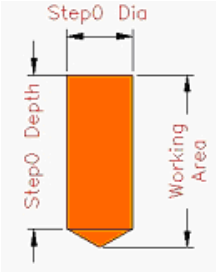


Port Cavities

3. Drill Holes

The complete cavity is treated as Working Area.

Hole dimensions are entered in Step0 of the cavity.



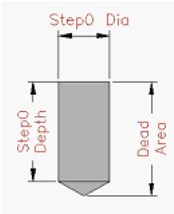
Drill Holes

4. Locating Pin Holes

The complete cavity is treated as Dead Area.

Hole dimensions are entered in Step0 of the cavity.

All the dimensions are fixed.



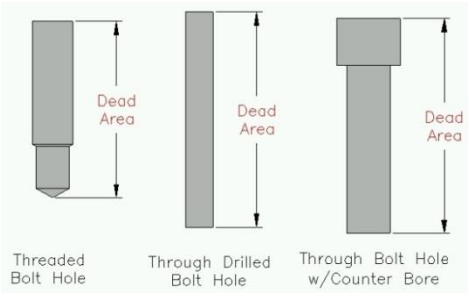
Location Pin Hole

5. Bolt Holes

The complete cavity is treated as Dead Area.

Three variations of bolt holes are used in manifold design.

- Threaded Bolt Hole
  (for mounting components on manifolds and for mounting manifolds)
- Through Drilled Bolt Hole
- Through Bolt Hole with Counter Bore
  (for mounting manifolds)



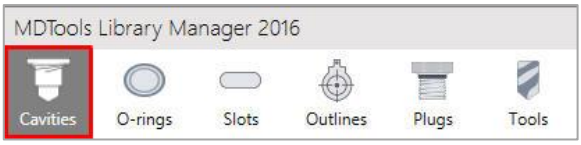
Bolt Holes

5. Cavities

Add, modify and delete library data and cavity data in the Cavities section.

1. MDTools Library Manager ribbon
   > **Cavities**
   The Cavities/Footprints section displays.

2. Perform the following operations from the Edit Cavity Library dialog box:
   - Add New library
   - Delete an existing library
   - Rename an existing library
   - Add cavities/footprints to the library
   - Modify cavities/footprints in the library
   - Delete an existing cavity/footprint



MDTools Library Manager: Cavities

NOTE:

- You can edit both the Inch and Metric unit libraries as per Units option selected in Options command.
- Do not edit the cavity library manually using the Microsoft Access; always use the MDTools® Library Manager program to edit the library.
- Microsoft Access is not required to edit the cavity library. You can edit the cavity library using the MDTools' Cavity Library program even though Microsoft Access is not installed on your machine.
- All cavities used in the manifold should be available in the MDTools' Cavity Library. You cannot create a cavity inside the MDTools program, if it is not available in the library.
- Two separate databases, one for Inch and the other for Metric units used to store the data.
- The Inch library is stored in the Microsoft Access database file named, InchVESTMDToolsLibrary.mdb and the Metric library is stored in MMVESTMDToolsLibrary.mdb.

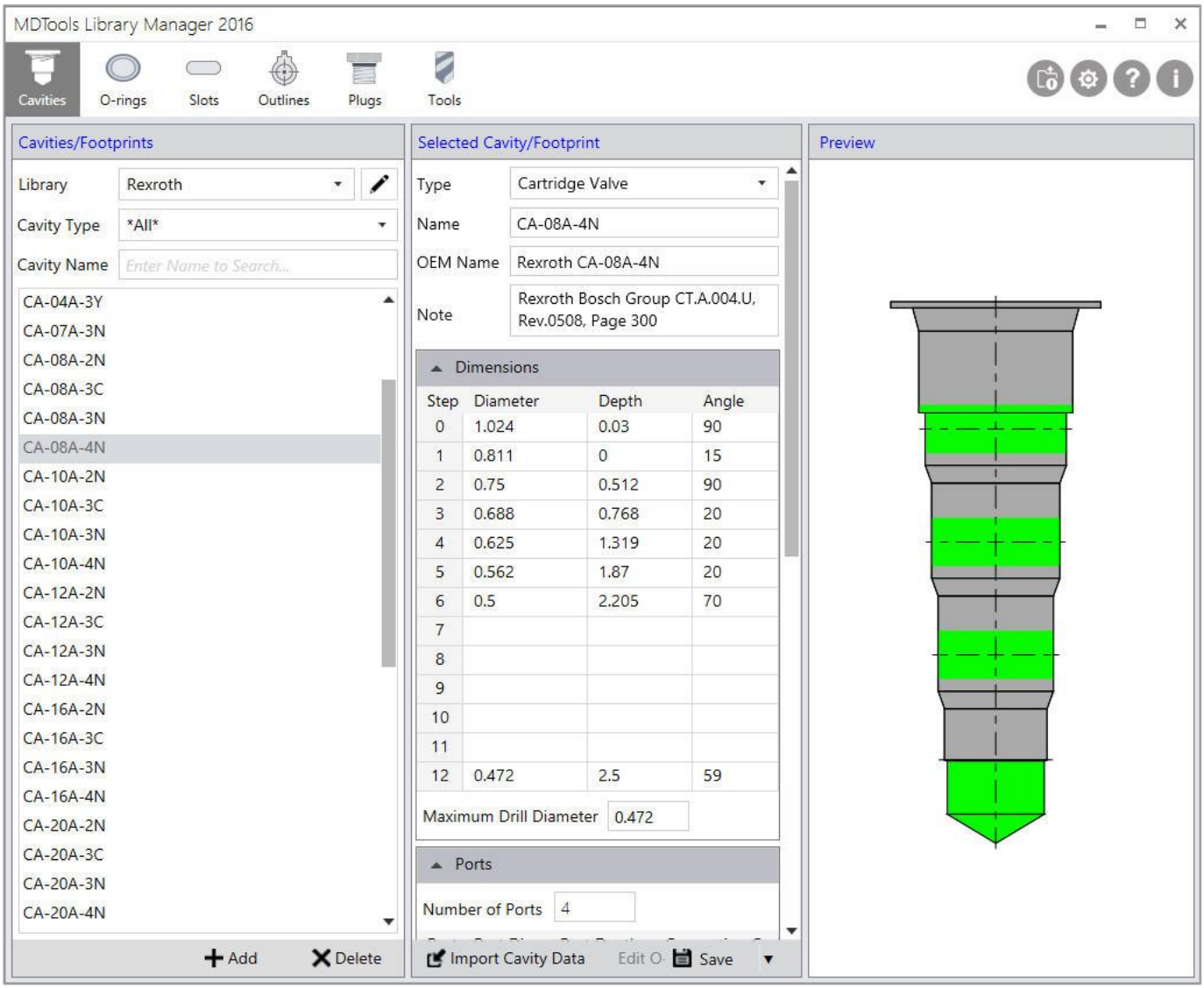
  These files are located in the root (installation) directory of MDTools Library.

  Share the cavity library over a network in your group by specifying the location of the library in the Options dialog box.
- Use Options to change the library path and units.

6. Create Cavities

Create cavities that are not available in the MDTools® Cavity Library and add these cavities into the library.

You can not create a cavity inside MDTools, if it is not available in the library; i.e. the cavity you want to use on the manifold must be available in the MDTools Cavity Library.



Adding/Modifying a Cavity

Add a new cavity/footprint into the library or modify an existing cavity/footprint.

1. MDTools® Library Manager ribbon > **Cavities**

   The Cavity/Footprints section displays.

2. Select a library to add or modify a cavity.

   *By default *All* is selected.*

   The Add button is enabled when a library is selected.
   Only cavities in the selected library displays in the Cavities/Footprints list.

3. Select **Cavity Type**.

   By default *All* is selected.
   All cavities in the selected library display in Cavities/Footprint section.

   Cavities of selected types display in the Cavities/Footprint section.

   Note:
   If there is no cavity of selected type in the library, then the Cavity Type option automatically changes to *All*.
   MDTools Library Manager displays all cavities in the selected library.

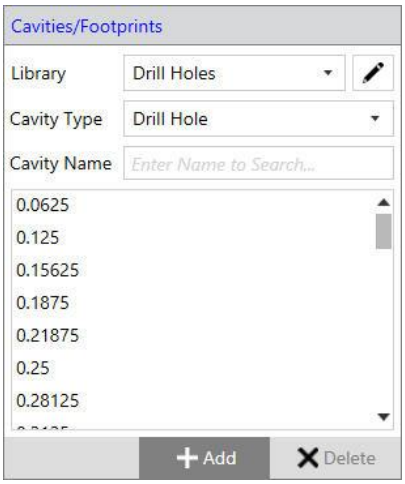
4. Click **Add** to add new cavity.

   Or

   Select a cavity from the Cavities/Footprint list to modify a cavity.

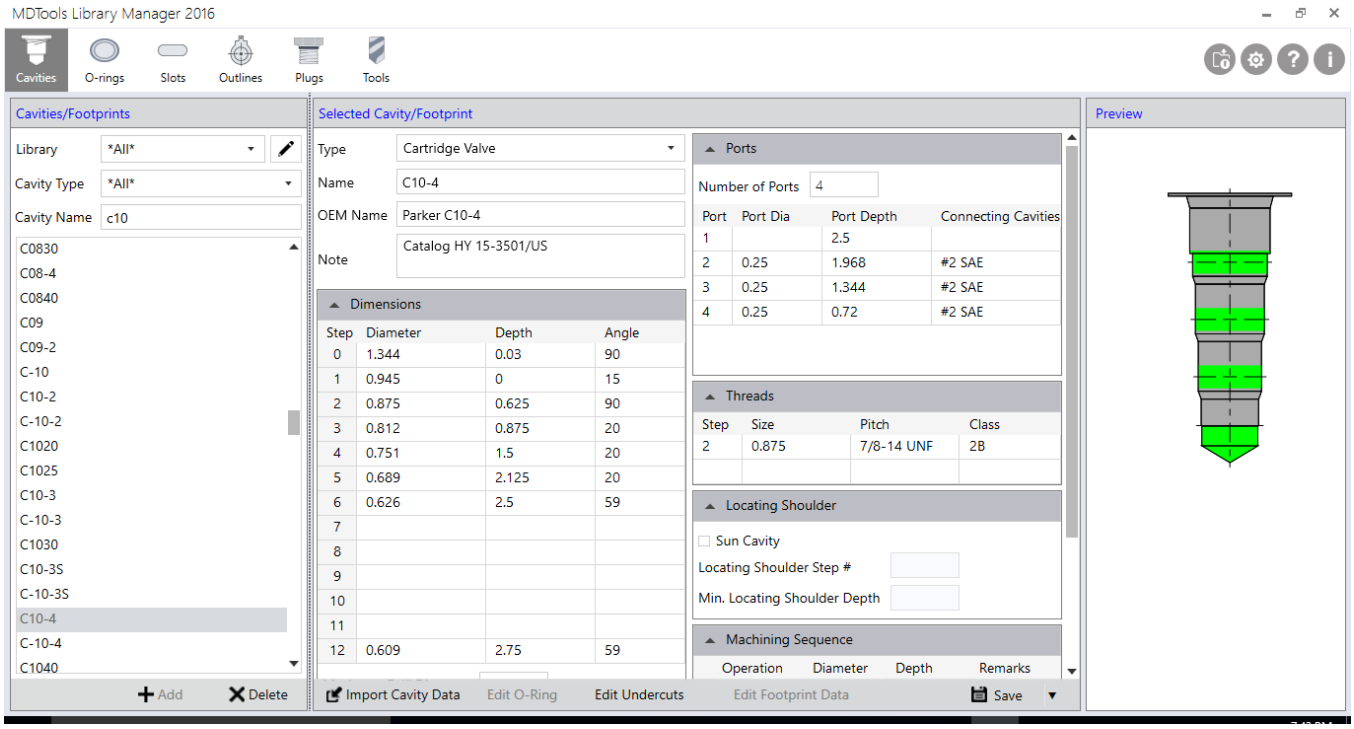
   Note:
   Search a cavity by entering few letters of the cavity name in the **Cavity Name** text box. MDTools Library Manager searches only the cavities listed in the Cavities/Footprint list.

   The Selected Cavity/Footprint section displays.



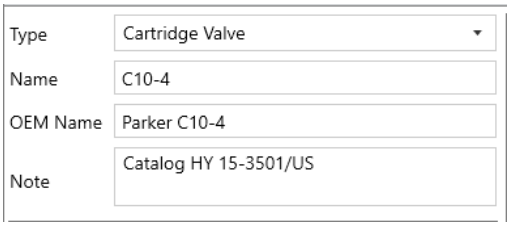
Cavities/ Footprints List

Selected Cavity/Footprint section



Selected Cavity/Footprint section for new cavity

The Selected Cavity/Footprint section includes:



1. **Type**

   Select **Cavity Type**.
   The five different type of cavities in MDTools® are:

   - Cartridge Valve Cavity
   - Port
   - Drill Hole
   - Bolt Hole
   - Flange
   - Interface Pattern

2. **Name**

   Name of the cavity to be displayed in the Cavity/Footprints list and the Insert Cavity dialog box.

3. **OEM Name**

   Name of the OEM and name of the cavity/footprint used by the OEM to identify the cavity.

4. **Note**

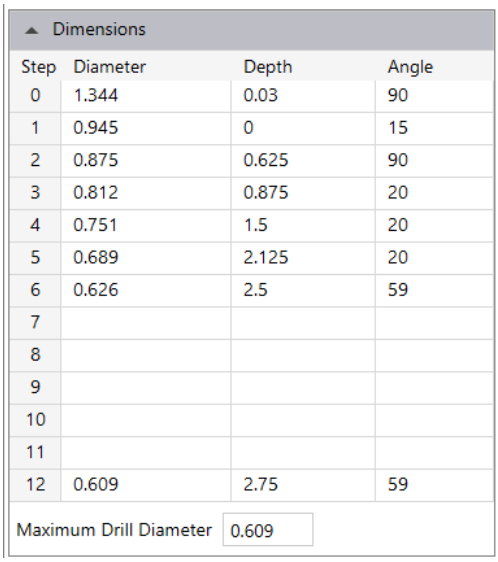
   Enter any notes about the cavity.

5. **Dimensions**

   Step0 through Step12 for entering the cavity geometry dimensions.
   Pilot drill dimensions should be entered in Step12.

6. **Maximum Drill Diameter**

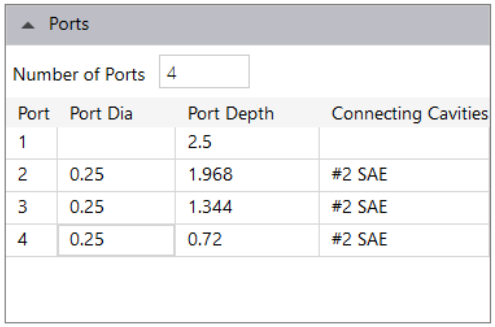
   Enter the maximum drill diameter allowed for the cavity.



Dimensions

7. Ports

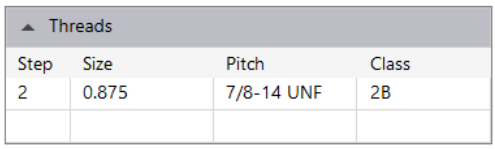
Enter the cartridge valve port dimensions and locations.



Ports

8. Threads

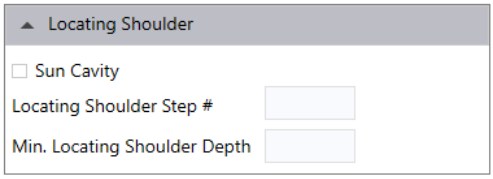
Enter the thread details for the cavity.



Threads

9. Locating Shoulder

Enter the Locating shoulder details, if applicable.

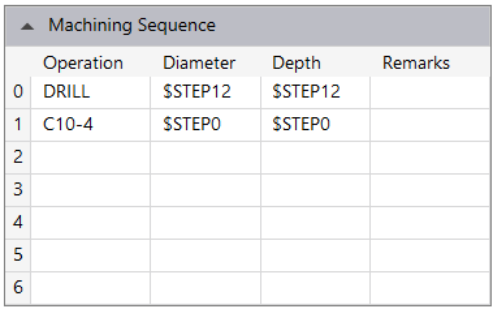


Locating Shoulder

10. Machining Sequence

Enter the cavity machining details.

Maximum number of operations in a cavity is seven.



Machining Sequence

11. Plug Detail

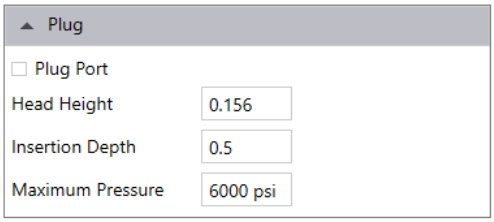
Enter the plug head height, plug insertion depth, and the plug maximum pressure rating.

12. Import Cavity Data

Imports other cavity data to this cavity.

13. Edit Undercuts

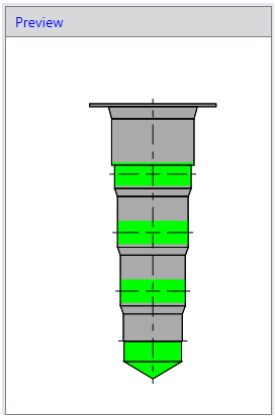
Store the details of Mandatory and Optional Undercut for the Cartridge Valve cavity.



Plug

14. Preview

Shows the preview of the cavity.



Preview

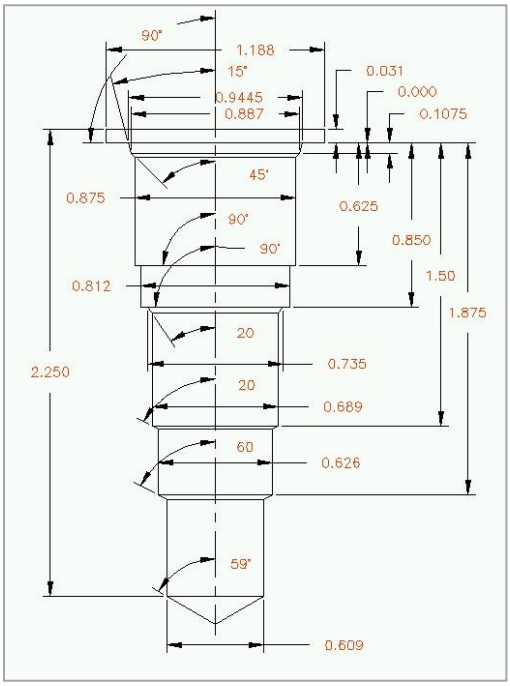
7. Create New Cavities

1 Cavity Geometry and Machining Details

2 Cartridge Valve Port Details

3 Undercut Details

4 Plug Details



1 Cavity Geometry and Machining Details

1. Select **Library**.
2. Select **Cartridge Valve** as cavity Type .
3. Click **Add** below the Footprint/Cavity Name list in the Cavity/Footprint section.

   The Selected Cavity/Footprint section displays with empty fields.

4. Select **Cartridge Valve** from the drop-down list of the cavity type.

   Select

5. Enter the name **C10-3**.

   This name displays in the Cavity Name list.

6. Enter the **OEM** name.
   For example, Parker C10-3
7. Enter the **note**.
   For example, Catalog HY 15-3501/US
8. Enter the cavity dimensions.

   Drill (last step in the cavity) dimensions is mandatory for Step12.

9. Enter the maximum drill diameter for the cavity.

   This data is used to ensure that the drill diameter in a design does not exceed maximum allowable value for a cavity.

Type: Cartridge Valve
Name: C10-3
OEM Name: Parker C10-3
Note: Catalog HY 15-3501/US

Dimensions

Step	Diameter	Depth	Angle
0	1.187	0.031	90
1	0.945	0	15
2	0.875	0.625	90
3	0.812	0.85	90
4	0.735	0.85	20
5	0.689	1.5	20
6	0.626	1.875	60
7			
8			
9			
10			
11			
12	0.609	2.2	59

Maximum Drill Diameter: 0.609

Dimensions

10. Enter the thread detail.

    Step number for thread in cavity, size, pitch, and class of thread.

11. Enter the machining sequence.
12. Enter all the machining details required to machine the cavity.
    These details appear in the machining chart.

    Notice that the diameter and depth are specified as '$Step#'. For example, '$Step12' is used for drill diameter and depth.

    The machining information section extracts the drill diameter and depth information from the diameter and depth of Step12 in the Geometry section.

    During design, you can change the diameter and depth. When the Machining chart is created, the tooling information is automatically extracted from the current definition of geometry in the drawing.

Ports

Number of Ports: 3

Port	Port Dia	Port Depth	Connecting Cavities
1		1.875	
2	0.25	1.344	#2 SAE
3	0.25	0.72	#2 SAE

Threads

Step	Size	Pitch	Class
2	0.875	7/8-14 UNF	2B

Machining Sequence

	Operation	Diameter	Depth	Remarks
0	DRILL	$STEP12	$STEP12	
1	C10-3	$STEP0	$STEP0	
2				
3				
4				
5				
6				

Selected Cavity Section: Cavity details

NOTE:

MDTools® displays a preview of the cavity in the preview section as you create the cavity.

2 Cartridge Valve Port Details

1. Enter the port details for all the cartridge valve cavities.
2. Enter the number of ports.

   Enter 3, as there are three ports in this cavity.

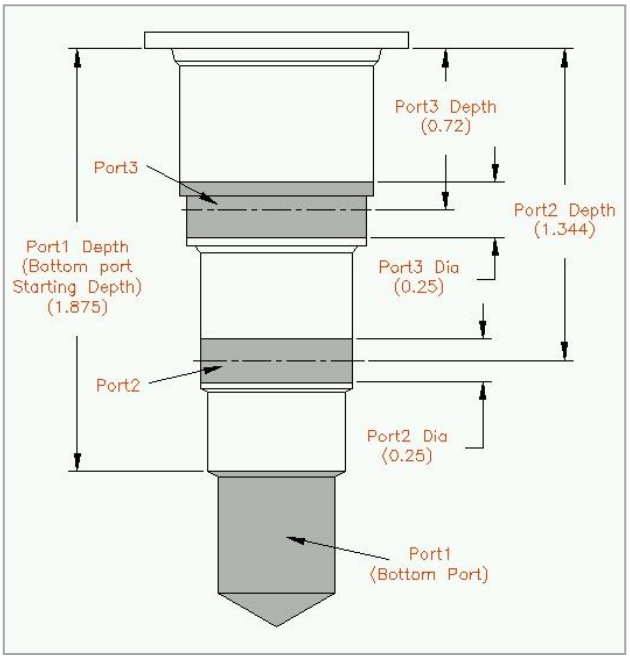
   When you enter the number of ports, all the required port dimensions are enabled automatically.

3. Enter the port details.

   Enter the port number, port diameter, port depth, and connecting cavity name.

   Connecting cavity name is used as a design reference to determine the size of the construction port to be used to make connection with the cartridge valve ports.

   This is very useful, if you are a new manifold designer.



C-10-3 Port Dimensions

NOTE:

- Enter the bottom port detail in the first row.
- Do not enter the bottom port diameter in the cavity.
- The bottom port depth is the starting depth of the bottom port from the spot face of the cavity.
  For all the other ports, the port depth is the depth from the spot face to the center of port.

Ports

Number of Ports 3

Port	Port Dia	Port Depth	Connecting Cavities
1		1.875	
2	0.25	1.344	#2 SAE
3	0.25	0.72	#2 SAE

Selected Cavity/Footprint Section: Port details

4. Click **Save** to save the cavity into the library.

3 Undercut Details

Add, modify and delete undercuts from cavity.

1. Click **Edit Undercuts** at the bottom of the Selected Cavity/Footprints section.

   The Edit Undercuts dialog box displays.

Edit Undercuts

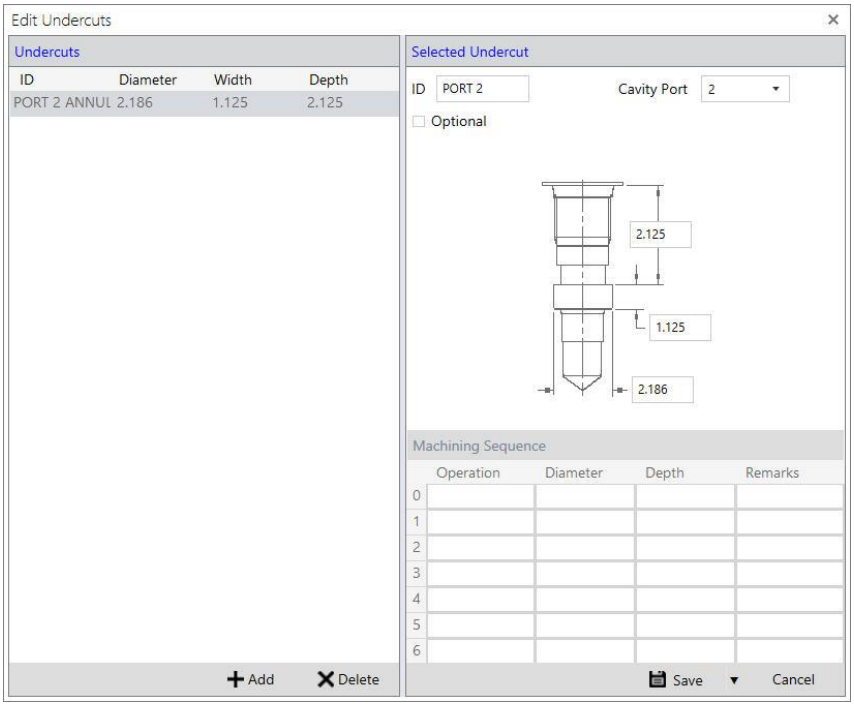
2. Click **Add** to add new undercuts.
3. Enter **undercut ID**.
4. Select **Cavity Port**.

   The undercut depth and width automatically displays.
   Alternatively, you can also enter the depth and width of the undercut directly in the textbox.
5. Select **Optional** for Optional undercut

   Optional Undercuts are stored along with the cavity and available during the insertion of undercut in MDTools®.

   Default undercut type is Mandatory undercut

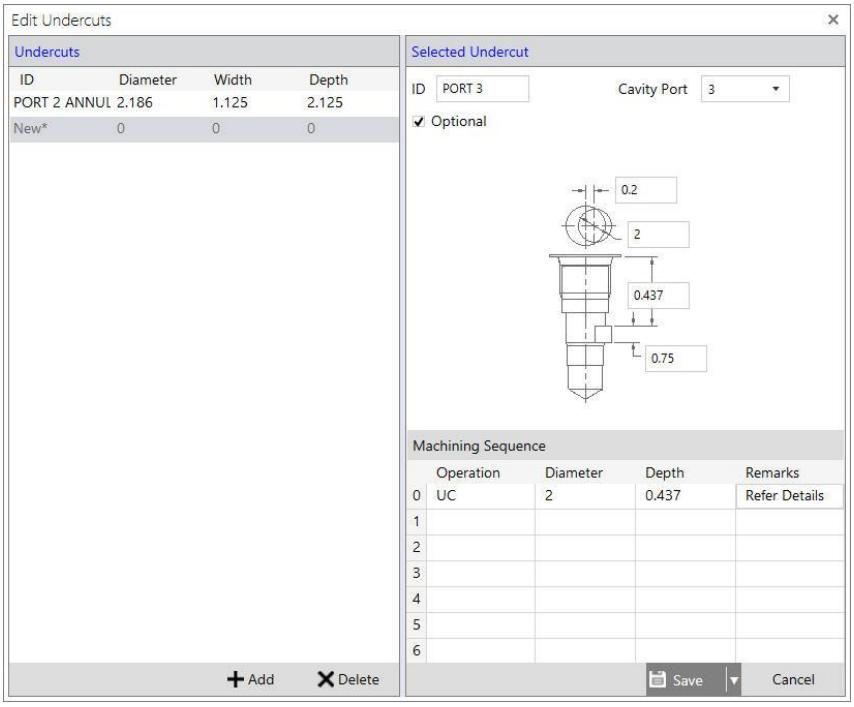
   Mandatory undercut is an integral part of the cavity profile and appears during insertion of cavity in MDTools.



Add/Modify Optional undercut

6. If **Optional** is selected, enter offset and Machining Sequence value for undercut.
7. Click **Save** to save a new undercut.
8. Select the existing undercut; modify the values and click **Save** or **Save As** to save as a new undercut.

   Added undercut displays in the Undercuts list.
9. Select the existing undercut; Click **Delete**.
10. Click **Cancel** to close the dialog box.



Add/Modify Mandatory undercut

Note:

The Mandatory undercut will not appear on the Cavity Preview in the MDTools Library.

4 Plug Details

For all type of ports, (SAE, BSP and Metric) enter the following plug details in the **Plug** section of the selected Cavity/Footprint section.

Head Height

Enter the Plug head height.

This information is used to flush the plug below the manifold surface using MDTools®.

Insertion Depth

Enter the insertion depth of a plug/fitting.

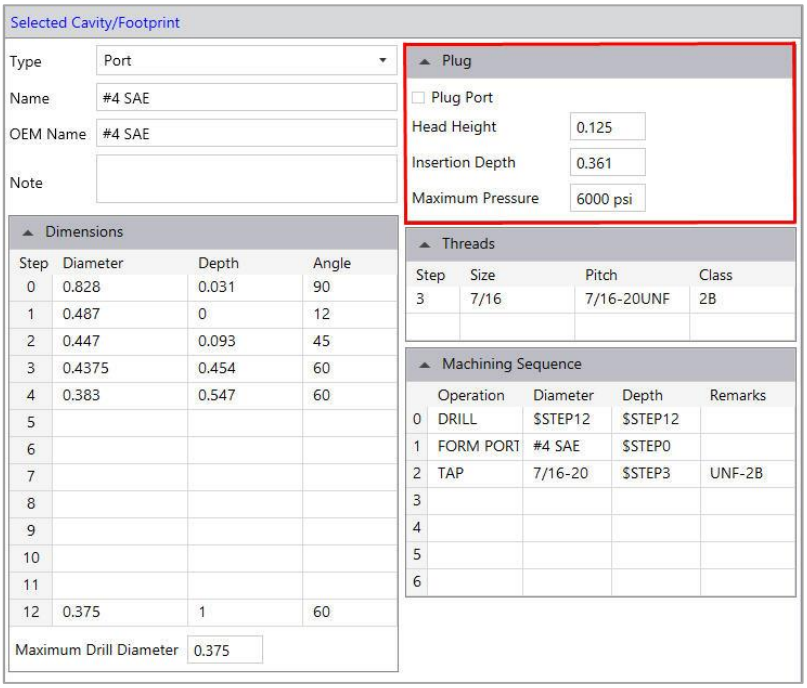
Insertion depth is the depth from the spot face; this is used to determine the dead area in ports.

Maximum Pressure

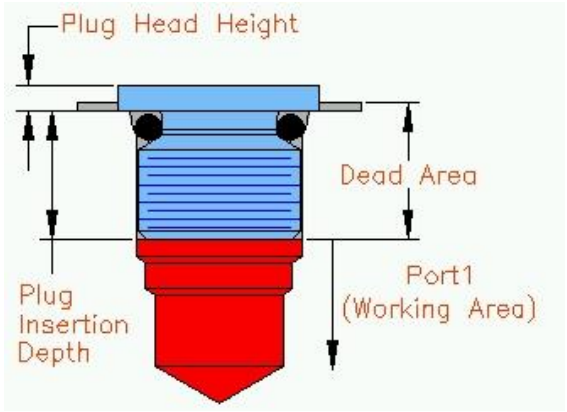
Enter the pressure rating of the port.

Note:

- If the plug insertion depth is not entered in a port, then the complete area below the spot face is considered as Working Area.
- Maximum pressure is the design reference that enables you to select the correct construction ports for making connections in the manifold.
- Enter the pressure rating in any of the units as required.
- Pressure rating is entered for all the ports in the MDTools Cavity Library.
- Change the data if required, by modifying the cavity.



Sample Selected cavity/Footprint section showing the plug details of #4 SAE port



Plug details

Modifying an existing cavity

1. Select the cavity you want to edit from the Cavity/Footprints list.

   The Selected Cavity/Footprint section displays the entire cavity data.

2. Make the desired changes.
3. Click **Save** to save the changes into the library.

5 Importing Cavity Data

Import cavity data from an existing cavity while creating a new cavity or updating an existing cavity.

1. Select the **Library** in which you want to add a cavity/footprint.
2. Click **Add**.

   The Selected Cavity/Footprint section displays with empty fields.

3. Click the **Import Cavity Data** option at the bottom of selected Cavity/Footprints section.

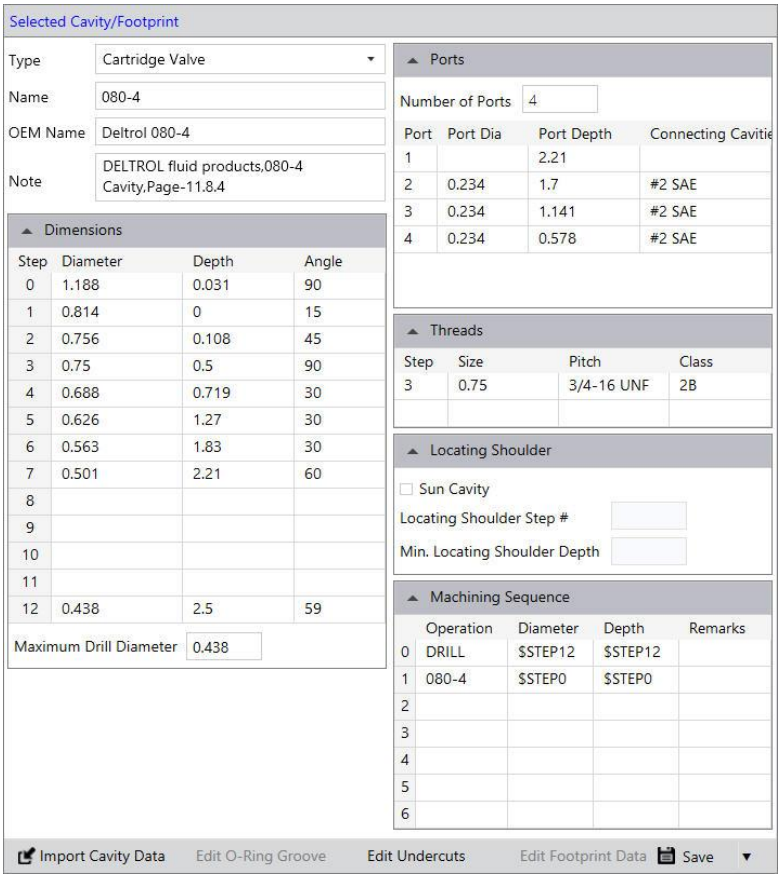
   The Import Cavity/Footprint Data dialog box displays.

4. Select **Library Name** from the Library Name list.
5. Select **Cavity**/Footprint from the Cavity list.
6. Click **OK**.

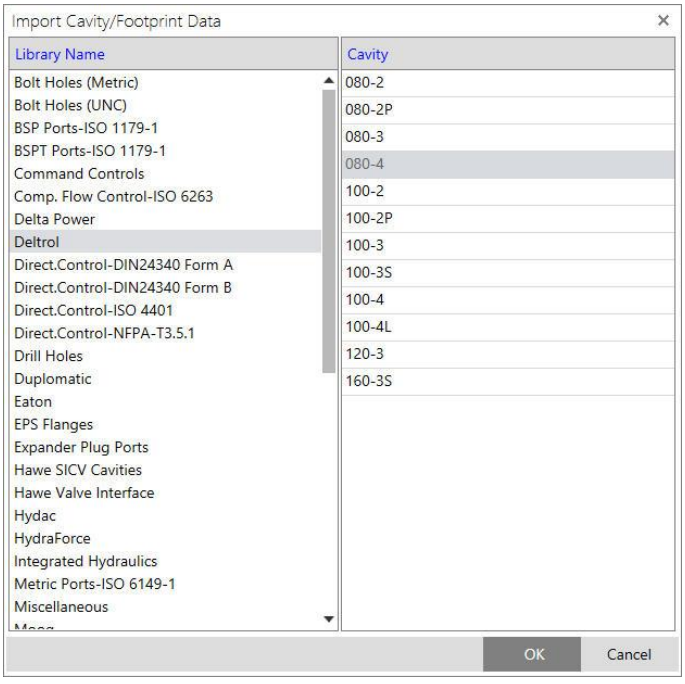
   The Import Cavity/Footprint Data dialog box closes. The selected cavity data gets populated in the Selected Cavity/Footprint section.

7. Modify cavity data, if required.
8. Click **Save**.

Import Cavity Data



Import Cavity/Footprint Data dialog box



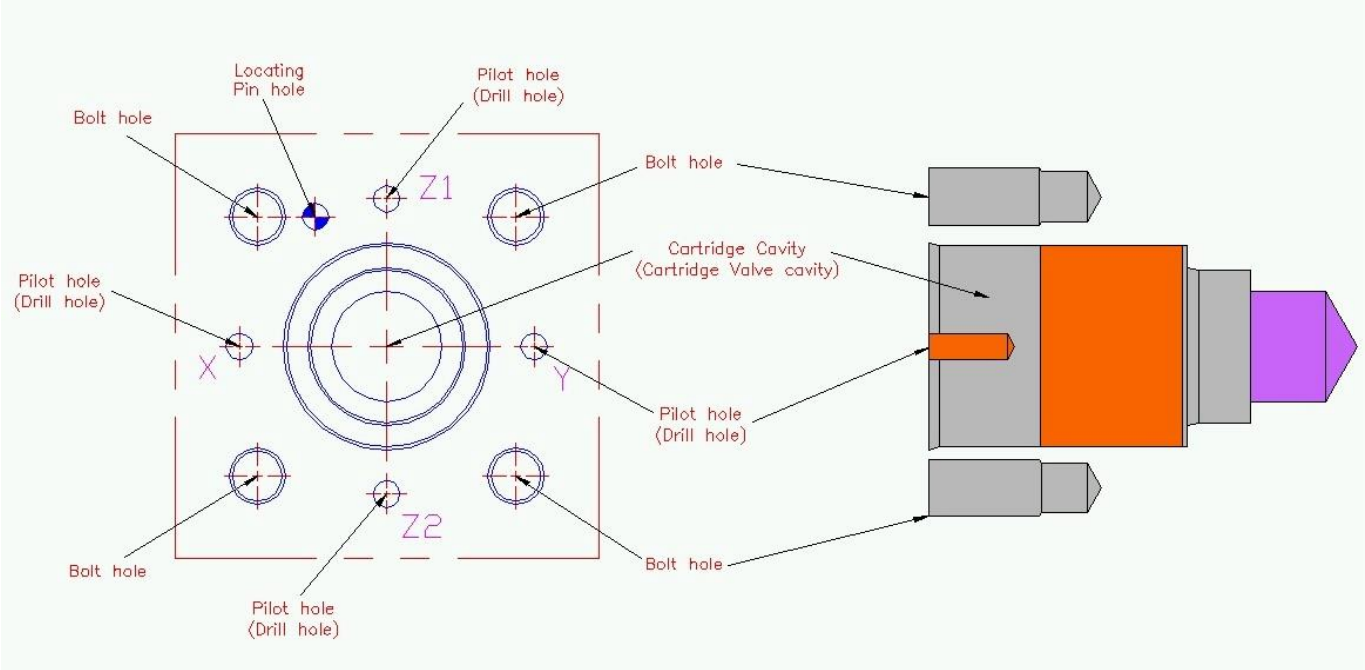
Cavity Data populated from Import Cavity Data

8. Create Footprints

If a component in a circuit has more than one cavity, such cavities are grouped together to form footprints.

Footprints generally contain different type of cavities; bolt holes for mounting the component, locating pinholes for locating the component in the correct orientation, and drill holes for different ports on the component.

Creating footprints is the same as creating cavities; the only difference is that you need to create multiple cavities in the footprint.

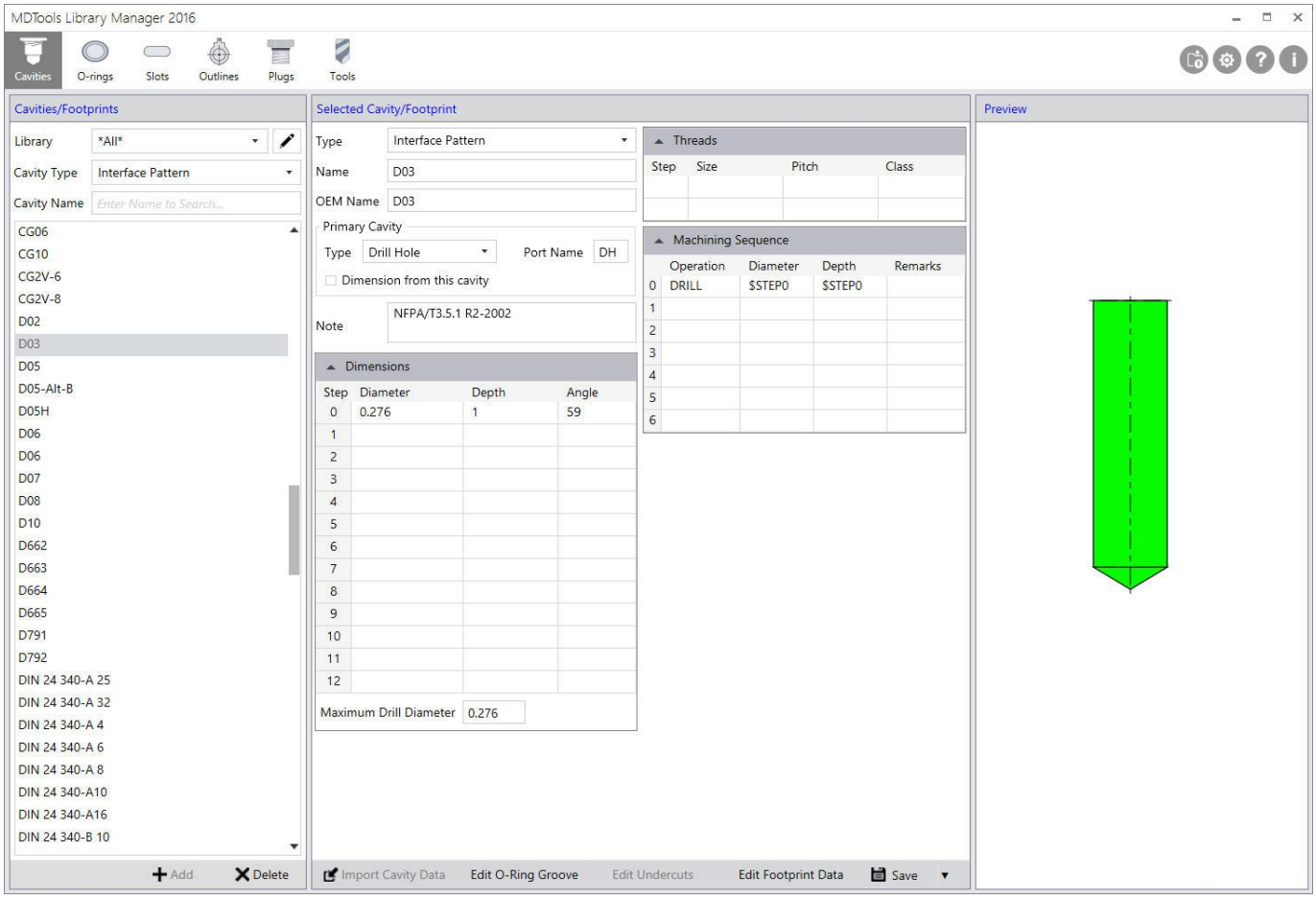


Typical slip-in cartridge valve footprint

Create Footprints

1 Creating/Modifying Footprints

2 Creating/Modifying Footprint Envelope



1 Creating/Modifying Footprints

1. Select a library to add or modify footprints.

   *By default, *All* is selected.*

   *The **Add** option gets enabled after selecting a library.*
   Only cavities in the Selected library displays in the Cavities/Footprints list.

2. Select the cavity type as **Flange** or **Interface**.

   *By default, *All* is selected.*

   All type of cavities in the Selected Library display in the Cavities/Footprint section.

3. Click the **Add** option below the Cavities/Footprints list to add a new footprint.

   Or

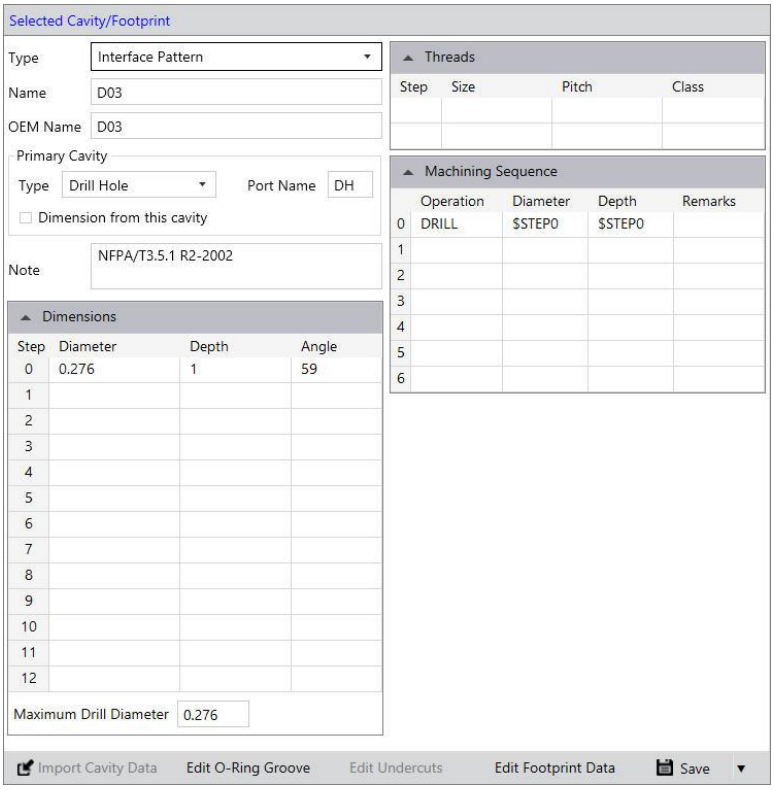
   Select a footprint from the Cavity/Footprint list to modify a footprint.

   You can also search a footprint by entering the name of the footprint in the Cavity Name field.

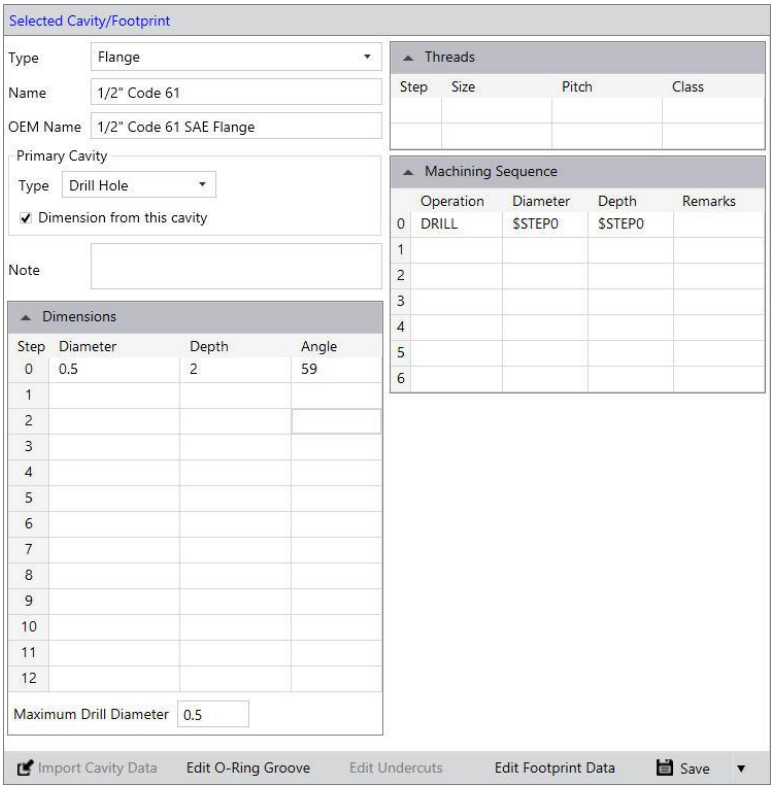
   The Selected Cavity/Footprint section displays.

   Enter/modify the main cavity details.

4. Enter footprint **Type** as Interface Pattern or Flange.
5. Enter **Name** and **OEM Name** of the footprint.



Selected Cavity/Footprint section: D03 footprint data



Selected Cavity/Footprint section: ½" Code 61 data

6. Enter **Primary Cavity** details.

   The Primary cavity is created at the insertion point when the footprint is inserted on the manifold.

7. Select **Primary Cavity Type**.

   For Interface Pattern,
   Primary cavity is one of the following type:

   - Bolt Hole
   - Drill Hole
   - Cartridge Valve
   - Locating Pin Hole

   For Flange,
   Primary cavity is one of the following type:

   - Bolt Hole
   - Drill Hole
   - Port

8. Enter the port application name of the cavity in the **Port Application Name** field.

   The port application name is automatically entered, depending on the type of the cavity.

   You can edit the port application name, if the cavity is a drill hole.

   Port application name is the application name of the hole on the footprint.

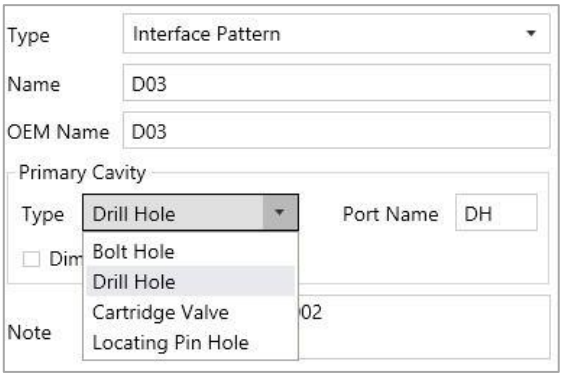
   For example A, B, T, and P are the application names of four working ports on a D03 footprint.

9. The **Dimension from this Cavity** option enables you to specify, which cavity will be dimensioned in the block machining drawing, when you want to dimension only the reference cavity in a footprint.

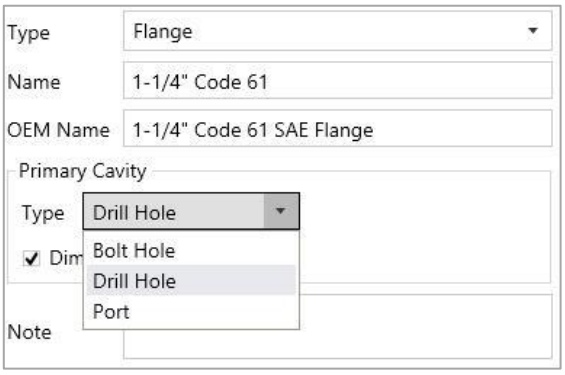
   *Only one cavity in an interface pattern or flange is selected as **Dimension from this Cavity,** other cavities get automatically deselected, if you selected Dimension from this Cavity for Primary cavity option.*

   If Dimension from this Cavity is not selected along with the primary cavity, then the primary cavity gets automatically selected.

10. Enter cavity geometry details.



Primary Cavity Type for interface Pattern



Primary Cavity Type for Flange

11. Attach/Delete an O-ring groove to a Drill Hole (DH).
    a. Click **Edit O-ring Groove**.

    The Select O-ring dialog box displays.

    b. Select the required O-ring.

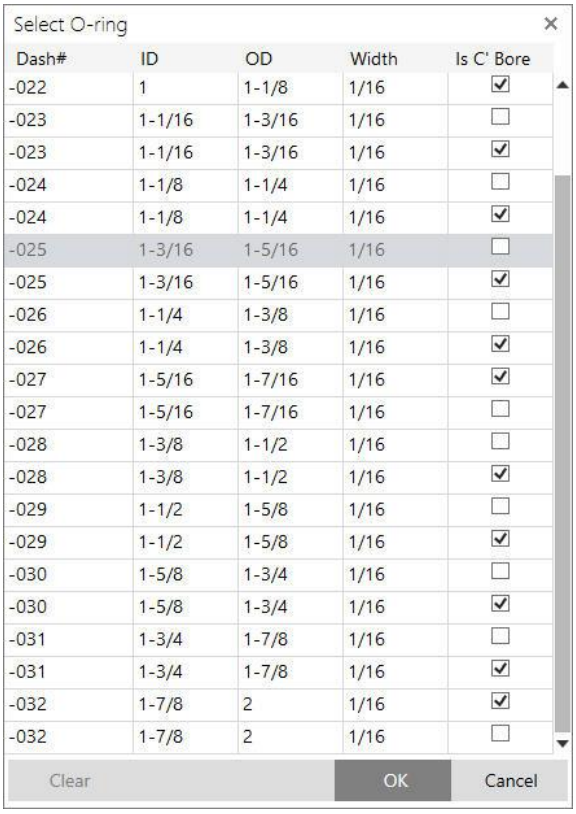
    c. Click **OK** to attach the selected O-ring groove corresponding to the O-ring.

    If an O-ring is already attached to a cavity, then it displays as a selected O-ring.

    d. You can delete attached O-rings using the **Clear** option.
12. Click **Save** to save the cavity data into the library.

Note:

- Save the main cavity into the library to create other cavities in the footprint.
- The O-ring groove will not appear on the Cavity Preview in the MDTools Library.
- The O-ring groove is available only for Drill Holes (DH).

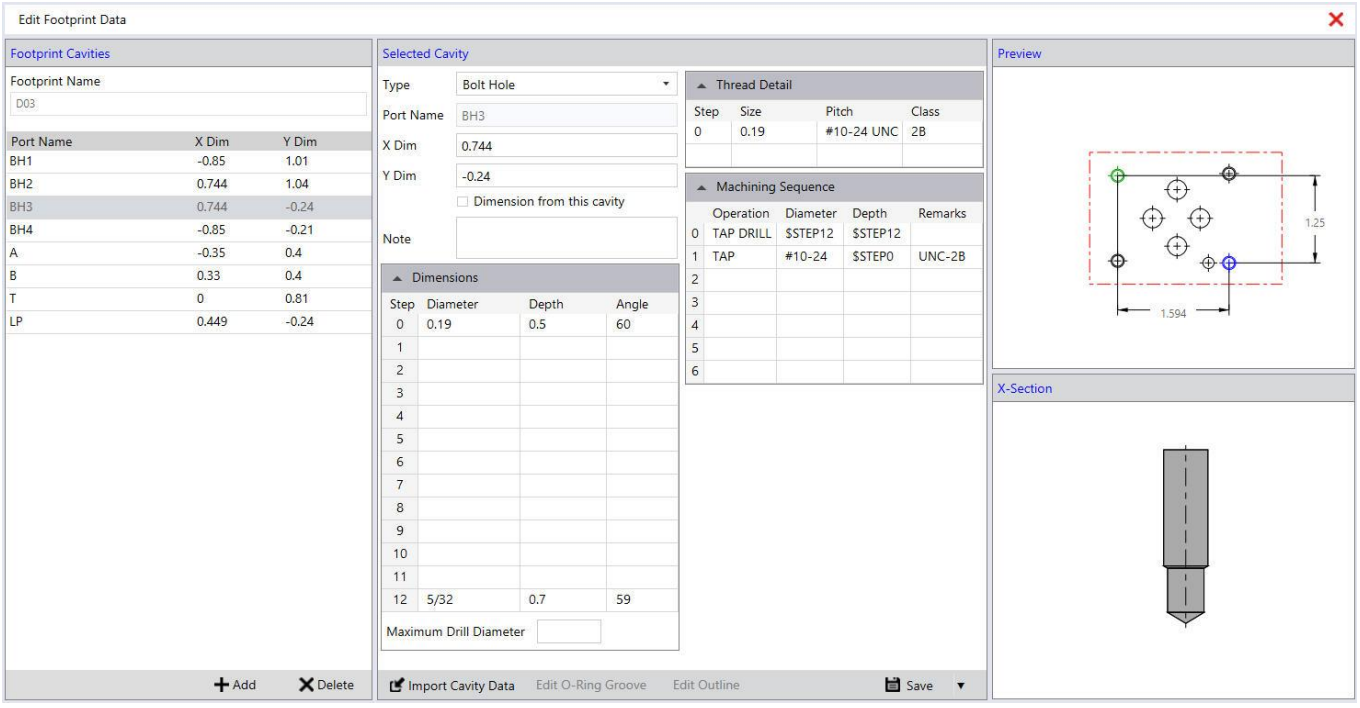


Select O-ring

Editing Footprint Child Cavities

1. Click **Edit Footprint Data** to create other cavities in the footprint.

The Edit Footprint Data section displays.



Edit Footprint Data section: D03 footprint data

2. Click the **Add** option to add a new cavity.
3. Select **Type** for the child cavity

   If Interface pattern is selected, then the child cavity is one of the following type

   - Bolt Hole
   - Drill Hole
   - Locating Pin Hole

   If Flange is selected, then the child cavity is one of the following type

   - Bolt Hole
   - Drill Hole

4. Enter the following details:

   Cavity Dimensions

   Thread Detail, if any

   Port Application Name

   Cavity **X Dim and** Cavity **Y Dim**

   Cavity **Machining Sequence**

5. Click **Edit O-ring Groove** and select the O-ring, if required.

   Note:

   - The O-ring groove will not appear on the Cavity Preview in the MDTools Library.
   - The O-ring groove is available only for Drill Holes (DH).

6. Click **Save** or **Save As** to add the cavity to the footprint data.

   When you add a cavity to the footprint, the cavity displays in the list of cavities in the footprint.

   This list contains the following details

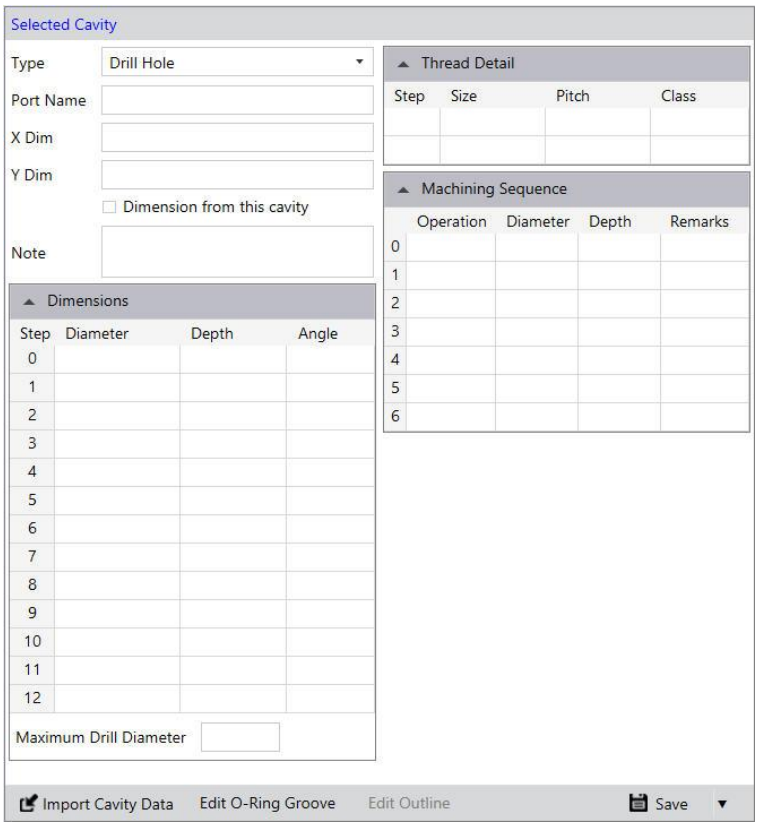
   Port Application Name

   Cavity X Dim

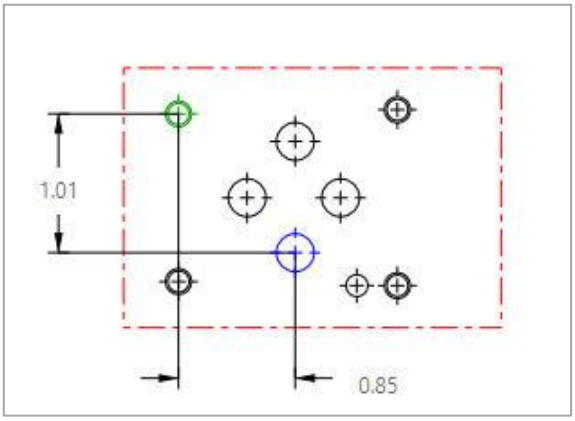
   Cavity Y Dim

   Note:

   - You can modify the cavity after selecting the cavity from the cavity list.
   - When you select the cavity, the cavity details are displayed in the Add/Modify Footprint dialog box.
   - After modifying the cavity, click **Add/ Modify** to save the changes to the library.
   - To delete a cavity from the footprint, select the cavity from the list and click **Delete**.



Edit Footprint Data section: Add Cavity



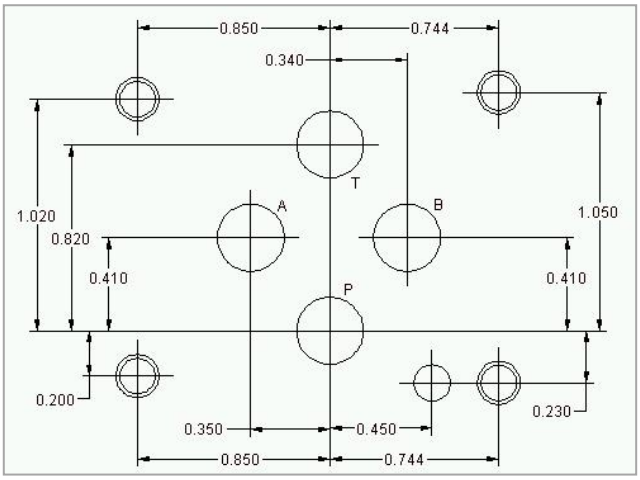
D03 footprint preview

Port Application Name

The default port application name for different type of cavities:

Cavity Type	Port Application Na
Cartridge Valve	CV
Port	Port
Drill Hole	DH
Bolt Hole	BH
Locating Pin Hole	LP

You can change the port application name of only drill holes.



D03 footprint showing X and Y Dim from 'P' port

Cavity X and Y Dim

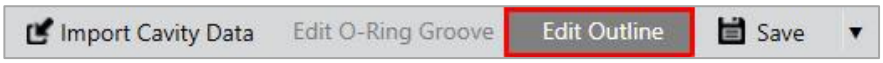
Cavity X and Y dim are the X and Y dimensions of cavities in the footprint from the main cavity entered on the selected cavity section.

Note:

When you create a footprint, you need to enter the X and Y dimensions for all the cavities created on the Edit Footprint Data dialog box.

2 Creating/Modifying Footprint Outline

Footprint outline dimensions are stored with the **first bolt hole** in a footprint.



Edit Outline option

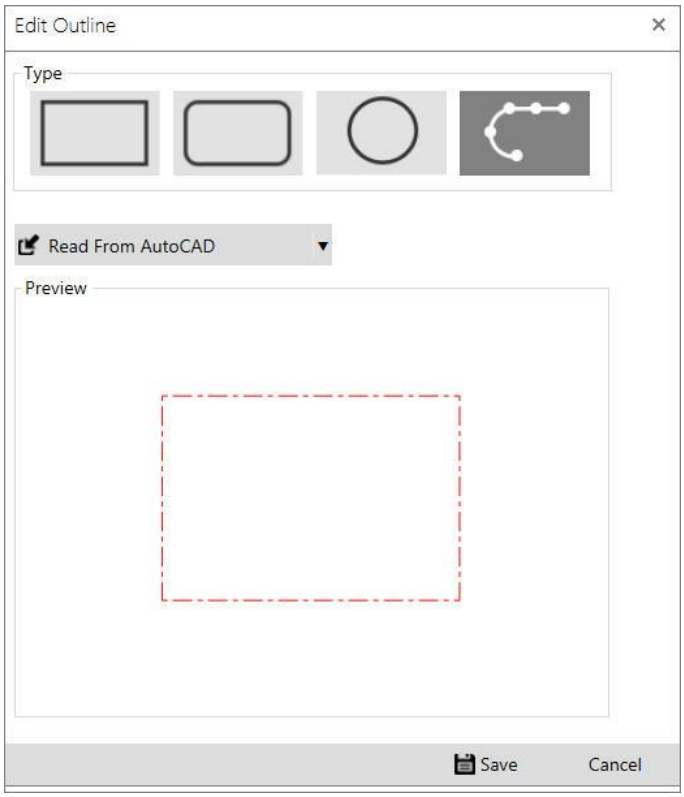
1. Select the **first bolt hole** (BH1) from the cavity list on the Edit Footprint Data dialog box.

   The Edit Outline option is enabled automatically on selecting the first bolt hole.

2. Click **Edit Outline**.

   The Edit Outline dialog box displays.

3. Select the **Type** of envelope.
4. Enter the respective envelope values.
5. Click **Save** to save the data.



Edit Outline dialog box

Note:

- The Footprint envelope can only contain two types of entities, Line and Arc.
- The Footprint envelope data must be stored with the First Bolt Hole in the footprint.

9. O-rings

Store the O-ring and O-ring grooves with and without counterbore data in the MDTools® Library. O-ring is available for only Drill Hole (DH) type cavities.

1. MDTools Library Manager ribbon >**O-rings**

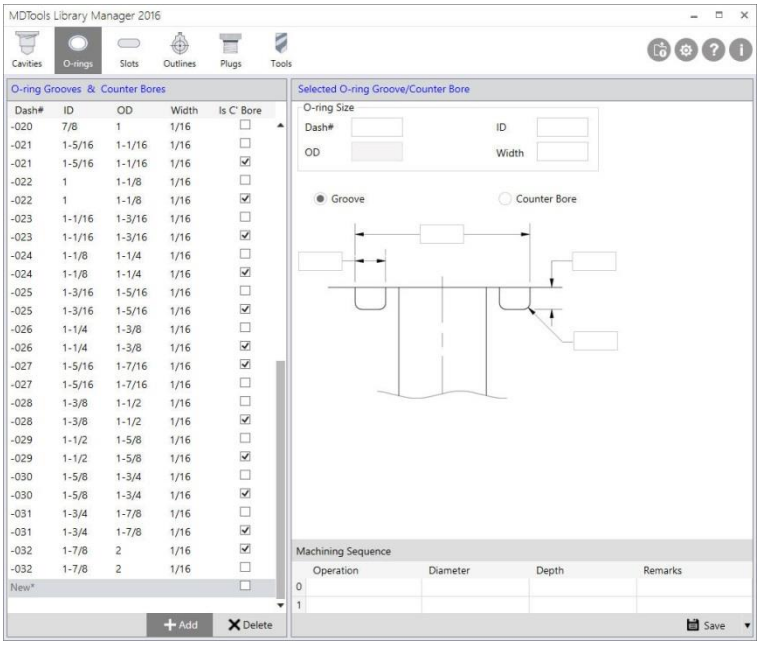
   The O-ring Grooves & Counter bore list displays, per the Units and Library path selected in the Options command.

2. Click **Add** to create a new O-ring groove.
3. Enter O-ring **Size** details,
   - Dash #
   - ID
   - Width

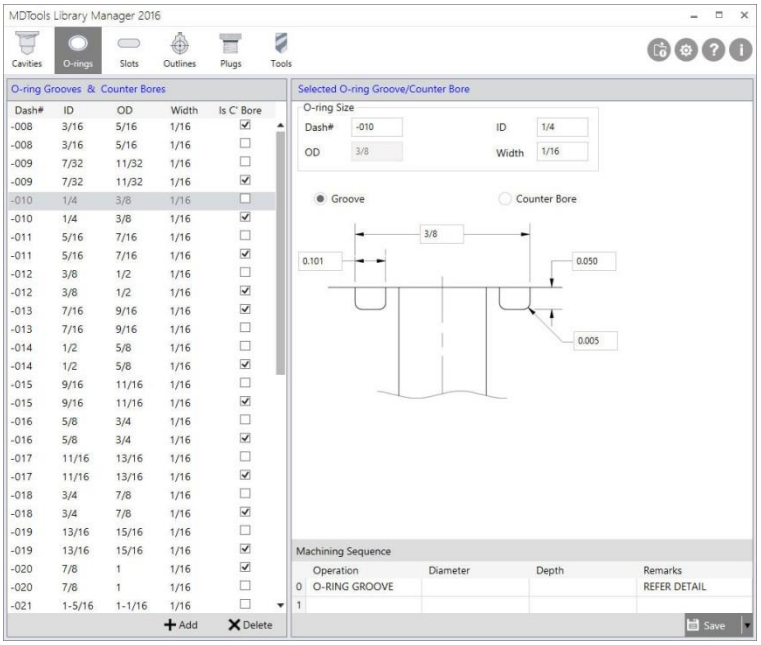
   The OD is automatically displayed based on the ID and the width.
4. Select the **Type**, Groove/Counter Bore.
5. Enter the O-ring groove details,
   - OD
   - Width
   - Depth
   - Corner Radius

   Width is applicable only for a groove.
6. Enter **Machining Sequence**.
7. Click **Save**.

   Added O-rings display in the O-ring Grooves & Counter Bore list.
8. Select the existing O-ring groove; modify the values and click **Save** or **Save As** to save as a new O-ring.
9. Select the existing O-ring groove; click **Delete** to delete the selected O-ring groove.



Add O-ring Grooves



Modify O-ring Grooves

10. Slots

Store the slot details in the MDTools® Library.

1. MDTools Library Manager ribbon >**Slots**

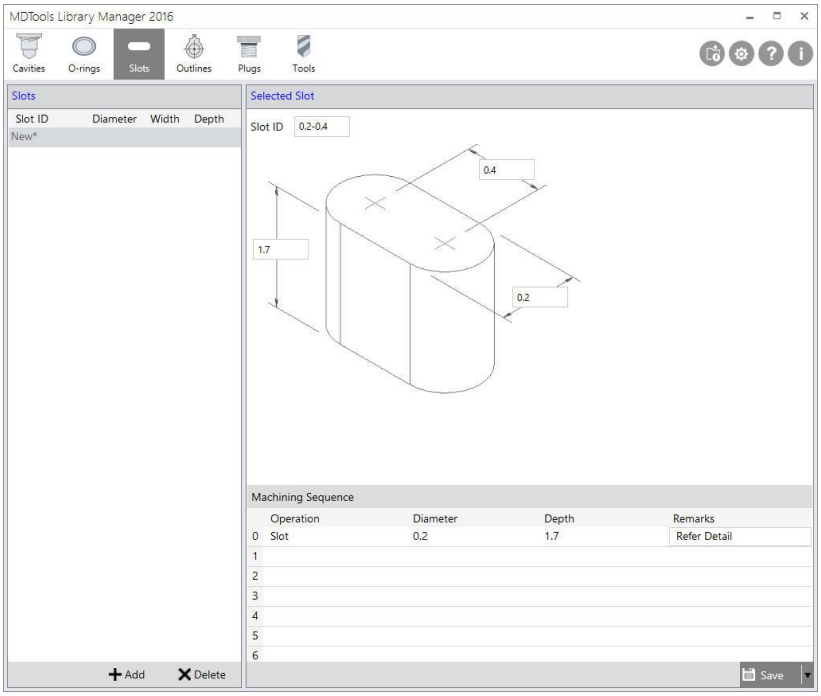
   *List of existing slots display, per the Unit and Library path selected in **Options**.*

2. Click **Add** to add new slots.
3. Enter **Slot ID**.
4. Enter **Slot Depth**.
5. Enter the slot **Diameter** and **Width**.
6. Enter **Machining Sequence**.
7. Click **Save**.

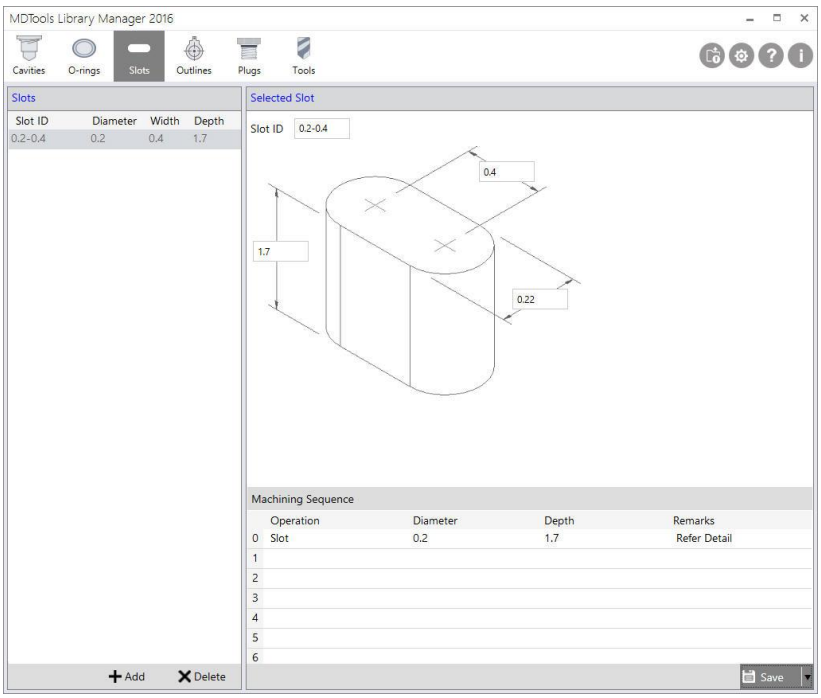
   *Added slot displays in the **Slots** list.*

8. Select the existing slot;
   modify the values and click **Save** or **Save As** to save as new slots.
9. Select the existing slot;
   Click **Delete** to delete the selected slot.

   Slot gets deleted from the library.



Add Slot



Modify Slot

11. Outlines

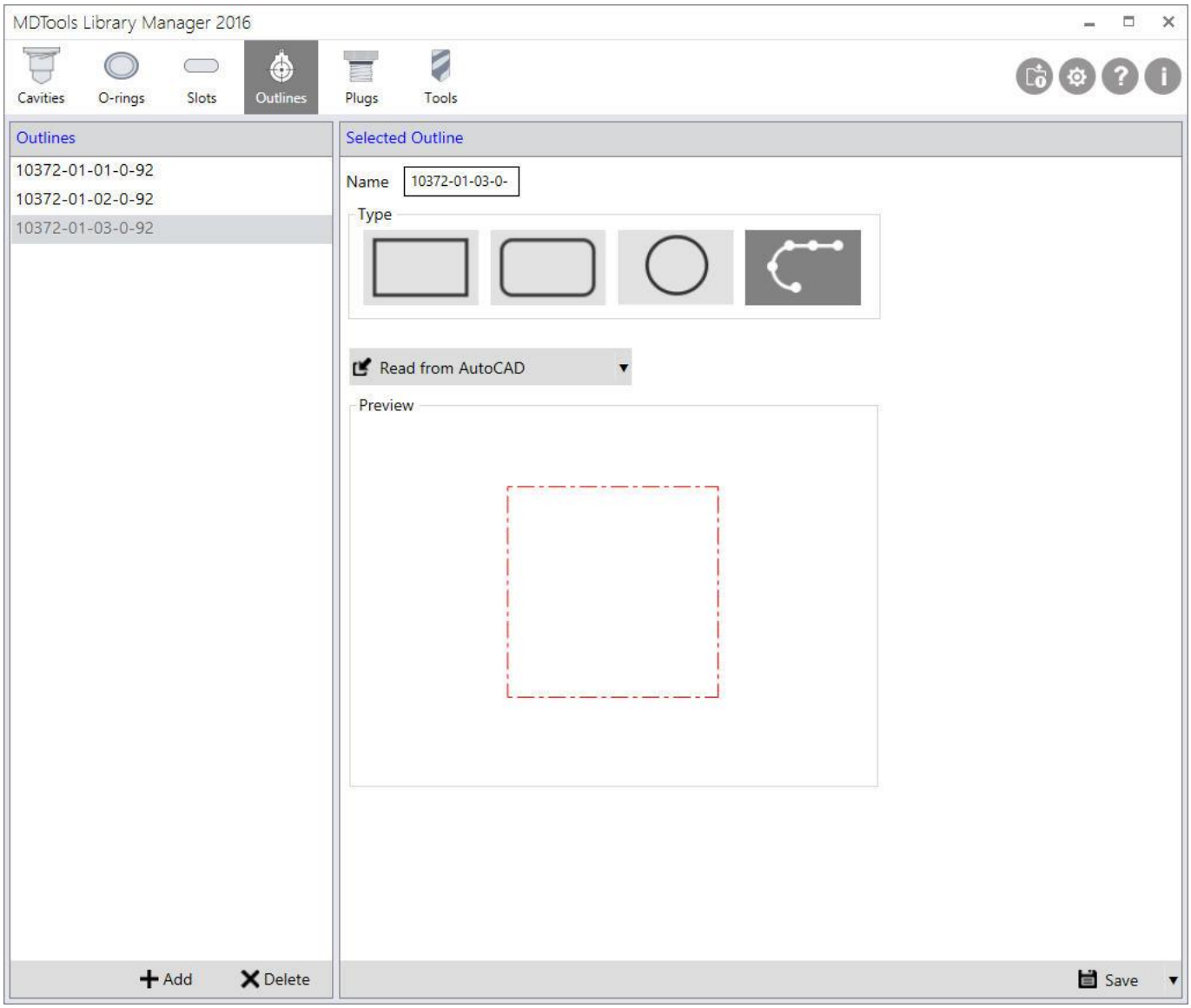
Create outlines for the MDTools® valves.

1 Creating Outline

2 Read Envelope Data from AutoCAD

3 Read Envelope Data from Inventor

4 Read Envelope Data from SolidWorks



1 Creating Outline

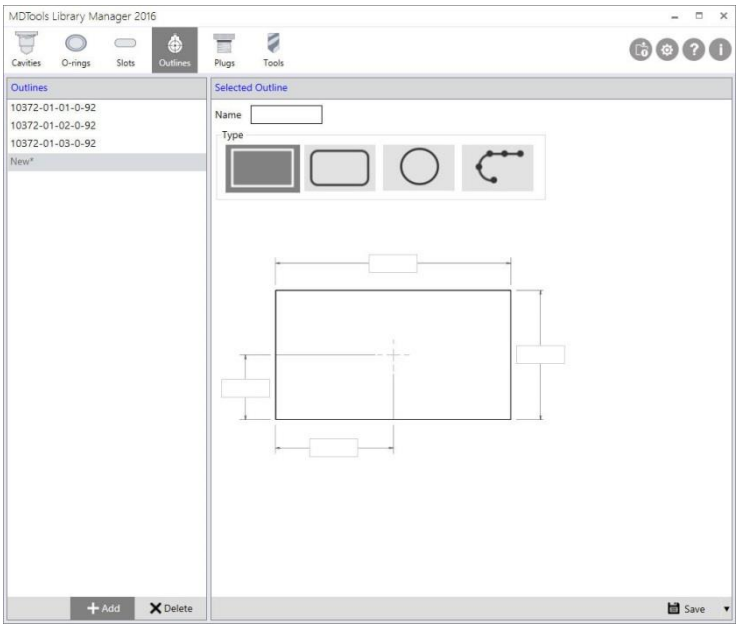
1. MDTools Library Manager ribbon > **Outlines**

   The Outlines and Selected Outline sections display.

2. Click **Add** to add new outline
3. Enter the outline **Name**.
4. Select the **Type** of outline required. *Rectangle type gets selected by default for new outlines*.
5. Enter **Width, Height** of the outline.
6. Enter **X and Y coordinate** for the center.

   The X and Y coordinates must be entered with respect to the cavity center or the center of the main cavity in the footprint.

7. Click **Save** to save an outline.



Add Outline

NOTE:

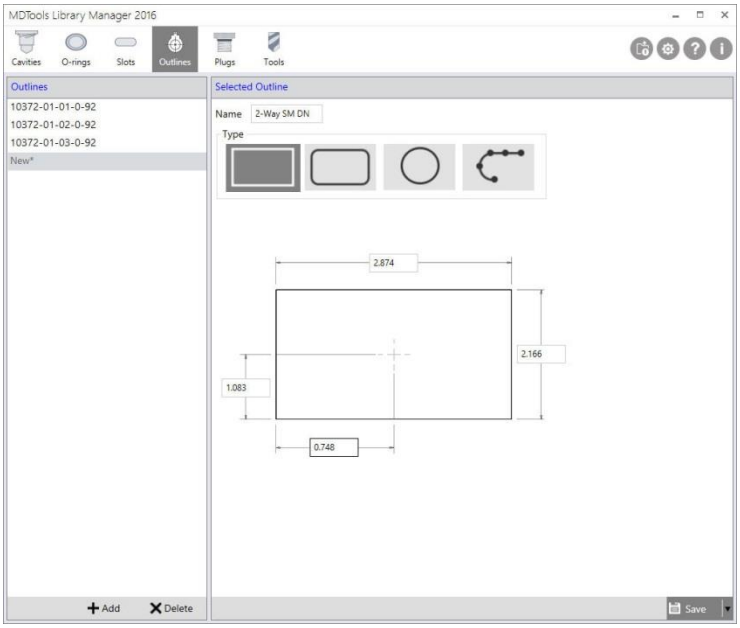
- Two separate databases are used to store the outline library in Inch and Metric units.
- MDTools® does not provide an Outline Library. Use MDTools Library Manager to create your own library.
- All existing outlines created using older version than MDTools Library Manger 2016 are used as Custom type outlines.
- You can change the outline type by selecting the appropriate outline Type.

1. Adding Rectangular Outline

1. Click **Add** to add new outline.
2. Enter the **name**.
3. Select the **Type** as rectangle.
4. Enter outline **width** and **height**.
5. Enter **X and Y coordinate** for the center.

   The X and Y coordinates must be entered with respect to the cavity center or the center of the main cavity in the footprint.

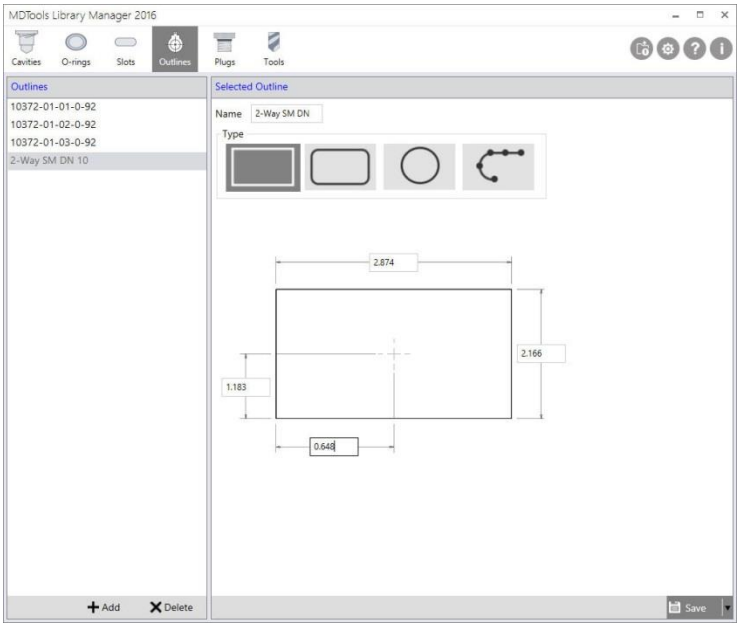
6. Click **Save** to save the outline data.



Adding a rectangular outline

2. Modifying Rectangular Outline

1. Select an outline from the Outlines list.
2. Make the required changes.
3. Click **Save** or **Save As** to save as the new outline.



Modifying a rectangular outline

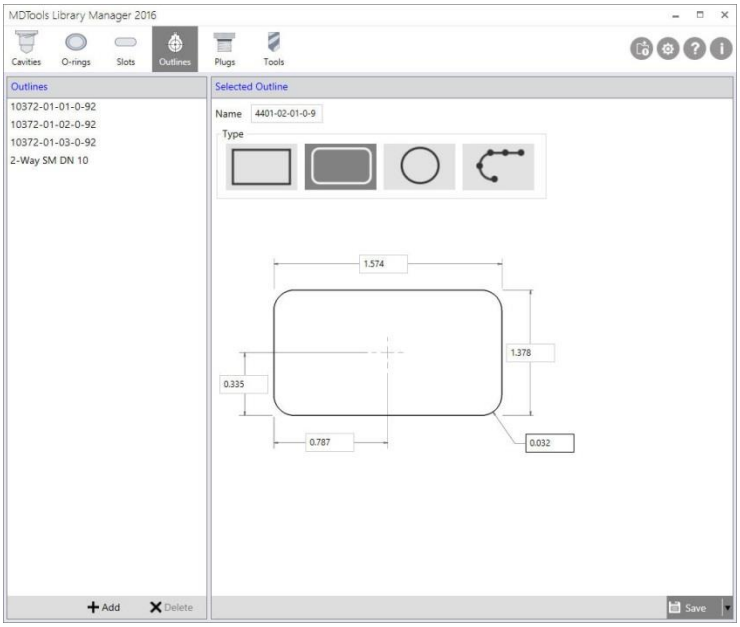
3. Adding Rounded Rectangular Outline

1. Click **Add** to add new outline.
2. Enter the outline name.
3. Select the **Type** as Rounded Rectangle.
4. Enter outline **width** and **height**.
5. Enter **corner radius**.
6. Enter **X and Y coordinate** for the center.

   The X and Y coordinates must be entered with respect to the cavity center or the center of the main cavity in the footprint.

7. Click **Save**.

   Added Outline displays in Outlines' list.

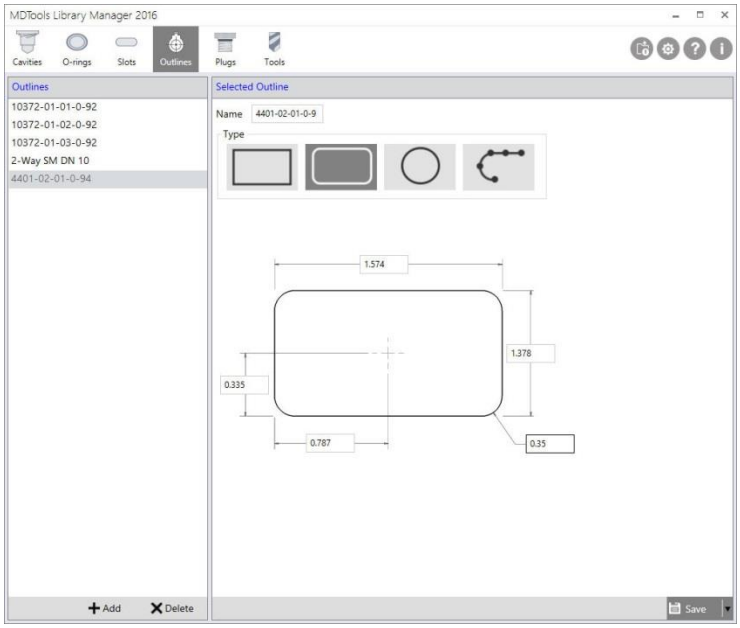


Adding a rounded rectangular outline

4. Modifying Rounded Rectangular Outline

1. Select an outline from the Outlines list.
2. Make the required changes to the selected outline.
3. Click **Save** or **Save As** to save as a new outline.

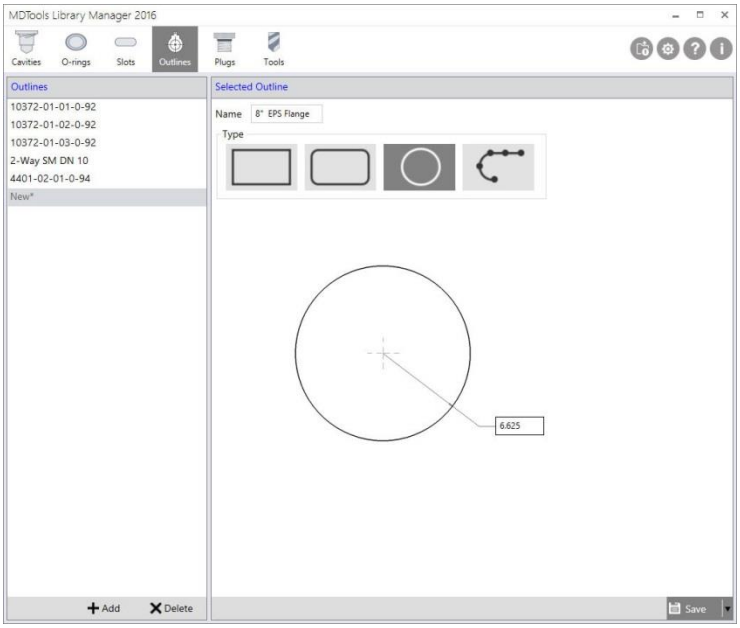
   Saved outline displays in the Outlines list.



Modifing a rounded rectangular outline

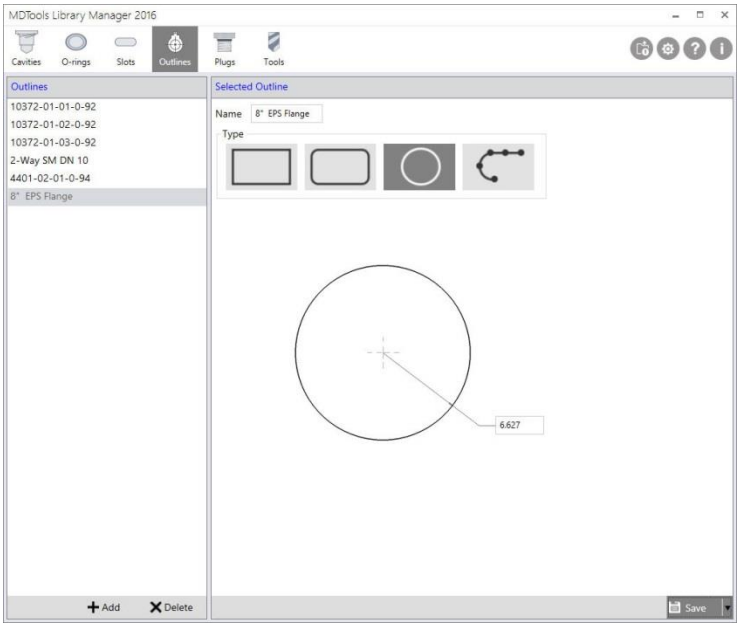
5. Adding Circular Outline

1. Click **Add** to add a new outline.
2. Enter the outline name.
3. Select the **Type** as **Circle**.
4. Enter the **outline radius**.
5. Click **Save** to save the outline data.



Adding a circular outline

6. Modifying Circular Outline



Modifying a circular outline

7. Adding Custom Outline

1. Click **Add** to add a new outline.
2. Enter the **outline name**.
3. Select the **Type** as **Custom**.

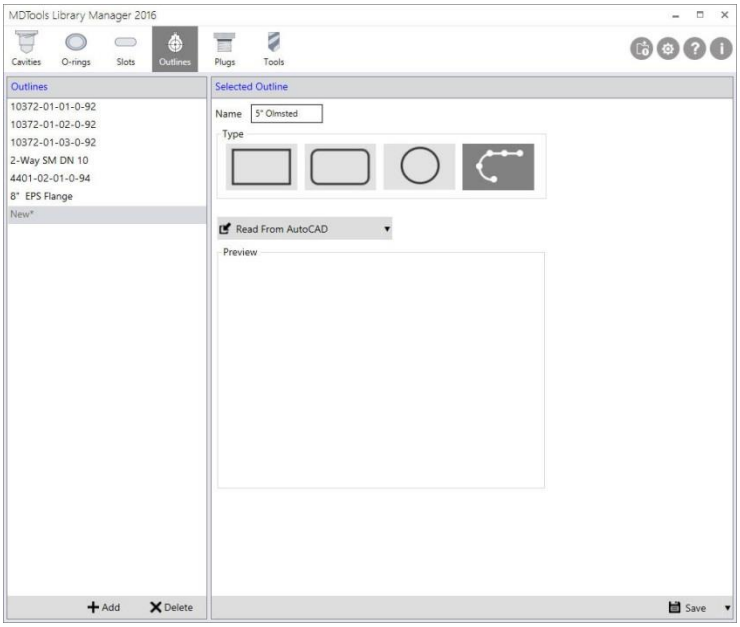
   You can import outline data from AutoCAD, Inventor and SolidWorks drawing.

4. Open the AutoCAD/Inventor/SolidWorks drawing, which has the envelope design to be imported into MDTools®.

5. Click the **Read from AutoCAD/Inventor/SolidWorks** option.
6. Select the **Reference Point** and **Entities**.

   Preview of imported outline displays in the Preview section.

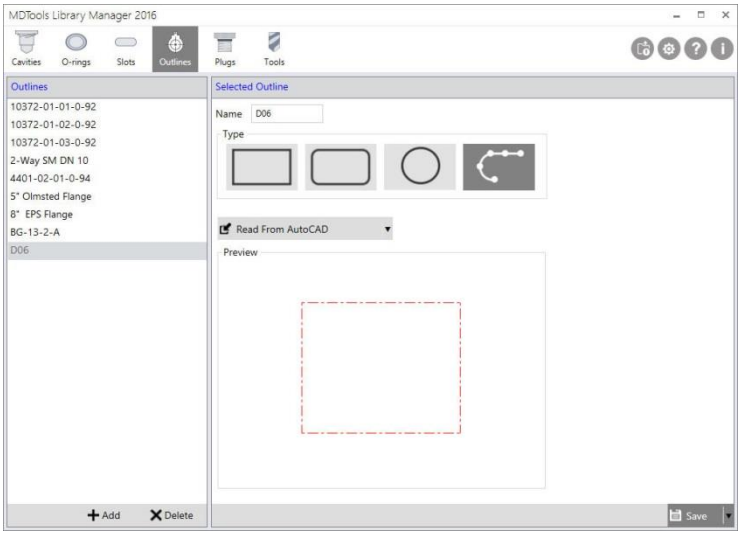
7. Click **Save** to save the outline data.



Adding a custom outline

8. Modifying Custom Outline

1. Select an outline from the Outlines list.
2. If selected outline type is **Custom**, import outline data from the AutoCAD, Inventor or SolidWorks drawing again.
3. Click **Save** or **Save As** to save as a new outline.

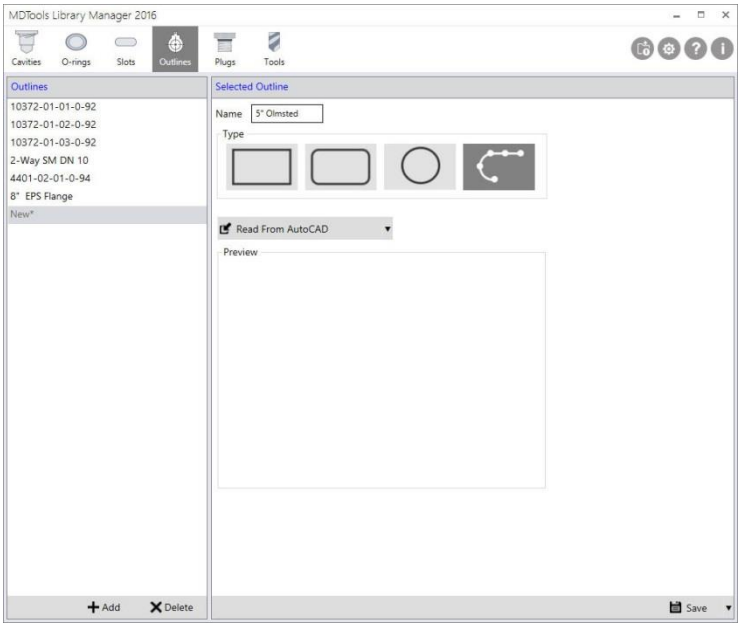


Modifying a custom outline

2 Reading Outline Data from AutoCAD

1. Click **Add** to add a new outline.
2. Enter **Outline Name**.
3. Select the Outline **Type** as **Custom**.
4. Open the AutoCAD drawing that has the envelope design to be imported into MDTools®.
5. Click the **Read from AutoCAD** option.

   The Read Outline dialog box displays in the AutoCAD drawing window.



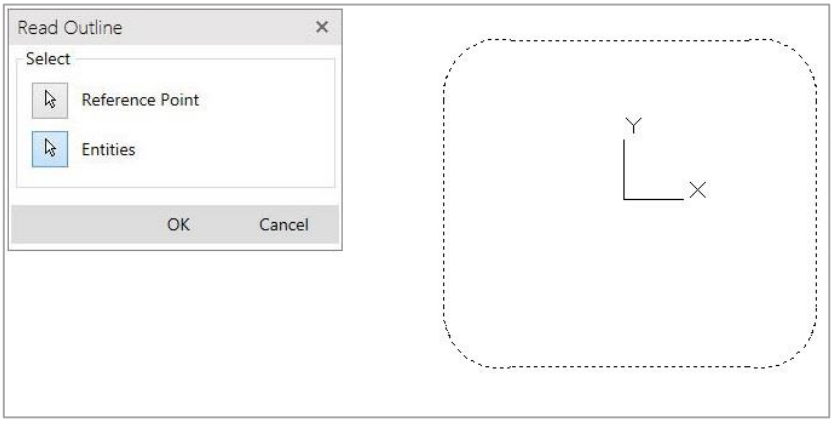
Create Custom Assembly Outline

*The **Reference Point** option gets selected. This ensures that the focus is changed.*

6. Click on the AutoCAD drawing window.
7. Select a **Reference Point**.

Read Outline - Reference Point Selection

8. Select the envelope entities in the AutoCAD drawing.
9. Press **Enter** or the **Spacebar** to complete the selection.

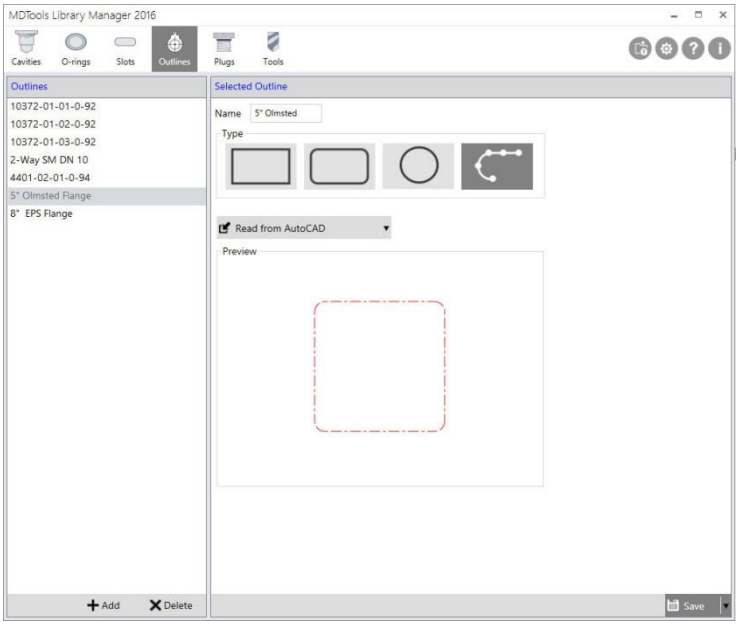


Read Outline - Entities Selection

10. Click **OK**.
    The outline data is imported and assigned to the selected envelope name.
11. Click **Save** or **Save As** to save as new outline.

NOTE:

MDTools Library Manager 2016 supports AutoCAD 2010 and higher.

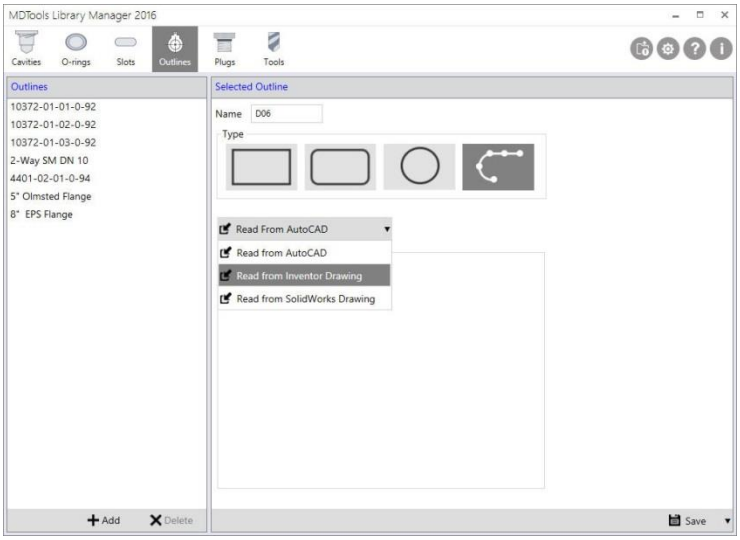


Outline Library with Imported Envelope

3 Reading Outline Data from Inventor

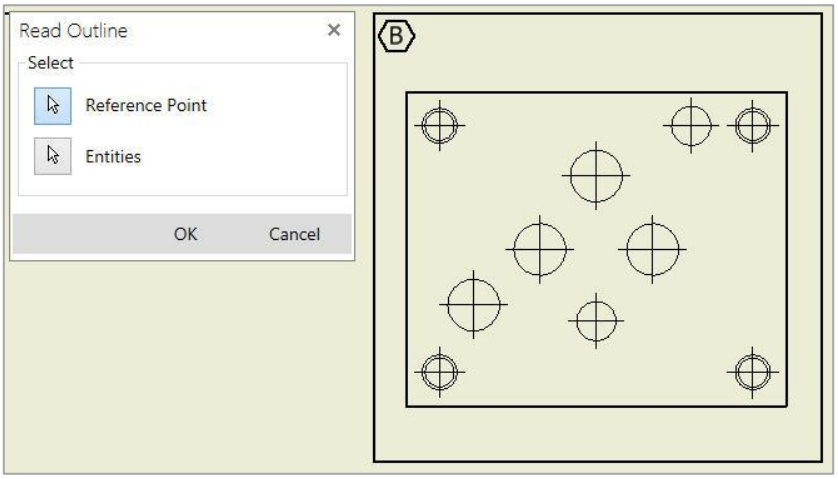
1. Click **Add** to add new outline.
2. Enter **Outline Name**.
3. Select the Outline **Type** as **Custom**.
4. Open the Inventor drawing that has the envelope design to be imported into MDTools®.
5. Select the **Read from Inventor Drawing** option.

   *The **Read Outline** dialog box displays in the Inventor drawing window.*



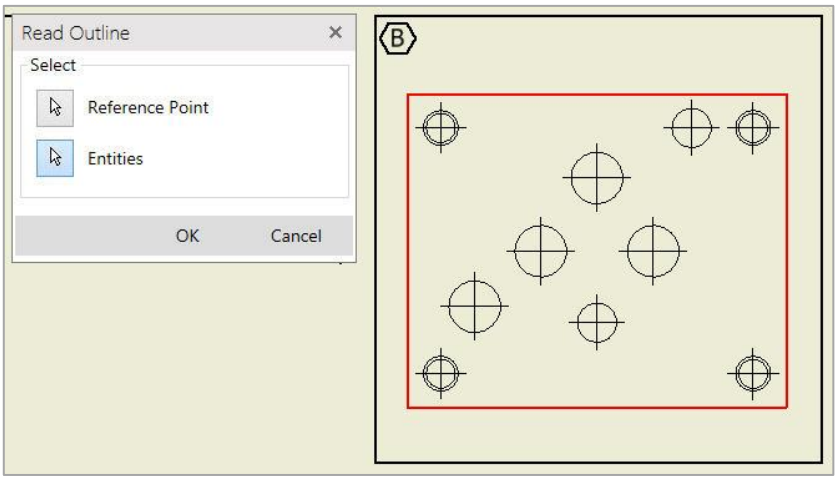
Create Custom Assembly Outline

6. Select the **Reference Point**.



Read Outline- Reference Point Selection

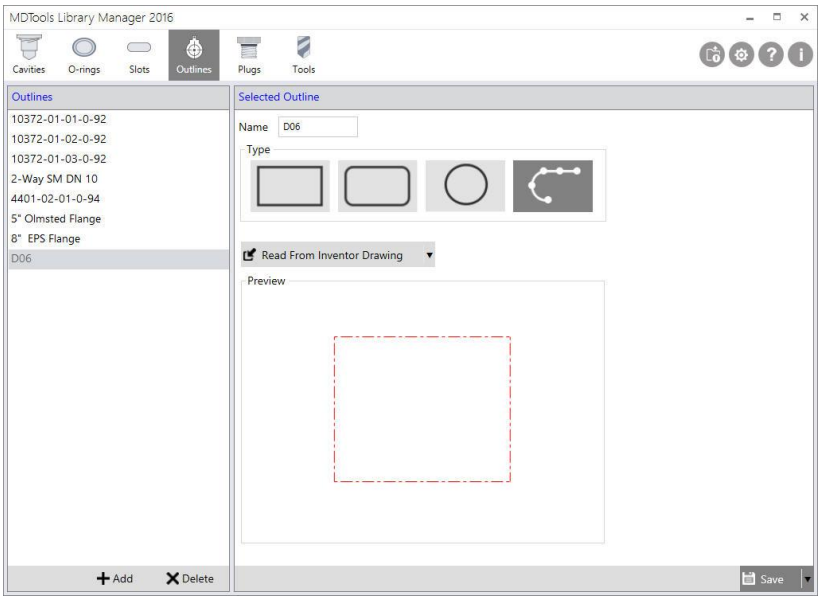
7. Select the **Entities** in the Inventor drawing.



Read Outline- Entities Selection

8. Click **OK**.
   The outline data is imported and assigned to the selected envelope name.
9. Click **Save** or **Save As** to save as a new outline.

   Saved outline displays in the Outlines list.

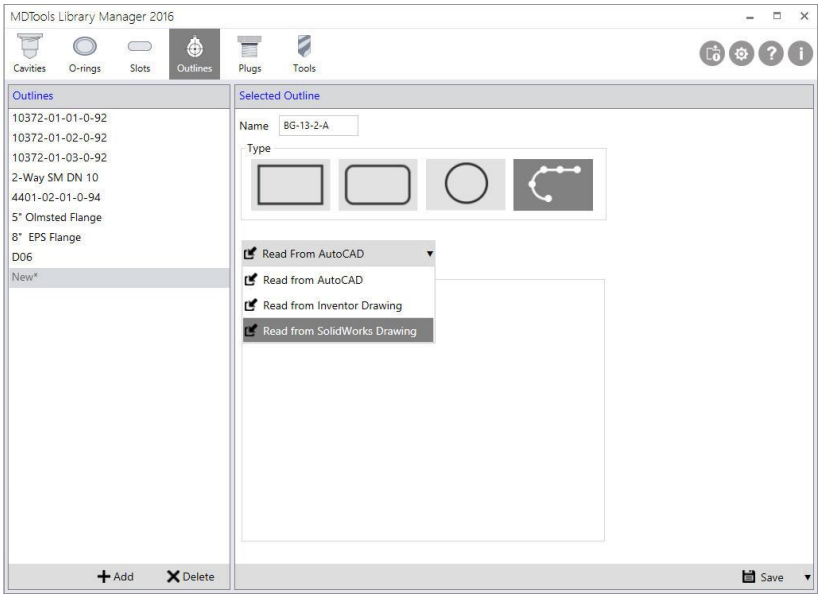


Outline Imported

4 Reading Outline Data from SOLIDWORKS

1. Click **Add** to add new outline.
2. Enter **Outline Name**.
3. Select the Outline **Type** as **Custom**.
4. Open the SolidWorks drawing with envelope design to be imported into MDTools.
5. Select the **Read from SolidWorks Drawing** option.

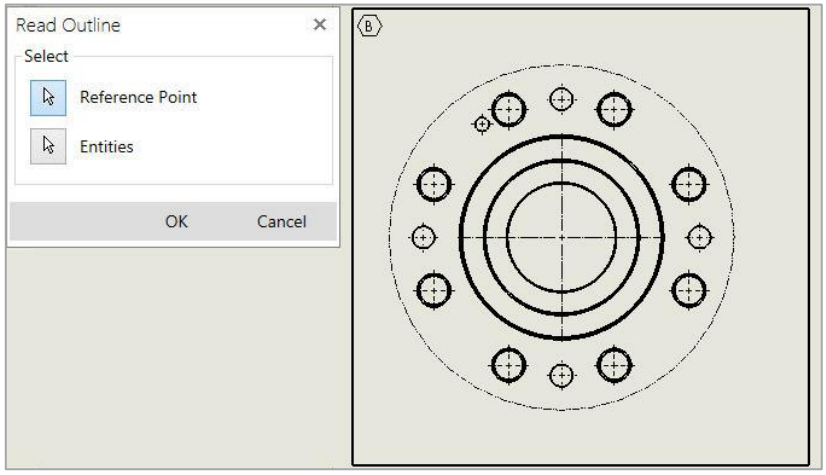
   *The **Read Outline** dialog box displays in the SolidWorks drawing window.*



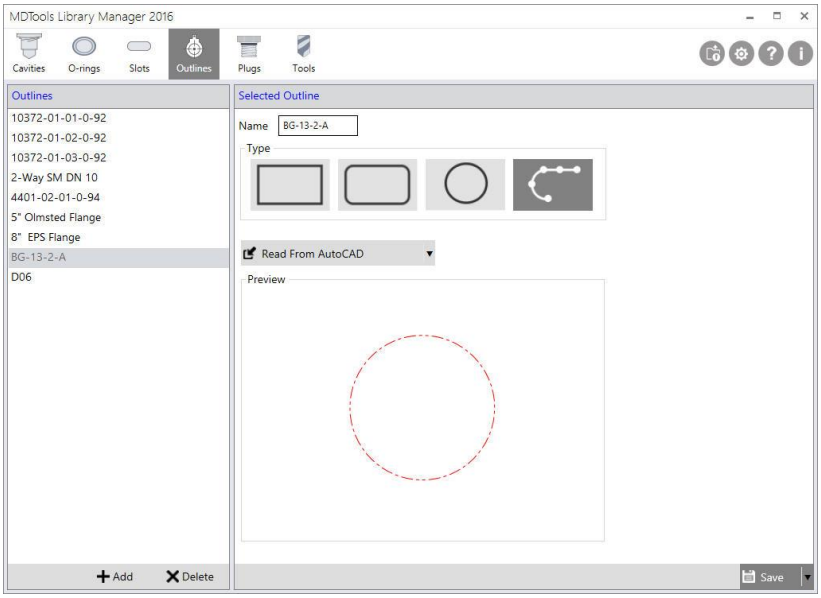
Create Custom Assembly Outline

6. Select the **Reference Point**.
7. Select the **Entities** in the SolidWorks drawing.
8. Click **OK**.
   The envelope data is imported and assigned to the selected envelope name.
9. Click **Save** or **Save As** to save as new outline.

   The saved outline displays in the Outlines list.



Read Outline dialog box



Outline imported

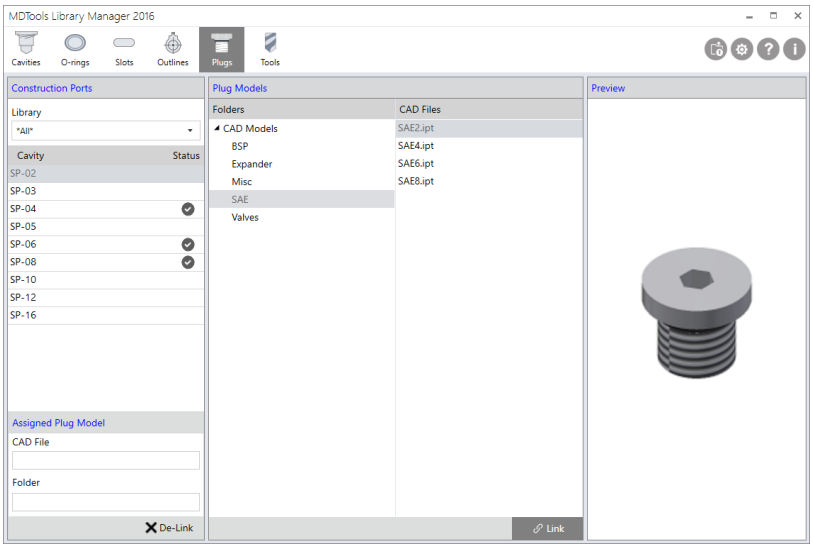
12. Plugs

1 Assign plug models for contruction ports.

This information is used inside MDTools® to assemble the plugs automatically.

1. MDTools Library Manager ribbon > **Plugs**
2. Select a **library** to list the construction ports in the selected library.

   *By default, *All* is selected.*
3. Perform the following operations from the Plugs command:
   - Assign Plug file with cavity
   - Modify Plug file assigned with cavity



Plugs

NOTE:

- Only libraries, which have construction plug cavities, appear in the Library dropdown.
- If plug model is linked to a cavity, then the status changes to .
- Assigned Plug Model section displays the linked plug model information.
- You can see the preview of the plug file, if linked by selecting any cavity from the construction port section, Cavity list.
- Do not edit the plug library files manually using Microsoft Access; always use the MDTools Library Manager to edit.
- Microsoft Access is not required to edit the library.
- All construction ports used in the manifold should be assigned with the particular plug/part file in this Plug section.
  Also, the plug file should exist at that specified location.
- Two separate databases, one for Inch and one for Metric units are used to store the library.
- The Inch library is stored in the MS Access database file named, INCHVESTMDToolsPLUGLibrary.mdb and the Metric library is stored in MMVESTMDToolsPLUGLibrary.mdb.
- These files are located in the root (installation) directory of the MDTools library.
- You can share the Plug library over a network in your group by specifying the location of the library in the Options command.

2 Linking a Plug File with a Construction Port

1. MDTools Library Manager ribbon > **Plugs**
2. You can select library using the dropdown.

   All constructs ports in the selected library appear in the Construction Ports section.
3. Select the cavity from the **Construction Ports** list.
4. Select the CAD file, which displays in the **Plug Models** section.

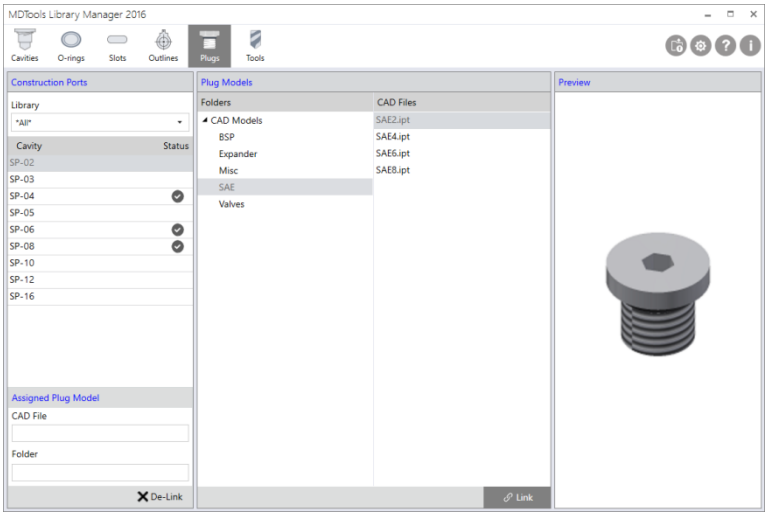
   The Plug file preview displays in the Preview section.
5. Click on the **Link.**

   The selected port status changes to .

   Selected CAD files are linked with the construction port.

   The linked port is identified by *status.*

   When you select a linked port, linked plug model information displays the linked plug file information.



Linking Plug for a construction port

NOTE:

- Prior to assigning the plug file to the cavity, assembly constraints must be set for the plug part file using the MDTools Set Assembly Constraints feature.
- If you want to modify the assigned plug file path, select the plug file and click the **Link** button**.**
  It removes the previous linked file and assigns the new file.

3 De-Linking the Plug File from a Construction Port

1. MDTools Library Manager ribbon > **Plugs**

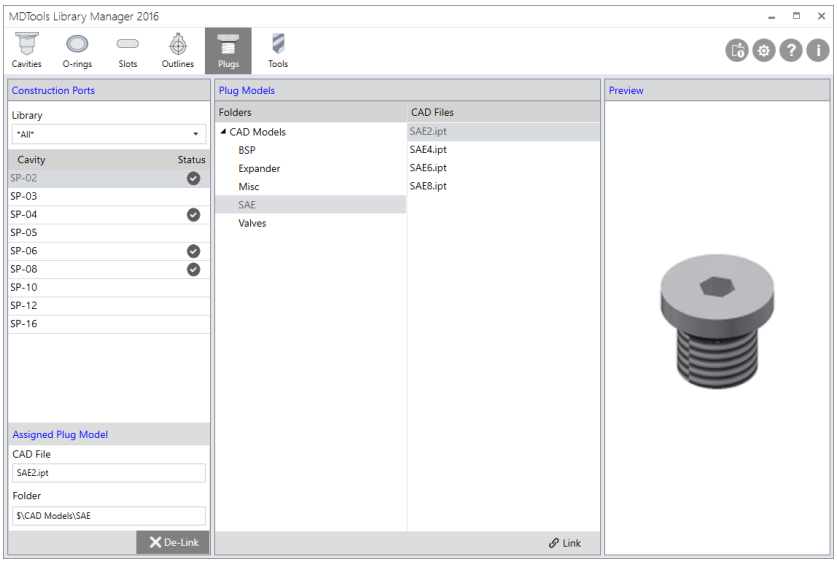
   All Construction plugs in the selected library display in the Construction Ports section.

2. Select a **Construction port**.

   Assigned plug model section displays the linked plug file information.

3. Click on **De-Link.**

   The program removes the linked plug file for the selected cavity.



De-linking plug model from a construction port

13. Tools

Create a list of drill, flat bottom drill and spot face tools.
This information is used by MDTools® to choose the correct diameter while connecting cavities automatically and to check manufacturablity to cavities in the manifold.

1 Adding a Tool

1. MDTools Library Manager ribbon > **Tools**

   The Drills and Selected Drill sections display.

2. Select **Tool** Type in the **Drills** section. Drill/Flat Bottom Drill/Spot Face

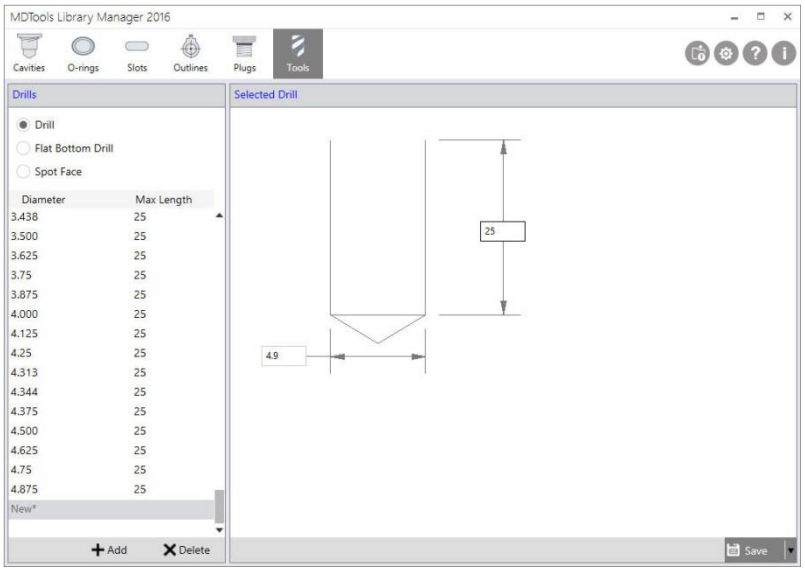
   All tools in the selected Tool type library lists in the section.

3. Click **Add**.
4. Enter values for the tool **Diameter** and the tool **Max Length**.
5. Click **Save** to save the tool values.

   The selected tool is added to the selected library.

NOTE:

The Tooling data is saved in ToolingAndManufacturing.mdb.



Tools: Adding a tool

2 Updating a Tool

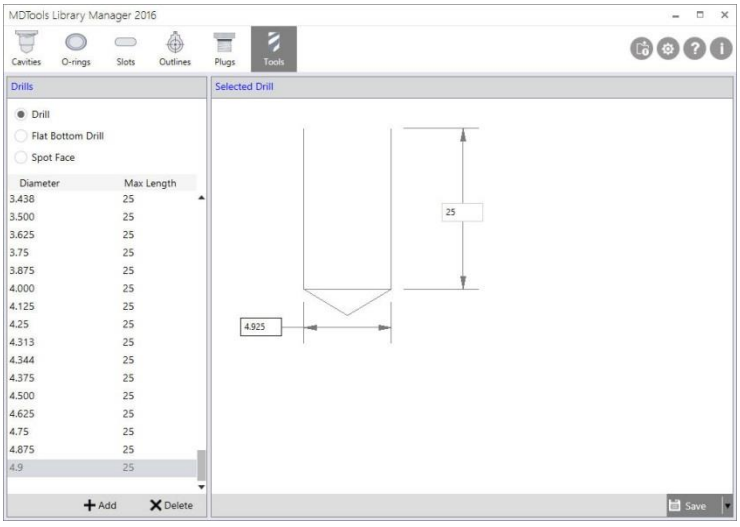
1. MDTools Library Manager ribbon > **Tools**

   The Drills and Selected Drill sections display.

2. Select **Tool** Type in the **Drills** section. Drill/Flat Bottom Drill/Spot Face

   All tools in the selected Tool type lists in the section.

3. Select a tool from the list.
4. Enter new values for the tool **Diameter** and the tool **Max Length**.
5. Click **Save** or **Save As** to save as a new tool.



Tools: Updating a tool

3 Deleting a Tool

1. MDTools Library Manager ribbon > **Tools**

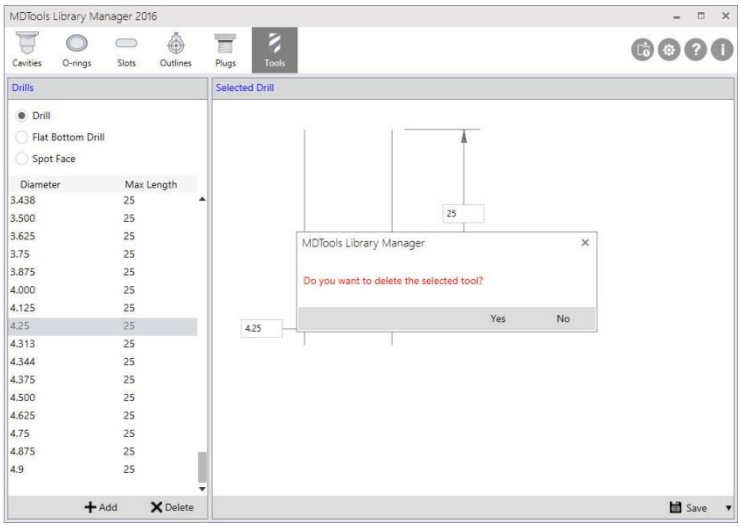
   The Drills and Selected Drill sections display.

2. Select **Tool** Type in the **Drills** section. Drill/Flat Bottom Drill/Spot Face

   All tools in the selected Tool type lists in the section.

3. Select a tool from the list.
4. Click **Delete**.

   The selected tool is deleted from the library and tools list.



Tools: Deleting a tool

14. Import Cavities

Import new cavities/footprints from a different MDTools Cavity library file into your library. Update your existing Cavity data.

1. MDTools Library Manager ribbon
   > **Import Cavity**

   The Import Cavities/Footprints dialog box displays.

2. Browse  and select the source **Library Path**.

3. Select the **cavity library** you want to import from the Library dropdown.

   Cavities in the selected library display in the Cavity list.

4. Select the cavities you want to import.

   *Select the **Delete cavity after importing** option, if you want to delete a cavity from the source library after importing.*

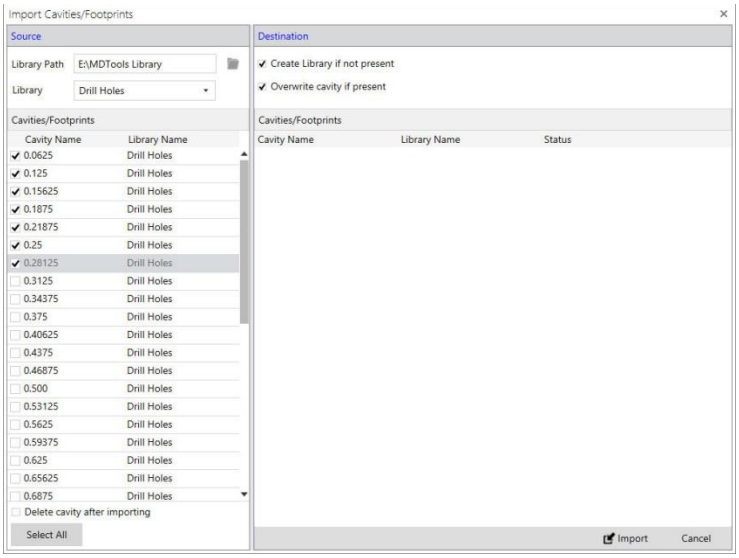
5. Select following **Options** in the **Destination** section, if required.

   - Create Library, if not present.
   - Overwrite cavity, if present

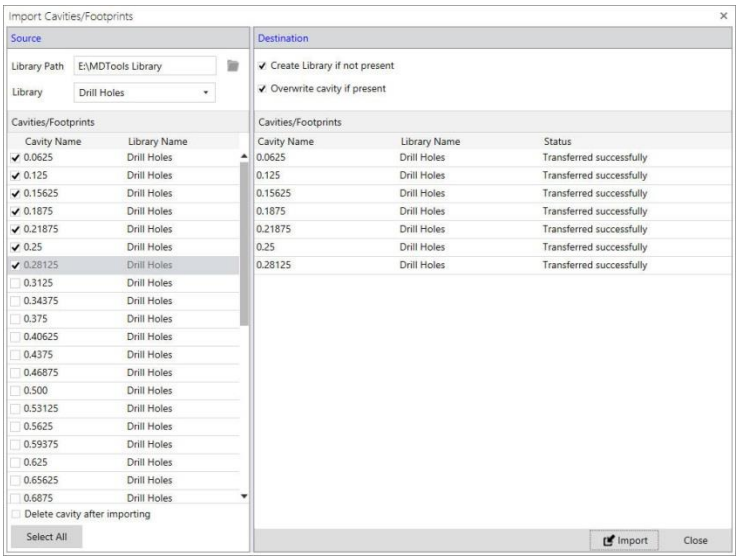
6. Click **Import**.

   The program lists all the cavities imported into the destination library with the status of transfer.

7. Click **Close**.



Import Cavities/Footprints dialog box



Import Cavity/Footprints: Selected cavities imported

15. Options

Configure Unit, Path and Plug Model Library path in Options.

1. MDTools Library Manager ribbon > **Options**

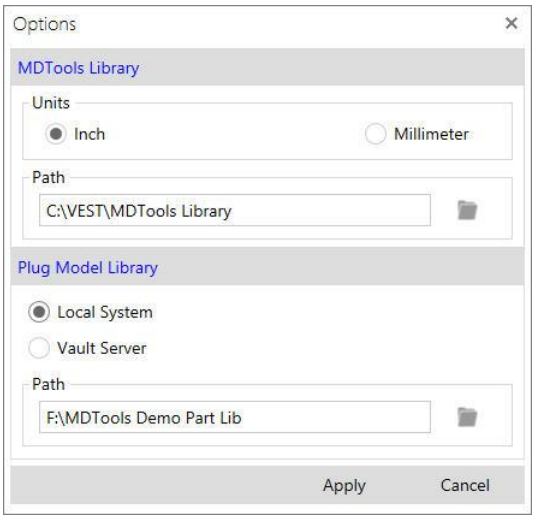
   The Options dialog box displays.

2. Select **Units**: Inch or Millimeter.

   If Inch is selected, all MDTools Library Manager commands use Inch libraries. (i.e. InchVESTMDToolsLibrary.mdb is used for the Cavity command)

   If Millimeter is selected, all MDTools Library Manager commands use Metric libraries. (i.e. MMVESTMDToolsLibrary.mdb used for the Cavity command)

3. Browse and select the Library **Path**.

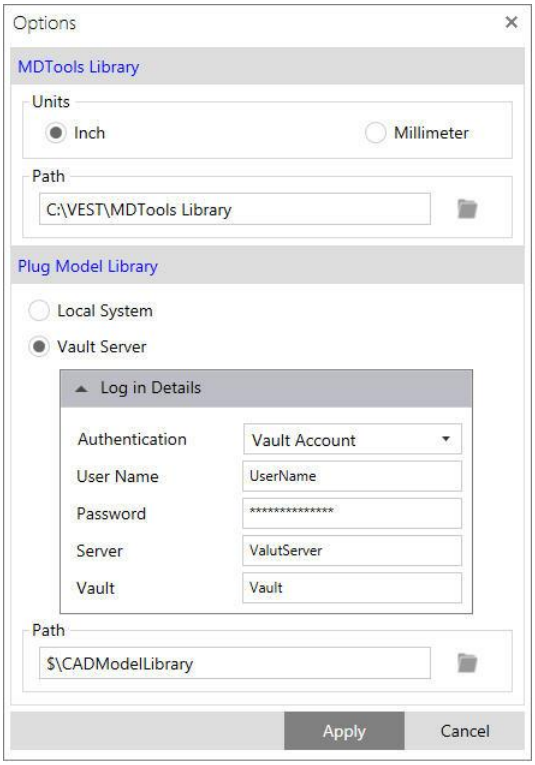


Options dialog box

4. Select the location of Plug Model Library.
   - **Local System**

     To use CAD files from the local system.
   - **Vault Server**

     To use CAD files from Vault Server. You need to fill log in details in the Vault Log In Details section.



Options: Plug Model Library

Vault Server - Log Details:

- Select **Authentication** type.
- Enter **User Name, Password, Server** and **Vault** details.
  Program remembers the Log in details for the current and future sessions.

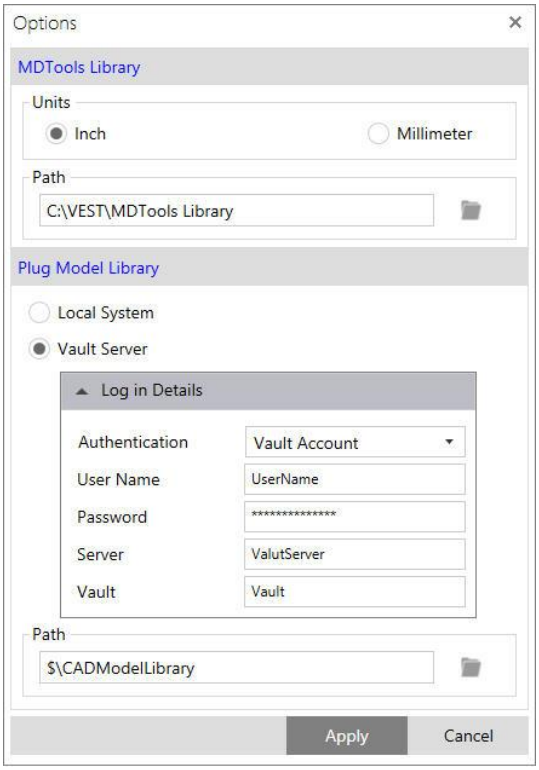
  You can change vault login details later at any stage.

5. Browse and select the Plug Model Library location path.

   Browse option will list the folders on the local machine or on a Vault server, based on the selected option as Local System or Vault Server.

6. Select the **CAD Models** folder in the Browse For Folder dialog box.
7. Click **Apply** to save the settings.

The Apply option reloads all the data in MDTools Library Manager.



Options: Vault Server login

NOTE:

- The default unit setting is Inch.
- Do not edit the cavity library manually using the Microsoft Access; always use the MDTools Library Manager program to edit the library.
- Microsoft Access is not required to edit the cavity library. You can edit the cavity library using the MDTools Cavity Library program even if Microsoft Access is not installed on your machine.
- Two separate databases, one for Inch and the other for Metric units is used to store the data.
- The Inch library is stored in the Microsoft Access database file named, InchVESTMDToolsLibrary.mdb and the Metric library is stored in MMVESTMDToolsLibrary.mdb.

  These files are located in the root (installation) directory of MDTools Library.

  Share the cavity library over a network in your group by specifying the location of the library in the Options dialog box.

16. Help

Open the MDTools Library Manager 2016 user manual in .pdf format.

1. MDTools Library Manager ribbon
   > **Help**

   MDTools Library Manager 2016 user manual open in .PDF format.

MDTools Library Manager ribbon: Help

17. About Library Manager

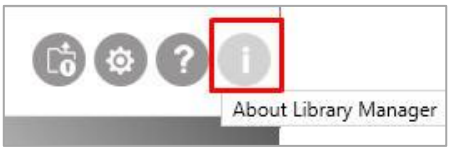
Displays the current MDTools Library Manager's release and build number.

1. MDTools Library Manager ribbon
   > **About Library Manager**

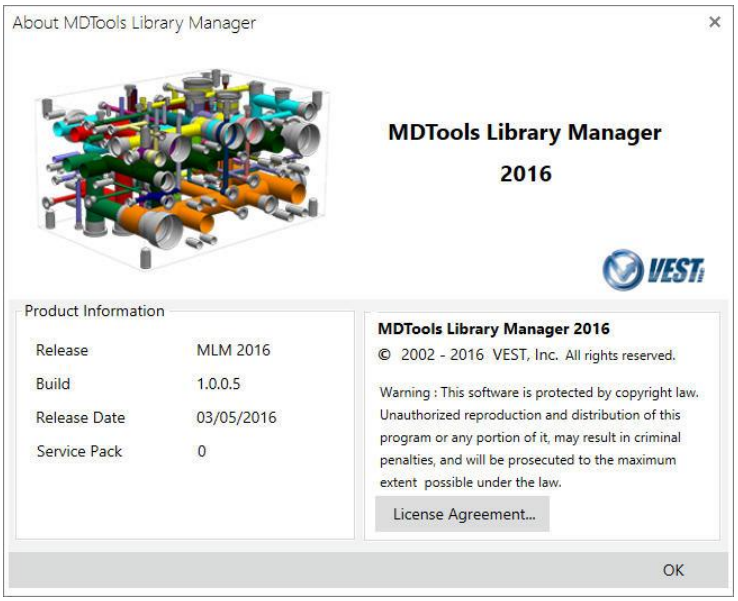
   The About MDTools Library Manger dialog box displays and shows the current release and build number.

   Click License Agreement… option to display the License Agreement dialog box.

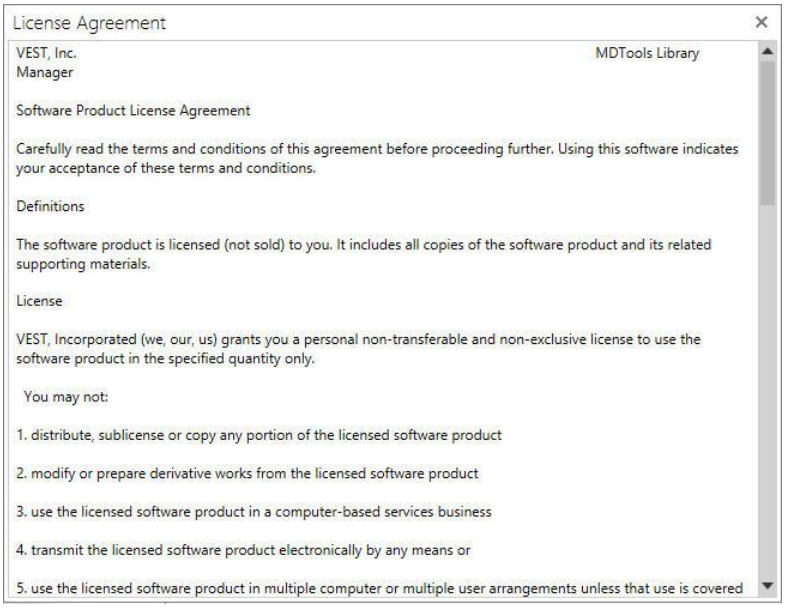
2. Click **OK** to close.



MDTools Library Manager ribbon: About Library Manager



About MDTools Library Manager dialog box



License Agreement dialog box

18. Cavities Included

List of Cavities Included in MDTools Library Manager 2016. Inch & MM

Library Name	Cavity Name
Bolt Holes (Metric)	M10x1.5-6H
Bolt Holes (Metric)	M12x1.75-6H
Bolt Holes (Metric)	M14x2.0-6H
Bolt Holes (Metric)	M16x2.0-6H
Bolt Holes (Metric)	M18x2.5-6H
Bolt Holes (Metric)	M20x2.5-6H
Bolt Holes (Metric)	M24x3.0-6H
Bolt Holes (Metric)	M30x3.5-6H
Bolt Holes (Metric)	M36x4.0-6H
Bolt Holes (Metric)	M4x0.7-6H
Bolt Holes (Metric)	M5x0.8-6H
Bolt Holes (Metric)	M6x1.0-6H
Bolt Holes (Metric)	M8x1.25-6H

Bolt Holes (UNC)	#10-24 UNC
Bolt Holes (UNC)	#6-32 UNC
Bolt Holes (UNC)	#8-32 UNC
Bolt Holes (UNC)	1"-8 UNC
Bolt Holes (UNC)	1/2"-13 UNC
Bolt Holes (UNC)	1/4"-20 UNC
Bolt Holes (UNC)	1-1/2"-6 UNC
Bolt Holes (UNC)	1-1/4"-7 UNC
Bolt Holes (UNC)	1-1/8"-7 UNC
Bolt Holes (UNC)	1-3/4"-5 UNC
Bolt Holes (UNC)	1-3/8"-6 UNC
Bolt Holes (UNC)	2"-4.5 UNC
Bolt Holes (UNC)	2-1/2"-4 UNC
Bolt Holes (UNC)	2-1/4"-4.5 UNC
Bolt Holes (UNC)	3"-4 UNC
Bolt Holes (UNC)	3/4"-10 UNC
Bolt Holes (UNC)	3/8"-16 UNC
Bolt Holes (UNC)	5/16"-18 UNC
Bolt Holes (UNC)	5/8"-11 UNC
Bolt Holes (UNC)	7/16"-14 UNC
Bolt Holes (UNC)	7/8"-9 UNC
Bolt Holes (UNC)	9/16"-12 UNC

BSP Ports-ISO 1179-1	G 1 1/2 -11
BSP Ports-ISO 1179-1	G 1 1/4 -11
BSP Ports-ISO 1179-1	G 1/2-14
BSP Ports-ISO 1179-1	G 1/4-19
BSP Ports-ISO 1179-1	G 1/8-28
BSP Ports-ISO 1179-1	G 1-11
BSP Ports-ISO 1179-1	G 2-11
BSP Ports-ISO 1179-1	G 3/4-14
BSP Ports-ISO 1179-1	G 3/8-19

Deltrol	080-2
Deltrol	080-2P
Deltrol	080-3
Deltrol	080-4
Deltrol	100-2

Library Name	Cavity Name
BSPT Ports-ISO 1179-1	RP 1 1/2 -11
BSPT Ports-ISO 1179-1	RP 1 1/4 -11
BSPT Ports-ISO 1179-1	RP 1/2-14
BSPT Ports-ISO 1179-1	RP 1/4-19
BSPT Ports-ISO 1179-1	RP 1/8-28
BSPT Ports-ISO 1179-1	RP 1-11
BSPT Ports-ISO 1179-1	RP 2-11
BSPT Ports-ISO 1179-1	RP 3/4-14
BSPT Ports-ISO 1179-1	RP 3/8-19

Command Controls	C0420
Command Controls	C0430
Command Controls	C0820
Command Controls	C0825
Command Controls	C0830
Command Controls	C0840
Command Controls	C1020
Command Controls	C1025
Command Controls	C1030
Command Controls	C1040
Command Controls	C1220
Command Controls	C1225
Command Controls	C1230
Command Controls	C1240
Command Controls	C1620
Command Controls	C1625
Command Controls	C1630
Command Controls	C1640

Comp. Flow Control-ISO 6263	6263-02-01-“-97
Comp. Flow Control-ISO 6263	6263-03-03-*-97
Comp. Flow Control-ISO 6263	6263-06-05-*-97
Comp. Flow Control-ISO 6263	6263-06-07-*-97
Comp. Flow Control-ISO 6263	6263-07-09-*-97
Comp. Flow Control-ISO 6263	6263-07-11-*-97
Comp. Flow Control-ISO 6263	6263-08-I 3-*-97
Comp. Flow Control-ISO 6263	6263-08-I 5*-97

Delta Power	40500000
Delta Power	40500001
Delta Power	40500002
Delta Power	40500003
Delta Power	40500004
Delta Power	40500005
Delta Power	40500006
Delta Power	40500012
Delta Power	40500017
Delta Power	40500018
Delta Power	40500019
Delta Power	40500020
Delta Power	40500021
Delta Power	40500024

Library Name	Cavity Name
Deltrol	100-2P
Deltrol	100-3
Deltrol	100-3S
Deltrol	100-4
Deltrol	100-4L
Deltrol	120-3
Deltrol	160-3S

Direct.Control-DIN24340 Form A	DIN 24 340-A 25
Direct.Control-DIN24340 Form A	DIN 24 340-A 32
Direct.Control-DIN24340 Form A	DIN 24 340-A 4
Direct.Control-DIN24340 Form A	DIN 24 340-A 6
Direct.Control-DIN24340 Form A	DIN 24 340-A 8
Direct.Control-DIN24340 Form A	DIN 24 340-A10
Direct.Control-DIN24340 Form A	DIN 24 340-A16

Direct.Control-DIN24340 Form B	DIN 24 340-B 10
Direct.Control-DIN24340 Form B	DIN 24 340-B 16
Direct.Control-DIN24340 Form B	DIN 24 340-B 25
Direct.Control-DIN24340 Form B	DIN 24 340-B 32
Direct.Control-DIN24340 Form B	DIN 24 340-B 40

Direct.Control-ISO 4401	4401-02-01-0-94
Direct.Control-ISO 4401	4401-03-02-0-94
Direct.Control-ISO 4401	4401-03-03-0-94
Direct.Control-ISO 4401	4401-05-04-0-94
Direct.Control-ISO 4401	4401-05-05-0-94
Direct.Control-ISO 4401	4401-07-06-0-94
Direct.Control-ISO 4401	4401-08-07-0-94
Direct.Control-ISO 4401	4401-10-08-0-94

Direct.Control-ISO 4401:2005	4401-02-01-0-05
Direct.Control-ISO 4401:2005	4401-03-02-0-05
Direct.Control-ISO 4401:2005	4401-03-03-0-05
Direct.Control-ISO 4401:2005	4401-05-04-0-05
Direct.Control-ISO 4401:2005	4401-05-05-0-05
Direct.Control-ISO 4401:2005	4401-05-06-0-05
Direct.Control-ISO 4401:2005	4401-07-07-0-05
Direct.Control-ISO 4401:2005	4401-08-08-0-05
Direct.Control-ISO 4401:2005	4401-10-09-0-05

Direct.Control-NFPA-T3.5.1	D02
Direct.Control-NFPA-T3.5.1	D03
Direct.Control-NFPA-T3.5.1	D05
Direct.Control-NFPA-T3.5.1	D05-Alt-B
Direct.Control-NFPA-T3.5.1	D05H
Direct.Control-NFPA-T3.5.1	D06
Direct.Control-NFPA-T3.5.1	D07
Direct.Control-NFPA-T3.5.1	D08
Direct.Control-NFPA-T3.5.1	D10

EPS Flanges	4" EPS Flange
EPS Flanges	5" EPS Flange
EPS Flanges	6" EPS Flange
EPS Flanges	8" EPS Flange

Library Name	Cavity Name
Delta Power	40500028
Delta Power	40500029
Delta Power	40500032
Delta Power	40500033
Delta Power	40500034
Delta Power	40500035
Delta Power	40500037

Duplomatic	D-10A
Duplomatic	D-10B
Duplomatic	D-10C
Duplomatic	D-10D
Duplomatic	D-10E
Duplomatic	KT08
Duplomatic	KT08U
Duplomatic	RS2-I
Duplomatic	RS3-I
Duplomatic	RS4-I
Duplomatic	RS5-I
Duplomatic	RS6-I
Duplomatic	RSN2-I
Duplomatic	RSN3-I
Duplomatic	RSN4-I
Duplomatic	RSN5-I
Duplomatic	VR2-I
Duplomatic	VR5-I
Duplomatic	VR7-I
Duplomatic	VSK1
Duplomatic	VSK2

Eaton	C-10-2
Eaton	C-10-3
Eaton	C-10-3S
Eaton	C-10-4
Eaton	C-10-4U
Eaton	C-10-5S
Eaton	C-12-2
Eaton	C-12-2U
Eaton	C-12-3
Eaton	C-12-3S
Eaton	C-12-4
Eaton	C-12-4U
Eaton	C-12-5S
Eaton	C-16-2
Eaton	C-16-3
Eaton	C-16-3S
Eaton	C-16-4
Eaton	C-16-5S
Eaton	C-20-2
Eaton	C-20-3
Eaton	C-20-3S
Eaton	C-20-4
Eaton	C-20-5S
Eaton	C-4-2
Eaton	C-4-3

Library Name	Cavity Name
Hawe SICV Cavities	AM1-20/E
Hawe SICV Cavities	BEV3-Z
Hawe SICV Cavities	CAV1
Hawe SICV Cavities	CAV2
Hawe SICV Cavities	CDK 3
Hawe SICV Cavities	CDSV 1
Hawe SICV Cavities	CMV1
Hawe SICV Cavities	CMV2
Hawe SICV Cavities	CMV3
Hawe SICV Cavities	CNE2
Hawe SICV Cavities	CNE21/22/23
Hawe SICV Cavities	CRH 1
Hawe SICV Cavities	CRH 2
Hawe SICV Cavities	CRH 3/3V
Hawe SICV Cavities	CRK 3
Hawe SICV Cavities	CRK/B 1
Hawe SICV Cavities	CRK/B 2
Hawe SICV Cavities	CSJ
Hawe SICV Cavities	CSV2
Hawe SICV Cavities	CSV3
Hawe SICV Cavities	EM 11D
Hawe SICV Cavities	EM 11V/S
Hawe SICV Cavities	EM 21D
Hawe SICV Cavities	EM 41V/S
Hawe SICV Cavities	EM(P) 21V/S
Hawe SICV Cavities	EM(P) 31V/S
Hawe SICV Cavities	LB1
Hawe SICV Cavities	LB14-C
Hawe SICV Cavities	LB2
Hawe SICV Cavities	LB26-C
Hawe SICV Cavities	LB28-C
Hawe SICV Cavities	LB2-UNF
Hawe SICV Cavities	LB3
Hawe SICV Cavities	LB30-C
Hawe SICV Cavities	LB32-C
Hawe SICV Cavities	LB3-UNF
Hawe SICV Cavities	LB4
Hawe SICV Cavities	LB47-C
Hawe SICV Cavities	LB4-UN
Hawe SICV Cavities	LHT 3E
Hawe SICV Cavities	RC1
Hawe SICV Cavities	RC14
Hawe SICV Cavities	RC2
Hawe SICV Cavities	RC26
Hawe SICV Cavities	RC28
Hawe SICV Cavities	RC3
Hawe SICV Cavities	RC30
Hawe SICV Cavities	RC32
Hawe SICV Cavities	RE0
Hawe SICV Cavities	RE1
Hawe SICV Cavities	RE2
Hawe SICV Cavities	RE3
Hawe SICV Cavities	RE30
Hawe SICV Cavities	RE32
Hawe SICV Cavities	RE4

Library Name	Cavity Name
Eaton	C-8-2
Eaton	C-8-3
Eaton	C-8-4
Eaton	C-8-5S
Eaton	CG02
Eaton	CG03
Eaton	CG06
Eaton	CG10
Eaton	CG2V-6
Eaton	CG2V-8
Eaton	RCG03
Eaton	RCG06
Eaton	RCG10
Eaton	URG1-06
Eaton	URG1-10
Eaton	XGL03

Hawe Valve Interface	AM11
Hawe Valve Interface	BVP-11R/S
Hawe Valve Interface	BVP-11Z
Hawe Valve Interface	BVP-2R/S
Hawe Valve Interface	BVP-2Z
Hawe Valve Interface	BVP-3R/S
Hawe Valve Interface	BVP-3Z
Hawe Valve Interface	G (Z)3-0
Hawe Valve Interface	G (Z)3-1
Hawe Valve Interface	G (Z)3-2
Hawe Valve Interface	G (Z)3-3
Hawe Valve Interface	G (Z)3-4
Hawe Valve Interface	G (Z)4-1
Hawe Valve Interface	G R/S2-0
Hawe Valve Interface	G R/S2-1
Hawe Valve Interface	G R/S2-2
Hawe Valve Interface	G R/S2-3
Hawe Valve Interface	G R/S2-4
Hawe Valve Interface	G21-0
Hawe Valve Interface	G21-1
Hawe Valve Interface	G21-2
Hawe Valve Interface	G21-3
Hawe Valve Interface	G22-0
Hawe Valve Interface	G22-1
Hawe Valve Interface	G22-2
Hawe Valve Interface	G22-3
Hawe Valve Interface	HRP1
Hawe Valve Interface	HRP2
Hawe Valve Interface	HRP3(V)
Hawe Valve Interface	HRP4(V)
Hawe Valve Interface	HRP5(V)
Hawe Valve Interface	HRP7(V)
Hawe Valve Interface	LHT 33P-11
Hawe Valve Interface	LHT 33P-15
Hawe Valve Interface	MVP 4
Hawe Valve Interface	MVP 5
Hawe Valve Interface	MVP 6
Hawe Valve Interface	MVP 8

Library Name	Cavity Name
Hawe SICV Cavities	RHC1
Hawe SICV Cavities	RHC13
Hawe SICV Cavities	RHC2
Hawe SICV Cavities	RHC23
Hawe SICV Cavities	RHC23/1
Hawe SICV Cavities	RHC3
Hawe SICV Cavities	RHC33
Hawe SICV Cavities	RHC4
Hawe SICV Cavities	RHC43
Hawe SICV Cavities	RHC43/3
Hawe SICV Cavities	RHC5
Hawe SICV Cavities	RHC53
Hawe SICV Cavities	RHC6
Hawe SICV Cavities	RHCE1
Hawe SICV Cavities	RHCE13
Hawe SICV Cavities	RHCE2
Hawe SICV Cavities	RHCE23
Hawe SICV Cavities	RHCE3
Hawe SICV Cavities	RHCE33
Hawe SICV Cavities	RHCE4
Hawe SICV Cavities	RHCE43
Hawe SICV Cavities	RHCE5
Hawe SICV Cavities	RHCE53
Hawe SICV Cavities	RHCE6
Hawe SICV Cavities	RHCE63
Hawe SICV Cavities	RK/B0
Hawe SICV Cavities	RK/B1
Hawe SICV Cavities	RK/B14
Hawe SICV Cavities	RK/B2
Hawe SICV Cavities	RK/B28
Hawe SICV Cavities	RK/B3
Hawe SICV Cavities	RK/B32
Hawe SICV Cavities	RK/B4
Hawe SICV Cavities	RK/B47
Hawe SICV Cavities	SB0
Hawe SICV Cavities	SB0-14
Hawe SICV Cavities	SB1
Hawe SICV Cavities	SB1-18
Hawe SICV Cavities	SB2
Hawe SICV Cavities	SB2-22
Hawe SICV Cavities	SB3
Hawe SICV Cavities	SB3-27
Hawe SICV Cavities	WVC1

HydraForce	VC04-2
HydraForce	VC04-B2
HydraForce	VC04-B3
HydraForce	VC06-2
HydraForce	VC07-3
HydraForce	VC08-2
HydraForce	VC08-3
HydraForce	VC08-4
HydraForce	VC08-PCV
HydraForce	VC09-2
HydraForce	VC10-2

Library Name	Cavity Name
Hawe Valve Interface	PDM4P
Hawe Valve Interface	PDM5P
Hawe Valve Interface	PMVP 4
Hawe Valve Interface	PMVP 5
Hawe Valve Interface	PMVP 6
Hawe Valve Interface	PMVP 8
Hawe Valve Interface	PSLF3
Hawe Valve Interface	PSLF5
Hawe Valve Interface	SF2-3
Hawe Valve Interface	SF2-4
Hawe Valve Interface	SF2-5
Hawe Valve Interface	SF3-3
Hawe Valve Interface	SF3-4
Hawe Valve Interface	SF3-5
Hawe Valve Interface	SLF3
Hawe Valve Interface	SLF5
Hawe Valve Interface	TQ 3P-A
Hawe Valve Interface	TQ 4P-A
Hawe Valve Interface	TQ 5P-A

Hydac	03030
Hydac	3230
Hydac	04220
Hydac	05030
Hydac	05220
Hydac	05330
Hydac	05520
Hydac	05830
Hydac	06020
Hydac	06320
Hydac	08021
Hydac	08030
Hydac	08130
Hydac	08140
Hydac	08220
Hydac	08520
Hydac	08920
Hydac	10120
Hydac	10120A
Hydac	10130
Hydac	10520
Hydac	10920
Hydac	12120
Hydac	12120A
Hydac	12121
Hydac	12130
Hydac	12230
Hydac	12520
Hydac	12920
Hydac	16920
Hydac	20021
Hydac	FC07-3
Hydac	FC081-2
Hydac	FC08-2
Hydac	FC08-3

Library Name	Cavity Name
HydraForce	VC10-3
HydraForce	VC10-4
HydraForce	VC10-5
HydraForce	VC10-6
HydraForce	VC10-PCV
HydraForce	VC10-S3
HydraForce	VC10-S6
HydraForce	VC12-2
HydraForce	VC12-3
HydraForce	VC12-4
HydraForce	VC12-6
HydraForce	VC12-S3
HydraForce	VC12-S5
HydraForce	VC12-S6
HydraForce	VC16-2
HydraForce	VC16-3
HydraForce	VC16-4
HydraForce	VC16-PCV
HydraForce	VC16-S3
HydraForce	VC16-S5
HydraForce	VC16-S6
HydraForce	VC20-2
HydraForce	VC20-S3
HydraForce	VC42-M2
HydraForce	VC42-M3
HydraForce	VC42-M4
HydraForce	VC42-S6
HydraForce	VC98-3
HydraForce	VC-T001
HydraForce	VC-T004
HydraForce	VC-T009
HydraForce	VC-T011

Miscellaneous	Thru. Bolthole
Miscellaneous	Thru. Bolthole. Hole w/Cbore

Moog	CEE-NG25
Moog	D662
Moog	D663
Moog	D664
Moog	D665
Moog	D791
Moog	D792
Moog	G761

NPT Ports	NPT 1
NPT Ports	NPT 1/16
NPT Ports	NPT 1/2
NPT Ports	NPT 1/4
NPT Ports	NPT 1/8
NPT Ports	NPT 1-1/2
NPT Ports	NPT 1-1/4
NPT Ports	NPT 2
NPT Ports	NPT 3/4
NPT Ports	NPT 3/8

Library Name	Cavity Name
Hydac	FC08-4
Hydac	FC10-2
Hydac	FC10-3
Hydac	FC10-4
Hydac	FC12-2
Hydac	FC12-3
Hydac	FC12-4
Hydac	FC16-2
Hydac	FC16-3
Hydac	FC16-4

HYDAC 2-way Ball Valves	2-Way BV KHP-10
HYDAC 2-way Ball Valves	2-Way BV KHP-16
HYDAC 2-way Ball Valves	2-Way BV KHP-20
HYDAC 2-way Ball Valves	2-Way BV KHP-25
HYDAC 2-way Ball Valves	2-Way BV KHP-32
HYDAC 2-way Ball Valves	2-Way BV KHP-40
HYDAC 2-way Ball Valves	2-Way BV KHP-50

HYDAC Filters	CF-*-20
HYDAC Filters	CP-SAE 120
HYDAC Filters	CP-SAE 15
HYDAC Filters	CP-SAE 40
HYDAC Filters	DF-MA/MHA-160-280
HYDAC Filters	DF-MA-60-140
HYDAC Filters	DFP 160-280
HYDAC Filters	DFP/DFPF 330-1320
HYDAC Filters	DFP/DFPF 60-140
HYDAC Filters	DFPF 160-280
HYDAC Filters	DF-QE/MHE-330-1320
HYDAC Filters	DF-QE-160-280
HYDAC Filters	DF-QE-30
HYDAC Filters	DF-QE-60-140
HYDAC Filters	HF2P-04-08
HYDAC Filters	HF4P-09-18-27
HYDAC Filters	QE/OAI-160-280

Integrated Hydraulics	A1126
Integrated Hydraulics	A12088
Integrated Hydraulics	A12336
Integrated Hydraulics	A13245
Integrated Hydraulics	A2791
Integrated Hydraulics	A2976
Integrated Hydraulics	A3145
Integrated Hydraulics	A3146
Integrated Hydraulics	A3377
Integrated Hydraulics	A3531
Integrated Hydraulics	A5302
Integrated Hydraulics	A6610
Integrated Hydraulics	A6701
Integrated Hydraulics	A6835
Integrated Hydraulics	A6935
Integrated Hydraulics	A6951
Integrated Hydraulics	A7447
Integrated Hydraulics	A7708

Library Name	Cavity Name
Olmsted Flanges	4" Olmsted Flange
Olmsted Flanges	5" Olmsted Flange
Olmsted Flanges	6" Olmsted Flange

Polyhydron	C-06
Polyhydron	C-10
Polyhydron	C-20
Polyhydron	C-30
Polyhydron	CBS20S
Polyhydron	DPR06
Polyhydron	DPR10
Polyhydron	DPR20
Polyhydron	PPR06

Pr.Red, Seq, Unload-ISO 5781	5781-02-01-0-00
Pr.Red, Seq, Unload-ISO 5781	5781-03-04-0-00
Pr.Red, Seq, Unload-ISO 5781	5781-06-07-0-00
Pr.Red, Seq, Unload-ISO 5781	5781-08-10-0-00
Pr.Red, Seq, Unload-ISO 5781	5781-10-13-0-00

Pressure Control-ISO 6264	6264-02-01-97
Pressure Control-ISO 6264	6264-03-04-97
Pressure Control-ISO 6264	6264-06-07-97
Pressure Control-ISO 6264	6264-06-09-97
Pressure Control-ISO 6264	6264-08-11-97
Pressure Control-ISO 6264	6264-08-13-97
Pressure Control-ISO 6264	6264-10-15-97
Pressure Control-ISO 6264	6264-10-17-97

Rexroth	003
Rexroth	004
Rexroth	019-E
Rexroth	065
Rexroth	348
Rexroth	CA-04A-3Y
Rexroth	CA-07A-3N
Rexroth	CA-08A-2N
Rexroth	CA-08A-3C
Rexroth	CA-08A-3N
Rexroth	CA-08A-4N
Rexroth	CA-10A-2N
Rexroth	CA-10A-3C
Rexroth	CA-10A-3N
Rexroth	CA-10A-4N
Rexroth	CA-12A-2N
Rexroth	CA-12A-3C
Rexroth	CA-12A-3N
Rexroth	CA-12A-4N
Rexroth	CA-16A-2N
Rexroth	CA-16A-3C
Rexroth	CA-16A-3N
Rexroth	CA-16A-4N
Rexroth	CA-20A-2N
Rexroth	CA-20A-3C

Library Name	Cavity Name
Integrated Hydraulics	A877
Integrated Hydraulics	A878
Integrated Hydraulics	A879
Integrated Hydraulics	A880
Integrated Hydraulics	A881
Integrated Hydraulics	A890
Integrated Hydraulics	A892
Integrated Hydraulics	A893
Integrated Hydraulics	CVA-20-01-0
Integrated Hydraulics	CVA-22-06-0
Integrated Hydraulics	CVA-27-04-0
Integrated Hydraulics	CVB-22-06-0
Integrated Hydraulics	CVB-27-04-0
Integrated Hydraulics	CVB-42-04-0

Parker	100-1
Parker	2G
Parker	2R
Parker	2X
Parker	3A
Parker	3C
Parker	3J
Parker	3K
Parker	3M
Parker	3X
Parker	3Z
Parker	4C
Parker	53-1
Parker	54-1
Parker	5A
Parker	68-1
Parker	91-1
Parker	C04-2
Parker	C04-3
Parker	C08-2
Parker	C08-3
Parker	C08-4
Parker	C09-2
Parker	C10-2
Parker	C10-3
Parker	C10-3S
Parker	C10-4
Parker	C12-2
Parker	C12-3
Parker	C12-3L
Parker	C12-4
Parker	C12-4L
Parker	C16-2
Parker	C16-3
Parker	C16-3S
Parker	C16-4
Parker	C20-2
Parker	C20-3S
Parker	CAV0W-2

Library Name	Cavity Name
Rexroth	CA-20A-3N
Rexroth	CA-20A-4N
Rexroth	CC063A-01
Rexroth	CD072A-01
Rexroth	CD073A-01
Rexroth	DBD10K
Rexroth	DBD20K
Rexroth	DBD30K
Rexroth	DBD6K
Rexroth	MSR10KD
Rexroth	MSR10KE
Rexroth	MSR15KD
Rexroth	MSR15KE
Rexroth	MSR20KD
Rexroth	MSR20KE
Rexroth	MSR25KD
Rexroth	MSR25KE
Rexroth	MSR30KD
Rexroth	MSR30KE
Rexroth	MSR8KD
Rexroth	MSR8KE
Sauer Danfoss	CP04-2
Sauer Danfoss	CP04-3
Sauer Danfoss	CP07-3
Sauer Danfoss	CP08-3L
Sauer Danfoss	CP12-2
Sauer Danfoss	CP12-3
Sauer Danfoss	CP12-3M
Sauer Danfoss	CP12-3S
Sauer Danfoss	CP12-4
Sauer Danfoss	CP16-4
Sauer Danfoss	CP20-3S
Sauer Danfoss	FC-144
Sauer Danfoss	FC-304
Sauer Danfoss	FC-336
Sauer Danfoss	NCS04/2
Sauer Danfoss	NCS04/3
Sauer Danfoss	NCS06/2
Sauer Danfoss	NCS06/3
Sauer Danfoss	NCS06/4
Sauer Danfoss	NCS12/2
Sauer Danfoss	NCS12/3
Sauer Danfoss	NCS12/4
Sauer Danfoss	SDC08-2
Sauer Danfoss	SDC08-3
Sauer Danfoss	SDC08-4
Sauer Danfoss	SDC10-2
Sauer Danfoss	SDC10-3
Sauer Danfoss	SDC10-3S
Sauer Danfoss	SDC10-4
Sauer Danfoss	SDC12-2
Sauer Danfoss	SDC12-3
Sauer Danfoss	SDC16-2
Sauer Danfoss	SDC16-3

Library Name	Cavity Name
Parker	CAVSW-3
Parker	CAVT11A
Parker	CAVT21A
Parker	CDD-1010
Parker	CDD-1012
Parker	CDD-1013
Parker	CDD-1036
Roetelmann Ball Valves	2-Way SM DN 10
Roetelmann Ball Valves	2-Way SM DN 12
Roetelmann Ball Valves	2-Way SM DN 20
Roetelmann Ball Valves	2-Way SM DN 25
Roetelmann Ball Valves	2-Way SM DN 32
Roetelmann Ball Valves	2-Way SM DN 40
Roetelmann Ball Valves	2-Way SM DN 50
Roetelmann Ball Valves	2-Way SM DN 6
SAE Flanges-J518	1" Code 61
SAE Flanges-J518	1" Code 62
SAE Flanges-J518	1/2" Code 61
SAE Flanges-J518	1/2" Code 62
SAE Flanges-J518	1-1/2" Code 61
SAE Flanges-J518	1-1/2" Code 62
SAE Flanges-J518	1-1/4" Code 61
SAE Flanges-J518	1-1/4" Code 62
SAE Flanges-J518	2" Code 61
SAE Flanges-J518	2" Code 62
SAE Flanges-J518	2-1/2" Code 61
SAE Flanges-J518	2-1/2" Code 62
SAE Flanges-J518	3" Code 61
SAE Flanges-J518	3" Code 62
SAE Flanges-J518	3/4" Code 61
SAE Flanges-J518	3/4" Code 62
SAE Flanges-J518	3-1/2" Code 61
SAE Flanges-J518	4" Code 61
SAE Flanges-J518	5" Code 61
SAE Ports-J1926-1	#10 SAE
SAE Ports-J1926-1	#12 SAE
SAE Ports-J1926-1	#14 SAE
SAE Ports-J1926-1	#16 SAE
SAE Ports-J1926-1	#2 SAE
SAE Ports-J1926-1	#20 SAE
SAE Ports-J1926-1	#24 SAE
SAE Ports-J1926-1	#3 SAE
SAE Ports-J1926-1	#32 SAE
SAE Ports-J1926-1	#4 SAE
SAE Ports-J1926-1	#5 SAE
SAE Ports-J1926-1	#6 SAE
SAE Ports-J1926-1	#8 SAE
Screw-In Cartridge-ISO 7789	18-01-0-07
Screw-In Cartridge-ISO 7789	18-02-0-07
Screw-In Cartridge-ISO 7789	20-01-0-07
Screw-In Cartridge-ISO 7789	20-02-0-07

Library Name	Cavity Name
Sauer Danfoss	SDC16-3S
Sauer Danfoss	SDC20-2
Sauer Danfoss	SDC20-3
Sauer Danfoss	SDC20-4
Sauer Danfoss	VME06
Sauer Danfoss	VME07
Sauer Danfoss	VME08

Servo Valve-ISO 10372	10372-01-01-0-92
Servo Valve-ISO 10372	10372-02-02-0-92
Servo Valve-ISO 10372	10372-03-03-0-92
Servo Valve-ISO 10372	10372-04-04-0-92
Servo Valve-ISO 10372	10372-06-05-0-92

Short Ports	SP-02
Short Ports	SP-03
Short Ports	SP-04
Short Ports	SP-05
Short Ports	SP-06
Short Ports	SP-08
Short Ports	SP-10
Short Ports	SP-12
Short Ports	SP-16

Slip-In Cartridge-ISO 7368	BA-06-2-A
Slip-In Cartridge-ISO 7368	BA-06-2-B
Slip-In Cartridge-ISO 7368	BB-08-2-A
Slip-In Cartridge-ISO 7368	BB-08-2-B
Slip-In Cartridge-ISO 7368	BC-09-2-A
Slip-In Cartridge-ISO 7368	BC-09-2-B
Slip-In Cartridge-ISO 7368	BD-10-2-A
Slip-In Cartridge-ISO 7368	BD-10-2-B
Slip-In Cartridge-ISO 7368	BE-11-2-A
Slip-In Cartridge-ISO 7368	BE-11-2-B
Slip-In Cartridge-ISO 7368	BF-12-2-A
Slip-In Cartridge-ISO 7368	BF-12-2-B
Slip-In Cartridge-ISO 7368	BG-13-2-A
Slip-In Cartridge-ISO 7368	BH-14-2-A

Square Flanges-6000 Series	1" Square Flange
Square Flanges-6000 Series	1/2" Square Flange
Square Flanges-6000 Series	1-1/2" Square Flange
Square Flanges-6000 Series	1-1/4" Square Flange
Square Flanges-6000 Series	2" Square Flange
Square Flanges-6000 Series	2-1/2" Square Flange
Square Flanges-6000 Series	3" Square Flange
Square Flanges-6000 Series	3/4" Square Flange
Square Flanges-6000 Series	3-1/2" Square Flange
Square Flanges-6000 Series	4" Square Flange
Square Flanges-6000 Series	5" Square Flange

Square Flanges-ISO 6164	250 Bar - DN-10
Square Flanges-ISO 6164	250 Bar - DN-13
Square Flanges-ISO 6164	250 Bar - DN-19
Square Flanges-ISO 6164	250 Bar - DN-25

Library Name	Cavity Name
Screw-In Cartridge-ISO 7789	20-03-0-07
Screw-In Cartridge-ISO 7789	20-04-0-07
Screw-In Cartridge-ISO 7789	20-05-0-07
Screw-In Cartridge-ISO 7789	22-01-0-07
Screw-In Cartridge-ISO 7789	22-02-0-07
Screw-In Cartridge-ISO 7789	22-03-0-07
Screw-In Cartridge-ISO 7789	22-04-0-07
Screw-In Cartridge-ISO 7789	22-05-0-07
Screw-In Cartridge-ISO 7789	22-06-0-07
Screw-In Cartridge-ISO 7789	22-07-0-07
Screw-In Cartridge-ISO 7789	22-08-0-07
Screw-In Cartridge-ISO 7789	22-09-0-07
Screw-In Cartridge-ISO 7789	27-01-0-07
Screw-In Cartridge-ISO 7789	27-02-0-07
Screw-In Cartridge-ISO 7789	27-03-0-07
Screw-In Cartridge-ISO 7789	27-04-0-07
Screw-In Cartridge-ISO 7789	27-05-0-07
Screw-In Cartridge-ISO 7789	27-06-0-07
Screw-In Cartridge-ISO 7789	27-07-0-07
Screw-In Cartridge-ISO 7789	27-08-0-07
Screw-In Cartridge-ISO 7789	27-09-0-07
Screw-In Cartridge-ISO 7789	33-01-0-07
Screw-In Cartridge-ISO 7789	33-02-0-07
Screw-In Cartridge-ISO 7789	33-03-0-07
Screw-In Cartridge-ISO 7789	33-04-0-07
Screw-In Cartridge-ISO 7789	33-05-0-07
Screw-In Cartridge-ISO 7789	33-06-0-07
Screw-In Cartridge-ISO 7789	33-07-0-07
Screw-In Cartridge-ISO 7789	33-08-0-07
Screw-In Cartridge-ISO 7789	33-09-0-07
Screw-In Cartridge-ISO 7789	42-01-0-07
Screw-In Cartridge-ISO 7789	42-02-0-07
Screw-In Cartridge-ISO 7789	42-03-0-07
Screw-In Cartridge-ISO 7789	42-04-0-07
Screw-In Cartridge-ISO 7789	42-05-0-07
Screw-In Cartridge-ISO 7789	42-06-0-07
Screw-In Cartridge-ISO 7789	42-07-0-07
Screw-In Cartridge-ISO 7789	42-08-0-07
Screw-In Cartridge-ISO 7789	42-09-0-07

Sun Hydraulics	T-10A
Sun Hydraulics	T-11A
Sun Hydraulics	T-13A
Sun Hydraulics	T-162A
Sun Hydraulics	T-162DP
Sun Hydraulics	T-163A
Sun Hydraulics	T-16A
Sun Hydraulics	T-17A
Sun Hydraulics	T-18A
Sun Hydraulics	T-18AU
Sun Hydraulics	T-19A
Sun Hydraulics	T-19AU
Sun Hydraulics	T-21A
Sun Hydraulics	T-22A
Sun Hydraulics	T-23A

Library Name	Cavity Name
Square Flanges-ISO 6164	250 Bar - DN-32
Square Flanges-ISO 6164	250 Bar - DN-38
Square Flanges-ISO 6164	250 Bar - DN-51
Square Flanges-ISO 6164	250 Bar - DN-56
Square Flanges-ISO 6164	250 Bar - DN-63
Square Flanges-ISO 6164	400 Bar - DN-10
Square Flanges-ISO 6164	400 Bar - DN-13
Square Flanges-ISO 6164	400 Bar - DN-19
Square Flanges-ISO 6164	400 Bar - DN-25
Square Flanges-ISO 6164	400 Bar - DN-32
Square Flanges-ISO 6164	400 Bar - DN-38
Square Flanges-ISO 6164	400 Bar - DN-51
Square Flanges-ISO 6164	400 Bar - DN-56
Square Flanges-ISO 6164	400 Bar - DN-63
Square Flanges-ISO 6164	400 Bar - DN-70
Square Flanges-ISO 6164	400 Bar - DN-80

Library Name	Cavity Name
Sun Hydraulics	T-24A
Sun Hydraulics	T-2A
Sun Hydraulics	T-31A
Sun Hydraulics	T-32A
Sun Hydraulics	T-33A
Sun Hydraulics	T-34A
Sun Hydraulics	T-382A
Sun Hydraulics	T-3A
Sun Hydraulics	T-52A
Sun Hydraulics	T-5A
Sun Hydraulics	T-61A
Sun Hydraulics	T-62A
Sun Hydraulics	T-63A
Sun Hydraulics	T-64A
Sun Hydraulics	T-8A
Sun Hydraulics	T-9A

Valve Patterns-NFPA-T3.5.1	2F06
Valve Patterns-NFPA-T3.5.1	2F07
Valve Patterns-NFPA-T3.5.1	2F08
Valve Patterns-NFPA-T3.5.1	2F09
Valve Patterns-NFPA-T3.5.1	2FB07
Valve Patterns-NFPA-T3.5.1	3F06
Valve Patterns-NFPA-T3.5.1	3F07
Valve Patterns-NFPA-T3.5.1	C06
Valve Patterns-NFPA-T3.5.1	C08
Valve Patterns-NFPA-T3.5.1	C09
Valve Patterns-NFPA-T3.5.1	D06
Valve Patterns-NFPA-T3.5.1	F02
Valve Patterns-NFPA-T3.5.1	F03
Valve Patterns-NFPA-T3.5.1	P02
Valve Patterns-NFPA-T3.5.1	P03
Valve Patterns-NFPA-T3.5.1	P06
Valve Patterns-NFPA-T3.5.1	P08
Valve Patterns-NFPA-T3.5.1	P10
Valve Patterns-NFPA-T3.5.1	POC06
Valve Patterns-NFPA-T3.5.1	POC08
Valve Patterns-NFPA-T3.5.1	R02
Valve Patterns-NFPA-T3.5.1	R03
Valve Patterns-NFPA-T3.5.1	R06
Valve Patterns-NFPA-T3.5.1	R08
Valve Patterns-NFPA-T3.5.1	R10
Valve Patterns-NFPA-T3.5.1	RP06
Valve Patterns-NFPA-T3.5.1	RP08
Valve Patterns-NFPA-T3.5.1	RV08
Valve Patterns-NFPA-T3.5.1	RV10
Valve Patterns-NFPA-T3.5.1	POC09

Orifice Plugs	M10x1.5-6H
Orifice Plugs	M12x1.75-6H
Orifice Plugs	M5x0.8-6H
Orifice Plugs	M6x1.0-6H
Orifice Plugs	M8x1.25-6H
Orifice Plugs	1/4"-28 UNF
Orifice Plugs	5/16"-24 UNF
Orifice Plugs	5/8"-18 UNF
Orifice Plugs	7/16"-20 UNF
Orifice Plugs	9/16"-18 UNF

Inch Only

Library Name	Cavity Name
Drill Holes	0.21875
Drill Holes	0.25
Drill Holes	0.28125
Drill Holes	0.3125
Drill Holes	0.34375
Drill Holes	0.375
Drill Holes	0.40625
Drill Holes	0.4375
Drill Holes	0.46875
Drill Holes	0.5
Drill Holes	0.53125
Drill Holes	0.5625
Drill Holes	0.59375
Drill Holes	0.625
Drill Holes	0.65625
Drill Holes	0.6875
Drill Holes	0.71875
Drill Holes	0.75
Drill Holes	0.78125
Drill Holes	0.8125
Drill Holes	0.84375
Drill Holes	0.875
Drill Holes	0.90625
Drill Holes	0.9375
Drill Holes	0.96875
Drill Holes	1
Drill Holes	1.25
Drill Holes	1.5
Drill Holes	1.75
Drill Holes	2
Drill Holes	2.5
Drill Holes	3
Drill Holes	3.5
Drill Holes	4

Expander Plug Ports	MB-600-093 A
Expander Plug Ports	MB-600-125 A
Expander Plug Ports	MB-600-156 A
Expander Plug Ports	MB-600-187 A
Expander Plug Ports	MB-600-218 A
Expander Plug Ports	MB-600-250 A
Expander Plug Ports	MB-600-281 A

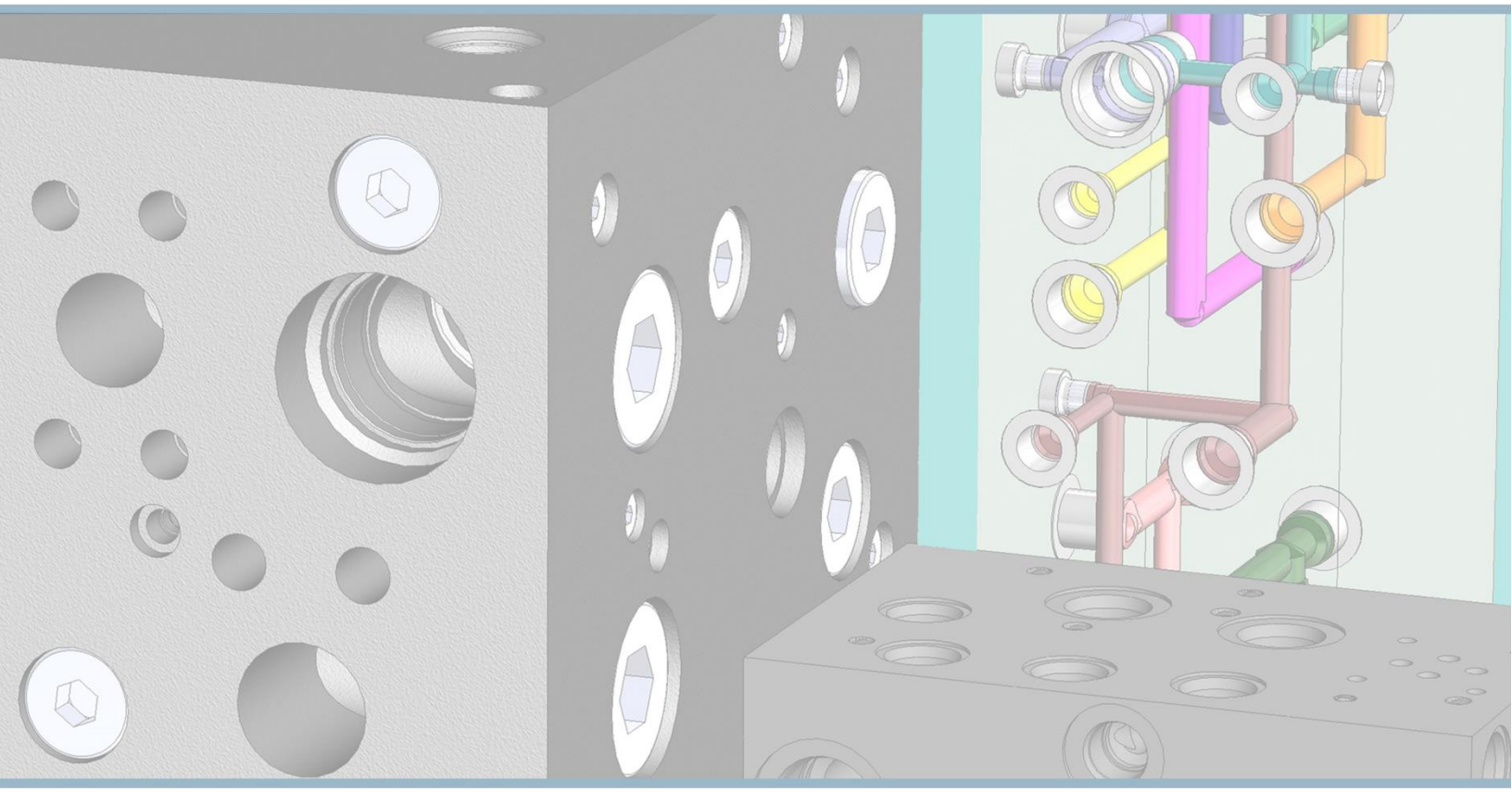
Metric Ports-ISO 6149-1	ISO 6149-1-M10
Metric Ports-ISO 6149-1	ISO 6149-1-M12
Metric Ports-ISO 6149-1	ISO 6149-1-M14
Metric Ports-ISO 6149-1	ISO 6149-1-M16
Metric Ports-ISO 6149-1	ISO 6149-1-M18
Metric Ports-ISO 6149-1	ISO 6149-1-M22
Metric Ports-ISO 6149-1	ISO 6149-1-M27
Metric Ports-ISO 6149-1	ISO 6149-1-M33
Metric Ports-ISO 6149-1	ISO 6149-1-M42
Metric Ports-ISO 6149-1	ISO 6149-1-M48
Metric Ports-ISO 6149-1	ISO 6149-1-M60
Metric Ports-ISO 6149-1	ISO 6149-1-M8

MM Only

Library Name	Cavity Name
Drill Holes	10
Drill Holes	11
Drill Holes	12
Drill Holes	14
Drill Holes	15
Drill Holes	16
Drill Holes	17
Drill Holes	18
Drill Holes	19
Drill Holes	20
Drill Holes	22
Drill Holes	24
Drill Holes	25
Drill Holes	28
Drill Holes	30
Drill Holes	32
Drill Holes	35
Drill Holes	38
Drill Holes	40
Drill Holes	45
Drill Holes	5
Drill Holes	50
Drill Holes	55
Drill Holes	6
Drill Holes	63
Drill Holes	8

Expander Plug Ports	MB-600-030
Expander Plug Ports	MB-600-040
Expander Plug Ports	MB-600-050
Expander Plug Ports	MB-600-060
Expander Plug Ports	MB-600-070
Expander Plug Ports	MB-600-080
Expander Plug Ports	MB-600-090
Expander Plug Ports	MB-600-120
Expander Plug Ports	MB-600-140

Metric Ports-ISO 6149-1	ISO 6149-1-M10 X 1
Metric Ports-ISO 6149-1	ISO 6149-1-M12 X 1.5
Metric Ports-ISO 6149-1	ISO 6149-1-M14 X 1.5
Metric Ports-ISO 6149-1	ISO 6149-1-M16 X 1.5
Metric Ports-ISO 6149-1	ISO 6149-1-M18 X 1.5
Metric Ports-ISO 6149-1	ISO 6149-1-M22 X 1.5
Metric Ports-ISO 6149-1	ISO 6149-1-M27 X 2
Metric Ports-ISO 6149-1	ISO 6149-1-M33 X 2
Metric Ports-ISO 6149-1	ISO 6149-1-M42 X 2
Metric Ports-ISO 6149-1	ISO 6149-1-M48 X 2
Metric Ports-ISO 6149-1	ISO 6149-1-M60 X 2
Metric Ports-ISO 6149-1	ISO 6149-1-M8 X 1



VEST, Inc.
3250 W Big Beaver Rd #440
Troy, MI 48084 USA

01 (248) 649 9550 sales@VESTusa.com VESTusa.com