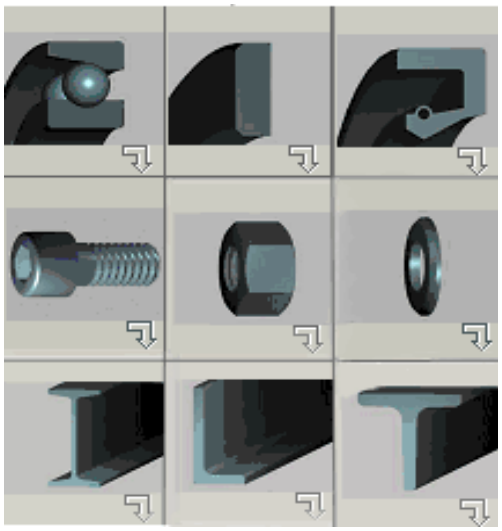
Autodesk **Skill Builders**

A Skill-building Exercise

Optimizing Standard Parts

In This Exercise



By using the predrawn standard parts in AutoCAD Mechanical, you can create your designs more quickly and accurately. Here, you learn how to fully optimize the standard parts for day-to-day work.

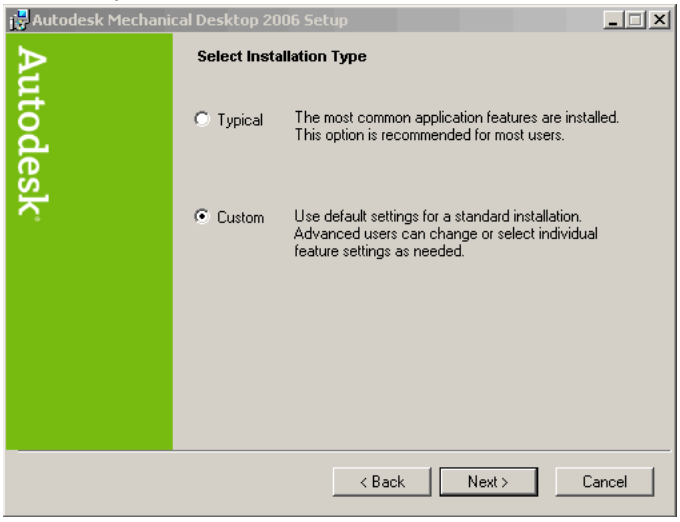
This Skill Builder demonstrates how to:

- Install custom standards.
- Configure standard parts settings.
- Limit the number of standard parts displayed to optimize performance.
- Set up custom standard parts using the VAL-editor to optimize the usage on standard parts.

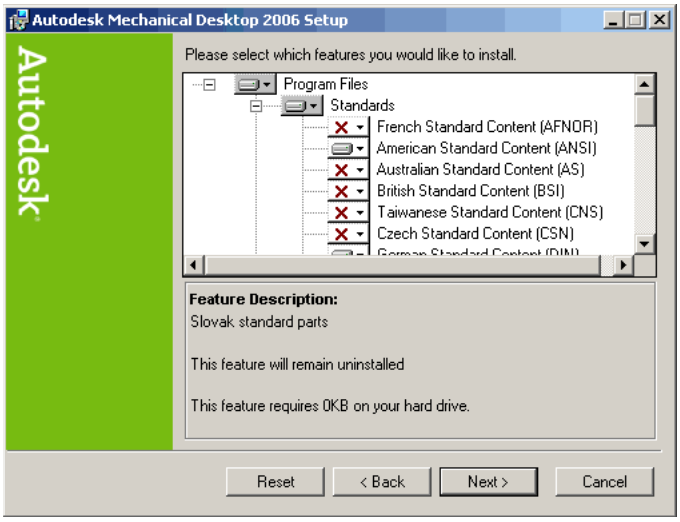
Custom Standards Installation

You must know which standard you plan to use for your projects to include them during the initial installation of AutoCAD Mechanical (for example, ISO, ANSI, DIN, and so on).

Select the Custom option during the installation for the required standards in your designs. You can turn off standard parts that your company rarely uses and reduce the time required to select the appropriate standard part.

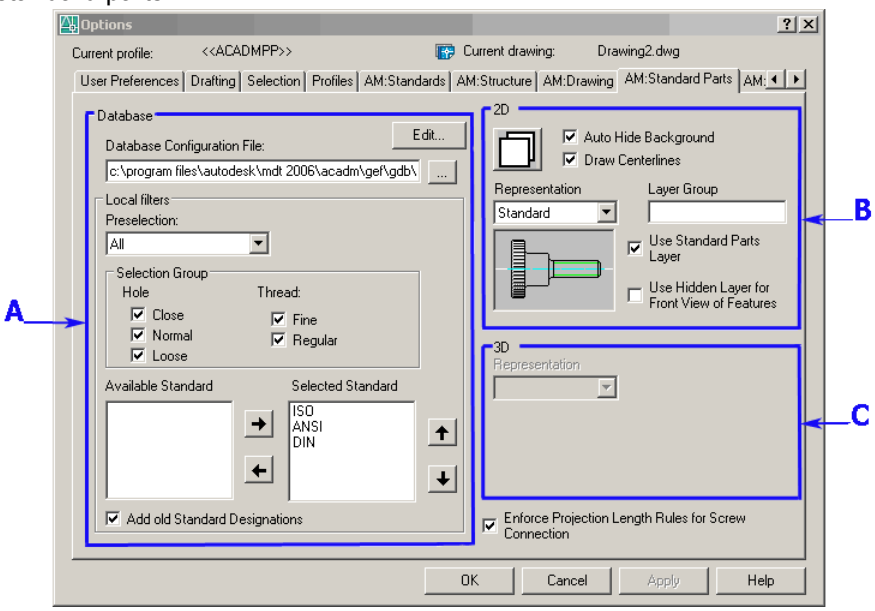


Next, use the Standards Setup dialog box to select the required standards. The default settings are ANSI, ISO and DIN Standards. You can switch off DIN standards if your company uses mainly ANSI and ISO standards.



System Setting for Standard Parts

Start to familiarize yourself with the AM:Stardard Part setting. From the pull-down menu, click Assist > Options > AM:Standard Parts tab or command: AMOPTIONS > AM:Standard Parts tab to set up the standard parts.



A - Database; B - 2D representation; C - 3D representation

Database

You can specify the database configuration file path, local filters for selection group, and required standards for your design.

- Database Configuration File
  Displays the path to standard parts. Browse to select a file that contains standard parts.

- Local Filters
  Configure your project's standard parts group based on company, industry standard, both or all standards in the local filters column.

- Preselection
  Specifies which preselection filter group the standard parts belongs to. The following options display in each of the preselection filter modes:

  All = S, A, C, and N
  Standard = S and A
  Company = C and A
  Company and Standard = A

NOTE: You can create four groups of standard parts in the Value Table of the standard parts database. Select S to make the size available for the "Standard" preselection filter, C for the "Company" preselection filter, A for all preselection filters and N for none.

  Company - C
  Standard - S
  Company and Standard - A
  None - N (groups of standard parts you do not want to display for selection.)

- Selection Group
  Sets the hole type to Close, Normal, or Loose and Thread type to Fine or Regular.

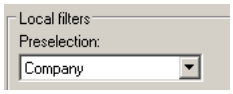
- Available Standard
  Displays all standards installed on your system.

- Selected Standard
  Selects the required standard (for example, DIN and ISO) to be used for your design when you do not need other standards.

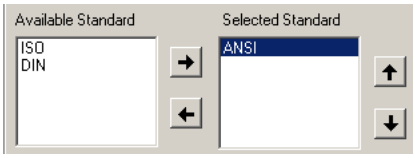
- Add old Standard Designations
  Displays both old and new designations for parts in the Standard Part Value Table.

To define which sizes of standard parts group to be available for design work

1. From AutoCAD Mechanical, click Assist > Options to display the Options dialog box.
2. Click the AM: Standard Parts tab.
3. Select Company standard at the preselection filter menu.



4. Select ANSI standard.



5. Click OK to close the Options dialog box.
6. At the command prompt, type **Amstdplibedit** to open the Edit Standard Parts Database dialog box.
7. Navigate to the subset folder. Click Standard Systems > ANSI Standard system > Fasteners > Screws and Threaded Bolts > Socket Head Types > Hexagon Socket Button Head Cap Screw - UNC (Regular Thread - Inch).
8. Click Edit Valuetable.
9. Scroll to ID Number G_740, switch the part status for G_740 through 800 to Company - C standard. See the following image.

an2424.val

	RID ID Number	SIZE Standard	IDN User ID Number	PAST Part Status	ThreadID THREADID	REST Record Status	NND Nominal Diameter	NLG Nominal Length	GAL Thread Run-out	KOD Head Diameter
74	G_740	1/4 - 20 - 3/8		C	I0.25x20	M	0.25000	0.37500	0.10000	0.43700
75	G_750	1/4 - 20 - 1/2		A	I0.25x20	M	0.25000	0.50000	0.10000	0.43700
76	G_760	1/4 - 20 - 5/8		C	I0.25x20	M	0.25000	0.62500	0.10000	0.43700
77	G_770	1/4 - 20 - 3/4		N	I0.25x20	M	0.25000	0.75000	0.10000	0.43700
78	G_780	1/4 - 20 - 7/8		S	I0.25x20	M	0.25000	0.87500	0.10000	0.43700
79	G_790	1/4 - 20 - 1		C	I0.25x20	M	0.25000	1.00000	0.10000	0.43700
80	G_800	1/4 - 20 - 1.1/4		C	I0.25x20	M	0.25000	1.25000	0.10000	0.43700
81	G_810	1/4 - 20 - 1.1/2		S	I0.25x20	M	0.25000	1.50000	0.10000	0.43700
82	G_820	1/4 - 20 - 1.3/4		S	I0.25x20	M	0.25000	1.75000	0.10000	0.43700
83	G_830	1/4 - 20 - 2		S	I0.25x20	M	0.25000	2.00000	0.10000	0.43700
84	G_840	5/16 - 18 - 1/2		A	I0.3125x18	O	0.31250	0.50000	0.11100	0.54700

10. Switch the part status for ID Number G_810 through G_830 to Standard - S. See the following image. Next, close the dialog box.

an2424.val

	RID ID Number	SIZE Standard	IDN User ID Number	PAST Part Status	ThreadID THREADID	REST Record Status	NND Nominal Diameter	NLG Nominal Length	GAL Thread Run-out	KOD Head Diameter
74	G_740	1/4 - 20 - 3/8		C	I0.25x20	M	0.25000	0.37500	0.10000	0.43700
75	G_750	1/4 - 20 - 1/2		C	I0.25x20	M	0.25000	0.50000	0.10000	0.43700
76	G_760	1/4 - 20 - 5/8		C	I0.25x20	M	0.25000	0.62500	0.10000	0.43700
77	G_770	1/4 - 20 - 3/4		C	I0.25x20	M	0.25000	0.75000	0.10000	0.43700
78	G_780	1/4 - 20 - 7/8		C	I0.25x20	M	0.25000	0.87500	0.10000	0.43700
79	G_790	1/4 - 20 - 1		C	I0.25x20	M	0.25000	1.00000	0.10000	0.43700
80	G_800	1/4 - 20 - 1.1/4		C	I0.25x20	M	0.25000	1.25000	0.10000	0.43700
81	G_810	1/4 - 20 - 1.1/2		S	I0.25x20	M	0.25000	1.50000	0.10000	0.43700
82	G_820	1/4 - 20 - 1.3/4		S	I0.25x20	M	0.25000	1.75000	0.10000	0.43700
83	G_830	1/4 - 20 - 2		S	I0.25x20	M	0.25000	2.00000	0.10000	0.43700
84	G_840	5/16 - 18 - 1/2		A	I0.3125x18	O	0.31250	0.50000	0.11100	0.54700

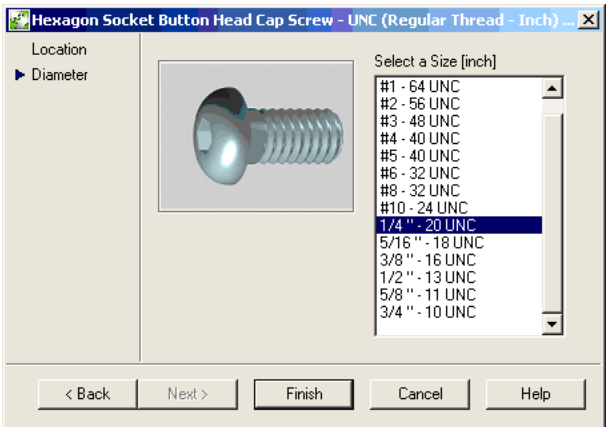
To insert a 1/4” - 20 UNC screw based on Company Standard

1. At the command prompt, type **Amstdplib**.

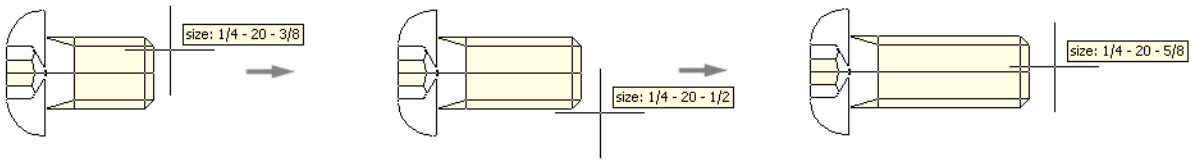
2. Click Standard Systems > ANSI Standard system > Fasteners > Screws and Threaded Bolts > Socket Head Types > Hexagon Socket Button Head Cap Screw - UNC (Regular Thread - Inch).

3. Click Front view, and click a point in the model space to specify the insertion point.

4. Select size - 1/4” -20UNC.



5. Notice only Company standard sizes are available.



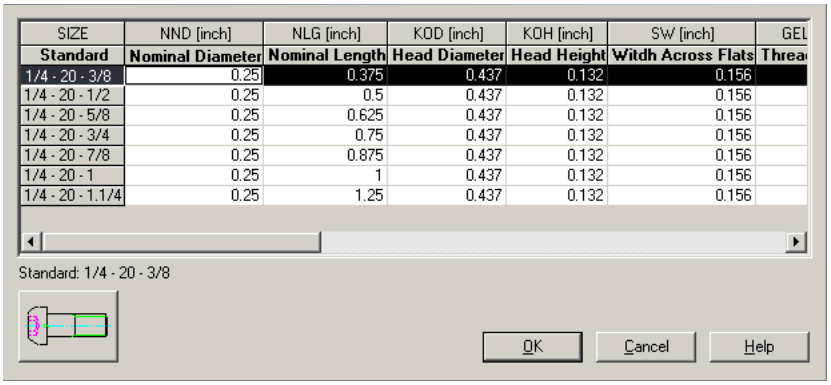
6. Place the screw.

7. Use the PowerEDIT command to change the screw's size. (From pull-down menu, click Modify > Power Commands > Power Edit.)

8. At the drag size prompt, press Enter to display Select Part Size dialog box.

9. Notice that only Company Standard sizes are displayed and available for selection.

10. Those screw ID number G_810, G_820, G_830 with part status - S (Standard) are not available for selection.



2D Representation

Set the 2D representation or appearance of the standard parts.

- 2D Hide button
  Displays standard parts with or without invisible hidden line.

- Auto Hide Background
  Hides objects behind the standard parts.

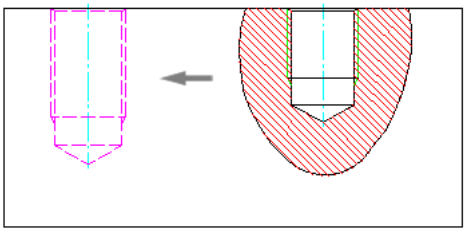
- Draw Centerlines
  Creates standard parts' centerlines.

- Representation
  2D representation of the standard parts (for example, symbolic, standard or simplified).

- Layer Groups
  Specifies layer groups to be used for standard parts.

- Use Standard parts Layer
  Uses the predefined standard parts layers for the standard parts.

- Use Hidden Layer for Front View of Features
  Uses the hidden layer for the front view of features. See image below.



3D Representation

Sets the 3D representation or appearance of the standard parts.

- Enforce Projection Length Rules for Screw Connection
  Sets the projection length of centerlines for screw connections to follow a rule similar to that of VDI 2230, where the projection length of the screw centerline should have a length of 1.5 times the length of the nut associated with it.

Optimizing Performance for Standard Parts

Time taken to display Standard Part Selection dialog boxes vary with the number of standards selected or displayed when standard parts are used. When all the standards are selected, performance is slower because the entire database is sorted to display the associated part information.

Method 1: Reducing the Number of Standards Displayed

You can optimize the performance by minimizing the number of standards displayed. To shorten the display time of standard parts for design, you do not need to display all standards.

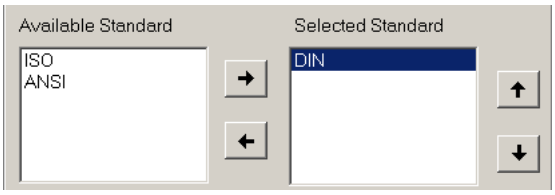
Tip: It is recommended to select only those standards for display that you use frequently. For example, in the U.S. market, you can select to display only the ANSI and ISO standard parts.

Limit the number of standards and standard parts displayed

1. From AutoCAD Mechanical, click Assist > Options to display the Options dialog box.

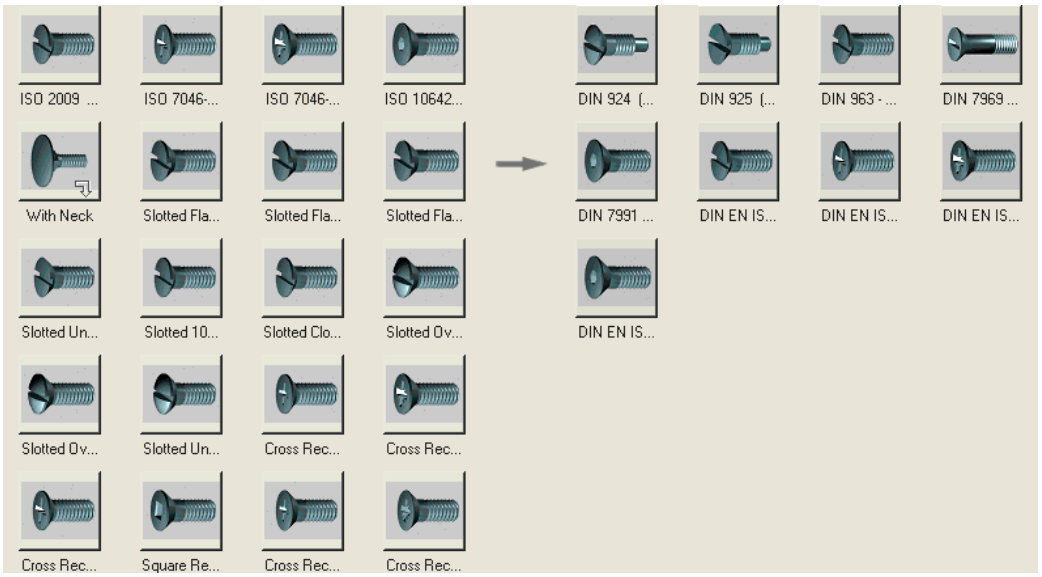
2. Click the AM: Standard Parts tab.

3. Select the unused standards and move them to the available standard column. Retain the frequently used standards in the Selected Standard list by using the left and right arrows. Use the up and down arrows to adjust the display order of each standard.

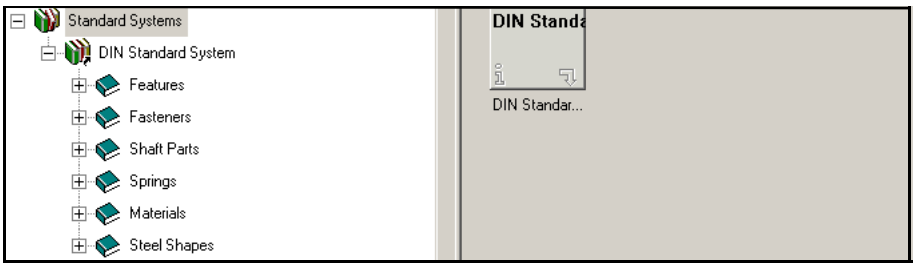


4. Click OK to save the current setting and close the Options dialog box.

5. The next time you attempt to insert a standard part, only the DIN standard parts will be displayed. Since the number of standard parts to load has reduced, the dialog box opens much faster.



6. Click the Standard Parts icon or command: AMSTDPLIB. Notice that only the DIN standard displays for all standard parts when you click any other standard parts like the steel shapes, springs and others.



NOTE: All installed standard parts based on the selected standards are displayed in this dialog box for inserting into the drawing. Use the AMSTDPLIBEDIT command to edit the standard part identification and physical properties if required.

Method 2: Limit the Parts shown in Selected Standard System Settings

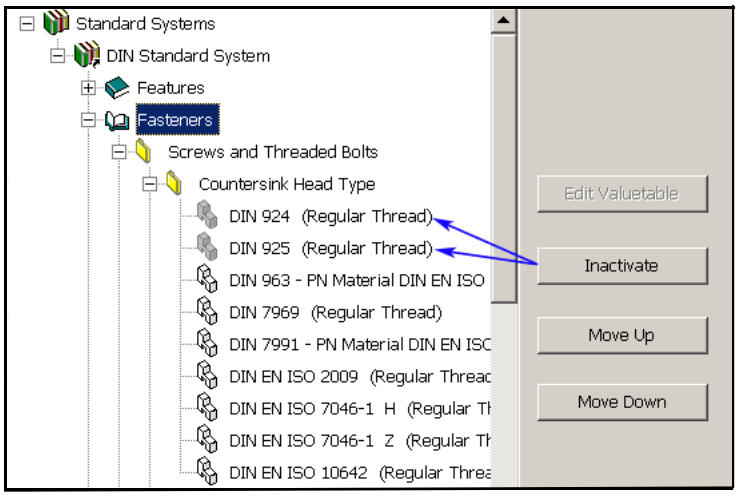
You can switch off the standard parts that you do not use in the current project. To accomplish this, use the following procedures before working on the standard parts.

Switching off Unused Standard Parts

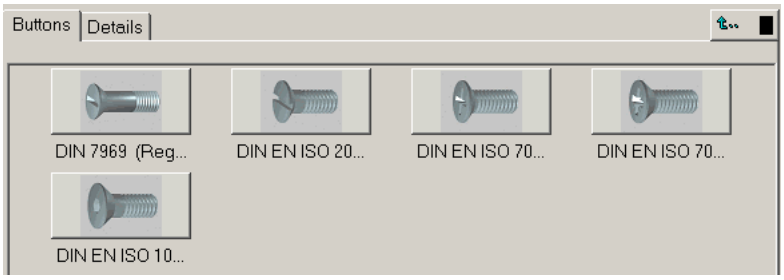
1. At the command prompt, type **Amstdplibedit** to open the Edit Standard Parts Database dialog box.

2. Expand the standard trees to Standard Systems > DIN Standard System > Fasteners > Screws and Threaded Bolts > Countersink Head Type or the standard parts that you want to switch off for your design.

3. Click DIN 924 (Regular Thread), and click Inactivate. Do the same for DIN 925 (Regular Thread).



4. The next time you place a countersink head type screw, both DIN 924 and DIN 925 standard are not available for quick selection.



5. To enable and display the parts, follow steps 1-3.

TIP: From the Content menu, select Change Representation or type **AMSTDPREP** in the command line to change the representation to Simplified, Symbolic or Standard.

Customize standard parts using VAL-editor

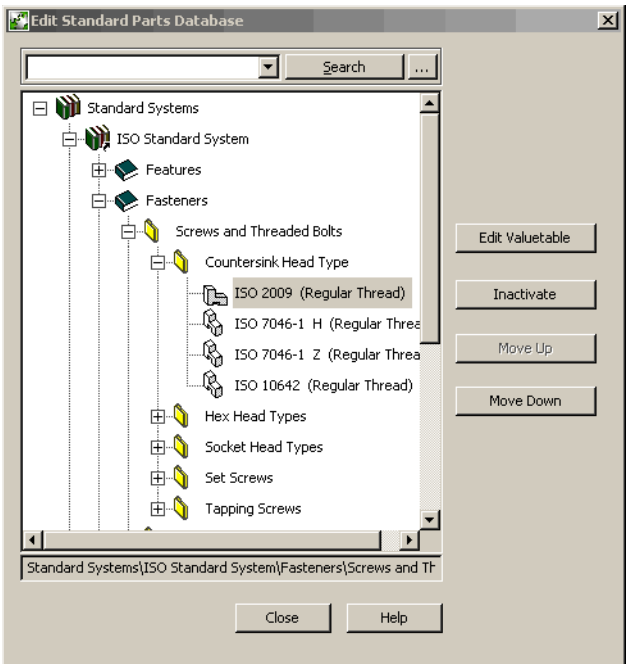
You can add new custom standard parts to the existing standard parts database by using the Val-editor (for example, to use different materials or sizes for the standard parts).

First, you must know the location of standard parts database value table for the standard part you customize for your designs.

Location of Standard Parts Database Value Table

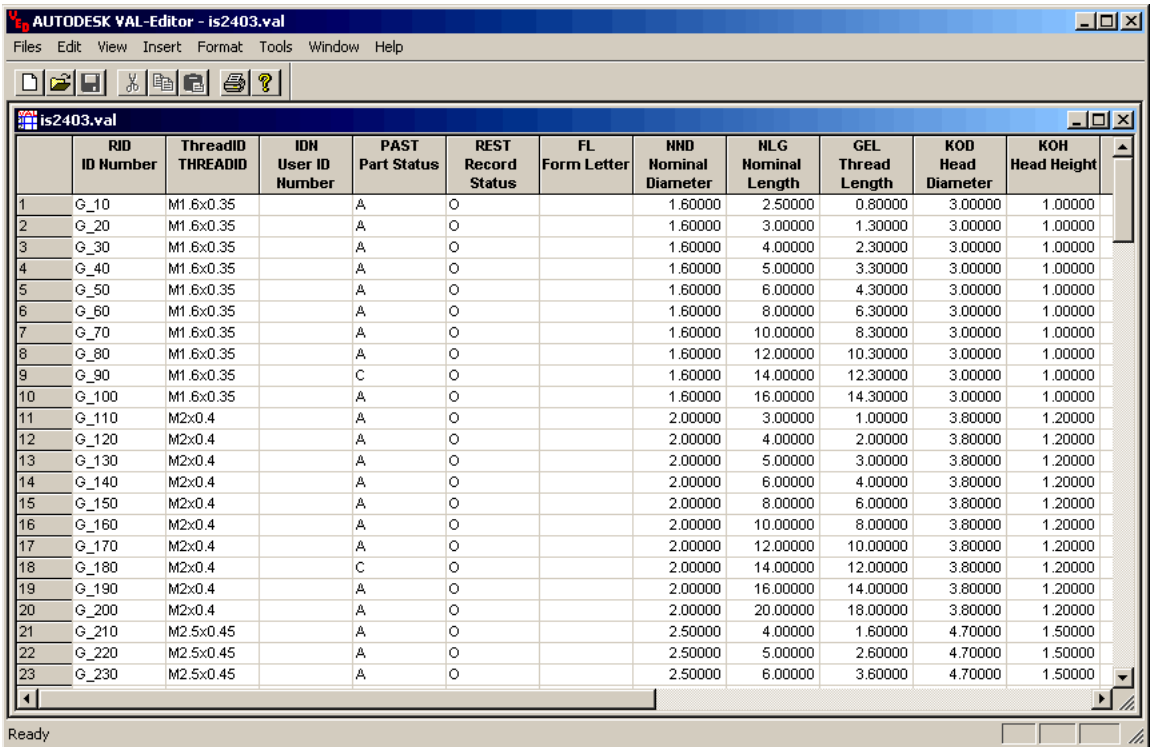
1. Use the AMSTDPLIBEDIT command to open the Edit Standard Part Database dialog box; or from the Assist pull-down menu, click Options > AM: Standard Parts tab. Click EDIT to start the Edit Standard Parts Database dialog box.

2. Expand the tree, and select the subset.



3. Click Edit Valuetable.

4. Notice the VAL filename at the top left corner of the dialog box. The VAL file name in the following image shows is2403.val for the countersink head ISO 2009 regular thread screw.



	RID ID Number	ThreadID THREADID	IDN User ID Number	PAST Part Status	REST Record Status	FL Form Letter	NND Nominal Diameter	NLG Nominal Length	GEL Thread Length	KOD Head Diameter	KOH Head Height
1	G_10	M1.6x0.35		A	O		1.60000	2.50000	0.80000	3.00000	1.00000
2	G_20	M1.6x0.35		A	O		1.60000	3.00000	1.30000	3.00000	1.00000
3	G_30	M1.6x0.35		A	O		1.60000	4.00000	2.30000	3.00000	1.00000
4	G_40	M1.6x0.35		A	O		1.60000	5.00000	3.30000	3.00000	1.00000
5	G_50	M1.6x0.35		A	O		1.60000	6.00000	4.30000	3.00000	1.00000
6	G_60	M1.6x0.35		A	O		1.60000	8.00000	6.30000	3.00000	1.00000
7	G_70	M1.6x0.35		A	O		1.60000	10.00000	8.30000	3.00000	1.00000
8	G_80	M1.6x0.35		A	O		1.60000	12.00000	10.30000	3.00000	1.00000
9	G_90	M1.6x0.35		C	O		1.60000	14.00000	12.30000	3.00000	1.00000
10	G_100	M1.6x0.35		A	O		1.60000	16.00000	14.30000	3.00000	1.00000
11	G_110	M2x0.4		A	O		2.00000	3.00000	1.00000	3.80000	1.20000
12	G_120	M2x0.4		A	O		2.00000	4.00000	2.00000	3.80000	1.20000
13	G_130	M2x0.4		A	O		2.00000	5.00000	3.00000	3.80000	1.20000
14	G_140	M2x0.4		A	O		2.00000	6.00000	4.00000	3.80000	1.20000
15	G_150	M2x0.4		A	O		2.00000	8.00000	6.00000	3.80000	1.20000
16	G_160	M2x0.4		A	O		2.00000	10.00000	8.00000	3.80000	1.20000
17	G_170	M2x0.4		A	O		2.00000	12.00000	10.00000	3.80000	1.20000
18	G_180	M2x0.4		C	O		2.00000	14.00000	12.00000	3.80000	1.20000
19	G_190	M2x0.4		A	O		2.00000	16.00000	14.00000	3.80000	1.20000
20	G_200	M2x0.4		A	O		2.00000	20.00000	18.00000	3.80000	1.20000
21	G_210	M2.5x0.45		A	O		2.50000	4.00000	1.60000	4.70000	1.50000
22	G_220	M2.5x0.45		A	O		2.50000	5.00000	2.60000	4.70000	1.50000
23	G_230	M2.5x0.45		A	O		2.50000	6.00000	3.60000	4.70000	1.50000

NOTE: The VAL files are stored in the ACADM\GEF\GDB\. GDB - global database folder. The database contains the description of the standard parts and the paths where the parametric files (GPL format) are saved.

Customize a Material in the Standard Part Content

Before you begin, back up the original VAL table (di0001.val) before adding a new material to the washer.

1. Type **AMSTDPLIBEDIT** at the command prompt.

2. Select DIN Standard System > Fasteners > Washers > Plain > DIN 125-1 A.

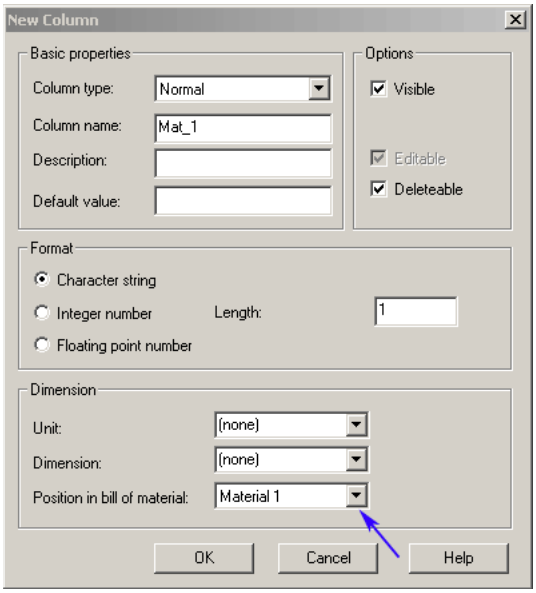
3. Select DIN 125-1 A, and the click the Edit Value table.

4. In the VAL Editor, click the NND Nominal Diameter Column, right-click, and then click Append Column.

5. Under the Column Type, make sure that the new column is Normal so you can set the default value at the Default Value box in the VAL-editor dialog box. If the entire column is to contain a single constant value, select Global. If the column is to contain a calculated value based on formula, select Calculated.

6. In Column Name, enter Mat_1

7. Under Position in Bill of Material, select Material1 so it is used as the default material.



8. Click OK to save and close the dialog box.

9. On the 12th row (Norminal Diameter is 7mm), enter Brass under material column.

di0001.val

	RID ID Number	IDN User ID Number	PAST Part Status	REST Record Status	SD1 Inside Diameter	SD2 Outside Diameter	SD Height	NND Nominal Diameter	PLMSK Parts list type	MAT_1
1	G_10		A	O	1.70000	4.00000	0.30000	1.60000		
2	G_20		A	O	1.80000	4.50000	0.30000	1.70000		
3	G_30		A	O	2.20000	5.00000	0.30000	2.00000		
4	G_40		A	O	2.50000	6.00000	0.50000	2.30000		
5	G_50		A	O	2.70000	6.00000	0.50000	2.50000		
6	G_60		A	O	2.80000	7.00000	0.50000	2.60000		
7	G_70		A	O	3.20000	7.00000	0.50000	3.00000		
8	G_80		A	O	3.70000	8.00000	0.50000	3.50000		
9	G_90		A	O	4.30000	9.00000	0.80000	4.00000		
10	G_120		A	O	5.30000	10.00000	1.00000	5.00000		
11	G_150		A	O	6.40000	12.00000	1.60000	6.00000		
12	G_180		A	M	7.40000	14.00000	1.60000	7.00000		Brass
13	G_210		A	O	8.40000	16.00000	1.60000	8.00000		
14	G_240		A	O	10.50000	20.00000	2.00000	10.00000		
15	G_270		A	O	13.00000	24.00000	2.50000	12.00000		
16	G_300		A	O	15.00000	28.00000	2.50000	14.00000		
17	G_310		A	O	17.00000	30.00000	3.00000	16.00000		
18	G_340		A	O	19.00000	34.00000	3.00000	18.00000		
19	G_370		A	O	21.00000	37.00000	3.00000	20.00000		
20	G_400		A	O	23.00000	39.00000	3.00000	22.00000		
21	G_450		A	O	25.00000	44.00000	4.00000	24.00000		
22	G_480		A	O	27.00000	50.00000	4.00000	26.00000		
23	G_510		A	O	28.00000	50.00000	4.00000	27.00000		
24	G_540		A	O	29.00000	50.00000	4.00000	28.00000		
25	G_570		A	O	31.00000	56.00000	4.00000	30.00000		

10. Save and close the VAL Editor.

Insert a Washer - DIN 125-1 A

1. Click Assist > Options > AM:Standards.

2. Under Standards, select DIN and double-click BOM support.

3. Make sure the Material is set to Visible in BOM.

1	2	Column	Caption	Width	Formula for Columns	3	4	5	6	7	Σ
☑		ITEM	Item	10.00				.0	0	1	
☑		QTY	Qty	10.00				.0	0	1	
☑		NAME	Name	60.00	=IF(ISBLANK(PART:NAME),BLOCK			A			
☑		DESCR	Description	70.00				A			
☑		STANDARD	Standard	50.00				A			
☑		MATERIAL	Material	42.88				A			
☐		NOTE	Note	30.00				A			
☐		VENDOR	Vendor	30.00				A			
☐		DESCR2	Description 2	70.00				A			
☐		STANDARD2	Standard 2	50.00				A			
☐		MATERIAL2	Material 2	42.88				A			
☐		MASS	Mass	30.00				.0	3	1	
☐		PRICE	Price	30.00				.0	2	1	

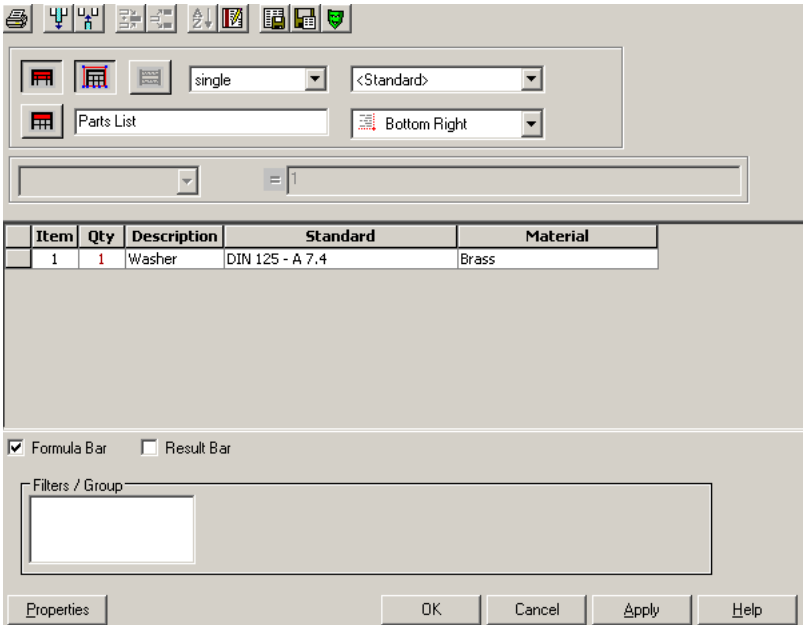
4. Type **AMSTDPLIB** at the command prompt.

5. Navigate to the Fasteners > Washers > Plain > DIN 125-1 A.

6. Click the Front View icon, and place the insertion point of a 7mm washer.

7. Click Annotate > Part List Tools > Part List to place the part list.

8. Notice the material displays Brass for the washer in the list.



Adding User-defined Size to the Standard Part

You may need to customize the existing standard parts for a newly defined size that is not found in the database. The following example shows you how to add an ANSI 1/4-20 x 1 3/8 inch Hexagon Socket Button Head Cap Screw - UNC (Regular Thread - Inch) to the standard parts database.

1. Type **AMSTDPLIBEDIT** at the command prompt.

2. Navigate to the subset folder. Click Standard Systems > ANSI Standard system > Fasteners > Screws and Threaded Bolts > Socket Head Types > Hexagon Socket Button Head Cap Screw - UNC (Regular Thread - Inch).

3. Click Edit Valuetable to start the VAL-Editor.

4. Scroll down to search for RID ID Number G_800 (1/4-20 x 1.1/4) screw.

5. Select the entire row by clicking the row at the left.

6. Right click to select Insert Row.

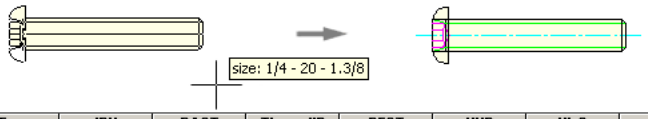
7. Copy (Ctrl + C) and paste (Ctrl + V) all the data, with the exception of the RID (ID Number), from the row you selected in step 4. (Note: Do not click on any cell while holding the left mouse button to select the entire row.)

8. Change the description for the newly added screw to 1/4-20 x 1.3/8.

9. In the Nominal Length column, change the value to 1.37500.

10. Save and close the VAL-Editor table.

11. Now you have an additional ANSI 1/4-20 screw in the standard parts list.



	RID ID Number	SIZE Standard	IDN User ID Number	PAST Part Status	ThreadID THREADID	REST Record Status	NND Nominal Diameter	NLG Nominal Length	GAL Thread Run-out	KOD Head Diameter	KOH1 Wrench Size
78	G_780	1/4 - 20 - 7/8		A	I0.25x20	O	0.25000	0.87500	0.10000	0.43700	0.03100
79	G_790	1/4 - 20 - 1		A	I0.25x20	O	0.25000	1.00000	0.10000	0.43700	0.03100
80	G_800	1/4 - 20 - 1.1/4		A	I0.25x20	O	0.25000	1.25000	0.10000	0.43700	0.03100
81	U_1366	1/4 - 20 - 1.3/8		A	I0.25x20	U	0.25000	1.37500	0.10000	0.43700	0.03100
82	G_810	1/4 - 20 - 1.1/2		A	I0.25x20	O	0.25000	1.50000	0.10000	0.43700	0.03100
83	G_820	1/4 - 20 - 1.3/4		A	I0.25x20	O	0.25000	1.75000	0.10000	0.43700	0.03100
84	G_830	1/4 - 20 - 2		A	I0.25x20	O	0.25000	2.00000	0.10000	0.43700	0.03100
85	G_840	5/16 - 18 - 1/2		A	I0.3125x18	O	0.31250	0.50000	0.11100	0.54700	0.03100
86	G_850	5/16 - 18 - 5/8		A	I0.3125x18	O	0.31250	0.62500	0.11100	0.54700	0.03100
87	G_860	5/16 - 18 - 3/4		A	I0.3125x18	O	0.31250	0.75000	0.11100	0.54700	0.03100