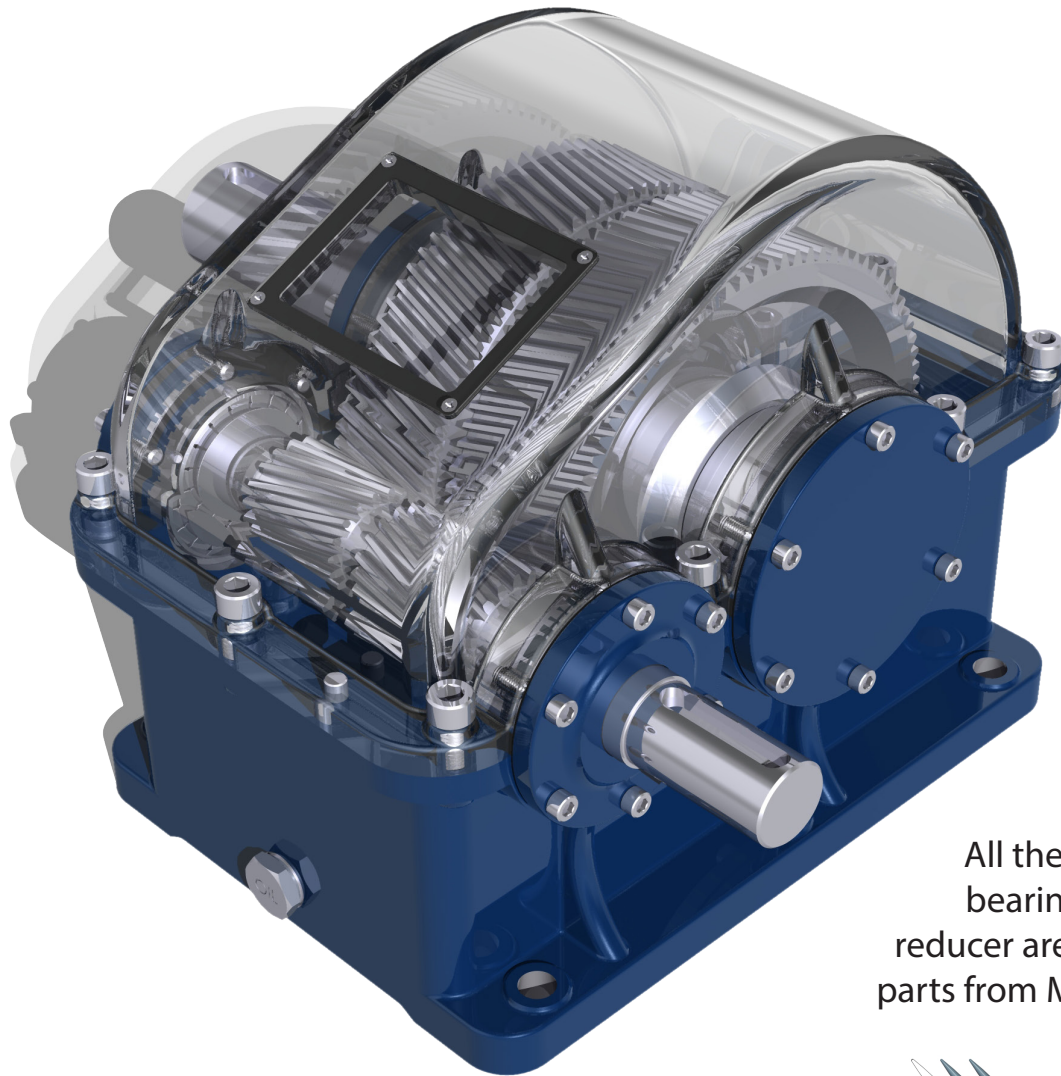


Using Standardized Parts can be a real time saver when designing with TurboCAD.

A standardized part is a component (part) or assembly that conforms to established industry or government published specifications. In essence, each standardized part (of a specific type) is identical and interchangeable.

Standardized parts include such things as fasteners, fittings, piping and bearings, to name but a few. They are generally purchased parts that a manufacturer, or other end-user, can purchase and integrate into their own designs, thus keeping development costs lower since these parts do not need to be produced from scratch.

There are many suppliers of standardized parts and many of these suppliers offer 3D models free of charge to all designers. The 3D models can be utilized during the development stage of any product and ensures that accuracy is achieved within the design.



All the fasteners and bearings in this gear reducer are standardized parts from McMaster-Carr.

The best places to get 3D models of standardized parts is from places that specialize in this sort of thing, a place where one can be sure that the parts they are downloading are accurate. These places hope that their products will be specified in designs, so they work hard to ensure high quality.

Using 3D models from places where any would-be engineer can post a model does not bode well in the trust department. The model may or may not be accurate, and really, there is no real way of knowing one way or the other.

One of Don Cheke's favorite places to get standardized parts from is McMaster-Carr. Unfortunately there is not a 3D model for all of their 555,000 products, but there are enough to consider them an excellent resource.

Visit: <http://www.mcmaster.com/#>

McMASTER-CARR OVER 555,000 PRODUCTS

Need help? Call (330) 342-6100, e-mail, or text 76947.

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- Building & Grounds
- Electrical & Lighting
- Fabricating
- Fastening & Joining
- Filtering
- Flow & Level Control
- Furniture & Storage
- Hand Tools
- Hardware
- Heating & Cooling
- Lubricating
- Material Handling
- Measuring & Inspecting
- Office Supplies & Signs
- Pipe, Tubing, Hose & Fittings
- Plumbing & Janitorial
- Power Transmission
- Pressure & Temperature Control
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- Raw Materials
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All Categories

Fastening & Joining

Fasteners

- Screws & Bolts
- Threaded Rods & Studs
- Eyebolts
- U-Bolts
- Nuts
- Washers
- Shims
- Helical & Threaded Inserts
- Spacers & Standoffs

Adhesives & Tape

- Adhesives
- Tape
- Hook & Loop

Welding, Brazing & Soldering

- Electrodes & Wire
- Welders
- Gas Regulators
- Welding Gloves
- Welding Helmets & Glasses

Pipe, Tubing, Hose & Fittings

- Pipe Fittings
- Pipe
- Pipe Joints
- Pipe & Tube
- Pipe Flange
- Tubing
- Tube Fittings
- Tube Cutters
- Tube Flaring

McMaster-Carr has a great user interface which helps to make part location fun and easy. Just select options to narrow parameters until a smaller selection is available for further viewing and drawing or model downloading.

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machine screws **FIND** [CONTACT US](#) [BOOKMARKS](#)

Narrow By

Head Style [Show](#)

Inch/Metric
Inch
Metric

Thread Size
[How to Read a Thread Size](#)

000-120
00-90
0-80
1-64
1-72
2-56
2-64
3-48

Length

3/32"
1/8"
5/32"
3/16"
7/32"
1/4"
9/32"
5/16"

8213 Products

Head Style

Pan
Pan head screws are general purpose screws with moderate head.
[Stainless Steel](#) [Steel](#) [Brass](#) [Titanium](#) [Plastic](#)

Flat
Flat head screws are angled under the head to provide a flush surface.
[Stainless Steel](#) [Steel](#) [Brass](#) [Aluminum](#) [Titanium](#) [Plastic](#)

Oval
Oval head screws are angled under the head so they can be countersunk. When installed, the rounded top sits above the surface.
[Stainless Steel](#) [Steel](#) [Brass](#)

Round
Round head screws have a thick, decorative round head that provides a finished appearance.
[Stainless Steel](#) [Steel](#) [Brass](#) [Aluminum](#) [Plastic](#)

Low-Profile Button
Low-profile button head screws are similar to pan heads but with a lower profile.
[Stainless Steel](#) [Steel](#)

Thread Size

Inch Sizes **Metric Sizes**

1/4"-20 000-120 2-64 6-32 1/4"-20 M2 M1 M2.5 M5

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machine screws **FIND** [CONTACT US](#)

Narrow By [Clear All](#)

Head Style [Show](#)

☒ Pan

Inch/Metric
☒ Inch

Thread Size [Show](#)
☒ 8-32

Length [Show](#)
☒ 1/2"

Material [Show](#)
☒ Stainless Steel

Finish [Show](#)
☒ Plain

Drive Style [Show](#)

14 Products

[About Machine Screws](#)
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Pan Head Phillips Machine Screws

Screws up to 2" long are fully threaded. Screws longer than 2" have at least 1 1/2" of thread measured from under the head.

CAD For technical drawings and 3D models, click on the part number.

Type 316 Stainless Steel

Lg.	Pkg. Qty.
8-32—#2 Drive	50

18-8 Stainless Steel

Lg.	Pkg. Qty.
8-32—#2 Drive	100

What is ideal about McMaster-Carr's models is the numerous 3D formats that are available and the 2D drawing(s) that accompany them.

Pan Head Phillips Machine Screws



Screws up to 2" long are fully threaded; those longer than 2" have at least 1 1/2" of thread. Length is measured from under the head.

CAD For technical drawings and 3-D models, click on a part number.

Type 316 Stainless Steel

Lg.	Pkg. Qty.	Pkg.
8-32—#2 Drive		
1/2"	50	91735A194 \$6.83

Product Detail

Type 316 Stainless Steel
Pan Head Phillips
Machine Screw, 8-32
Thread, 1/2" Length

☐ Packs of 50
ADD TO ORDER
In stock

- 3-D STEP
- 3-D Models
- 3-D EDRAW
- 3-D IGES
- 3-D PDF
- 3-D SAT
- 3-D Solidworks
- ✓ 3-D STEP
- Technical Drawings
- 2-D DWG
- 2-D DXF
- 2-D PDF
- 2-D Solidworks

Select Product Detail to view 2D drawing and to download drawing and/or 3D model.

OVER 555,000 PRODUCTS

Need help? Call e-mail, or text 76

CONTACT US

machine screws **FIND**

Type 316 Stainless Steel Pan Head Phillips Machine Screw

8-32 Thread, 1/2" Length

☐ Packs of 50

ADD TO ORDER

In stock
\$6.83 per pack of 50
91735A194

Length	1/2"
Additional Specifications	Type 316 Stainless Steel 8-32—#2 Drive

Screws up to 2" long are fully threaded; those longer than 2" have at least 1 1/2" of thread. Length is measured from under the head.

http://www.mcmaster.com

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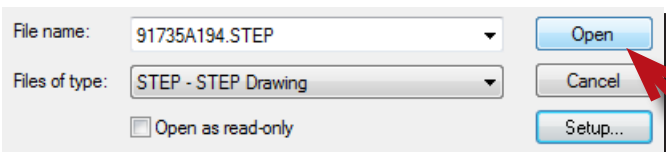
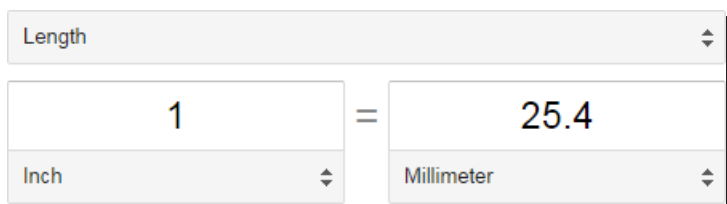
Information in this drawing is provided for reference only.

PART NUMBER	91735A194
Pan Head Phillips Machine Screw	

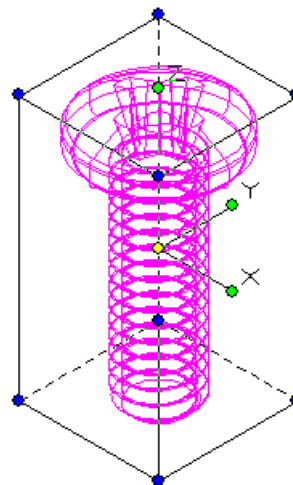
For use in TurboCAD STEP and SAT formats work best. IGES is not so good.

TurboCAD uses a different drawing units system that requires the user to adjust units for the STEP files downloaded from McMaster-Carr. The scale is always out by 25.4, which is the Imperial conversion to millimeters.

SAT files do not have this issue, but this issue is an important one to know about because when users export models from TurboCAD in these formats - for users of other programs such as SolidWorks, exporting may be off by 25.4. The TC user needs to make conversions to metric before exporting so the end user gets a model that reads the right size.



1. STEP file opened in TurboCAD.

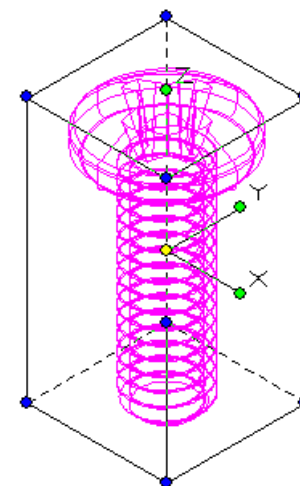


Size X	Size Y	Size Z
8.18 in	8.18 in	15.54 in

2. The part (a screw in this case) opens 25.4 times larger than it is supposed to be.

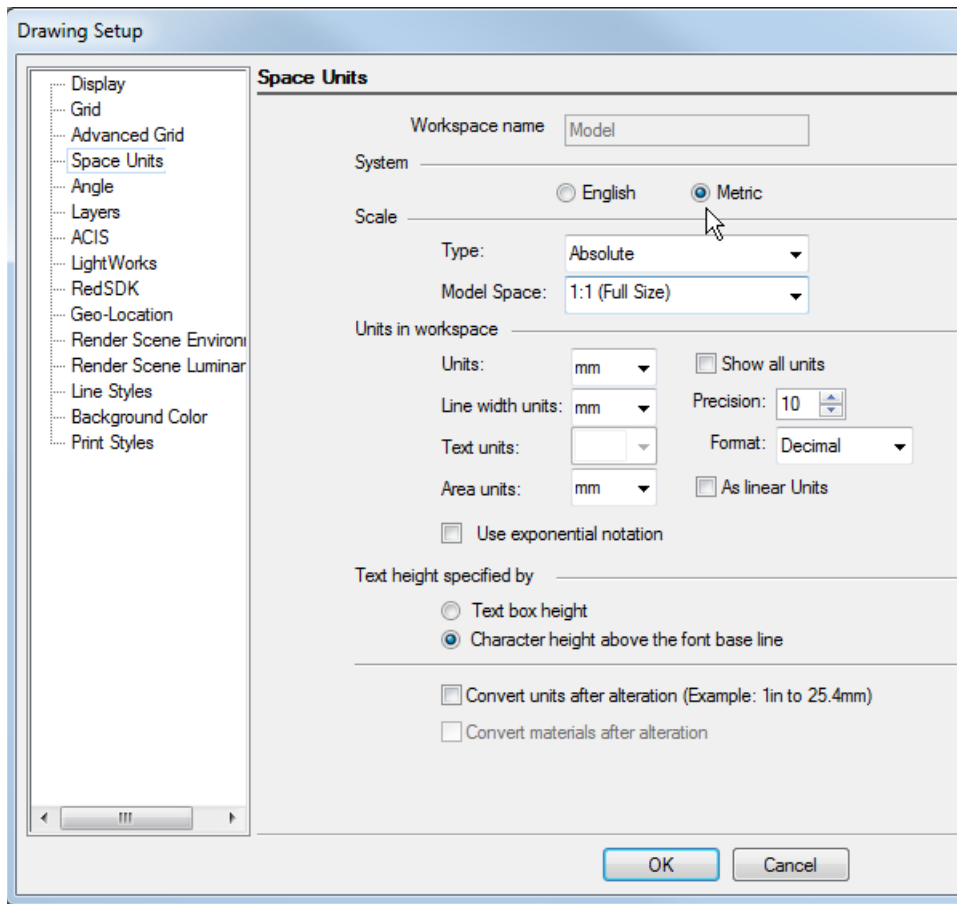
3. A user could just scale the object by 0.0393700787401575 ($1 \div 25.4$), but that is a hard number to remember without using a calculator and precision remains at two decimal places.

Scale X	Scale Y	Scale Z
0.03937007874	0.03937007874	0.03937007874

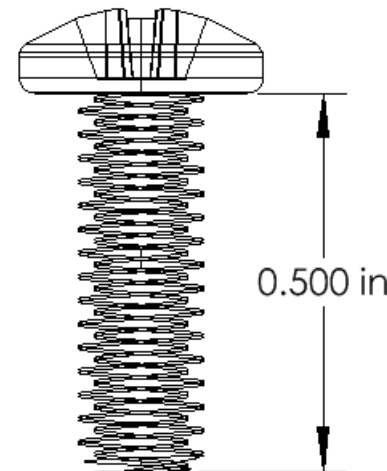
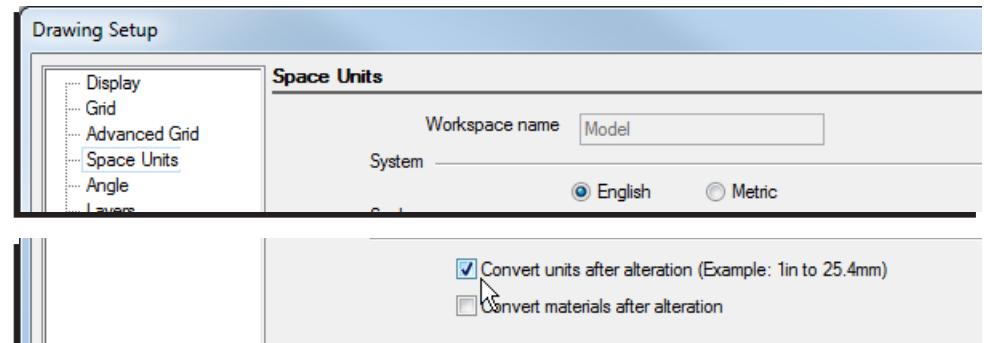


Size X	Size Y	Size Z
0.32 in	0.32 in	0.61 in

Don Cheke recommends opening the STEP file, opening Drawing Setup/Space Units, selecting Metric and increasing precision up from 2 (DBC always uses 10) and then clicking OK.



Don Cheke then recommends opening Drawing Setup/Space Units again, selecting Imperial, selecting "Convert units after alteration" and then clicking OK.



The part is now at the correct scale in Imperial units.

If metric is the desired drawing unit just select metric under space units again, ensure "Converts units..." is checked and click OK.

Size X	Size Y	Size Z
0.322 in	0.322 in	0.6119191125 in

As mentioned earlier, SAT parts do not seem to have the drawing units issue that STEP does.

McMASTER-CARR OVER 555,000 PRODUCTS

standard ball and roller bearings [FIND](#) [CONTACT US](#)

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Narrow By [Clear All](#)

Type
☒  Ball Bearings

Ball Bearing Style
☒  Open

Inch/Metric
☒ Inch

For Shaft Diameter [Show](#)
☒ 1/2"

Outer Diameter (OD) [Show](#)
☒ 1 1/2"

Width [Show](#)
☒ 7/16"

Dynamic Radial Load Capacity

1 Product

[About Rolling-Element Bearings](#)
[More](#)

Steel Ball Bearings

 Count on solid performance from these steel ball bearings. Temperature range is -20° to +250° F. Maximum speed is 1200 rpm for open bearings. These bearings are not ABEC rated.

Open **Open bearings** run cool and are easy to lubricate.

 For technical drawings and 3-D models, click on a part number.

Open

 Open

For Shaft Dia.	OD	Wd.	Dynamic Load Cap., lbs.	Part Number	Each
1/2"	1 1/2"	7/16"	769	6383K45	\$6.11

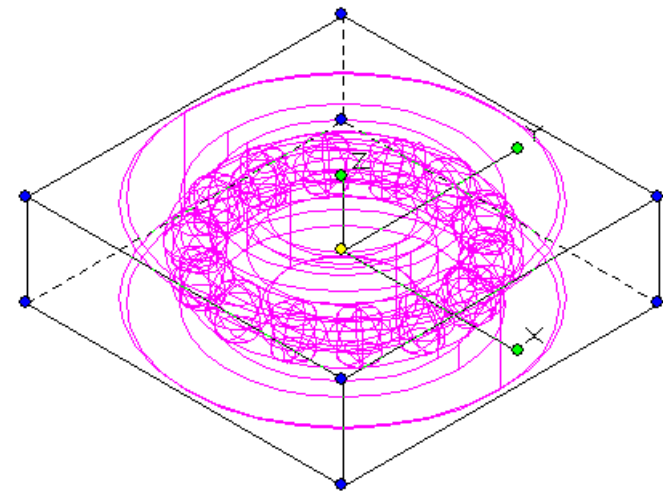
[Product Detail](#) 

Steel Ball Bearing, Plain Open for 1/2" Shaft Diameter, 1-1/2" OD, 7/16" Wide

☐ Each

[ADD TO ORDER](#)

In stock



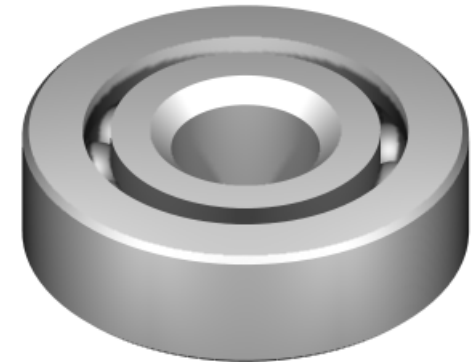
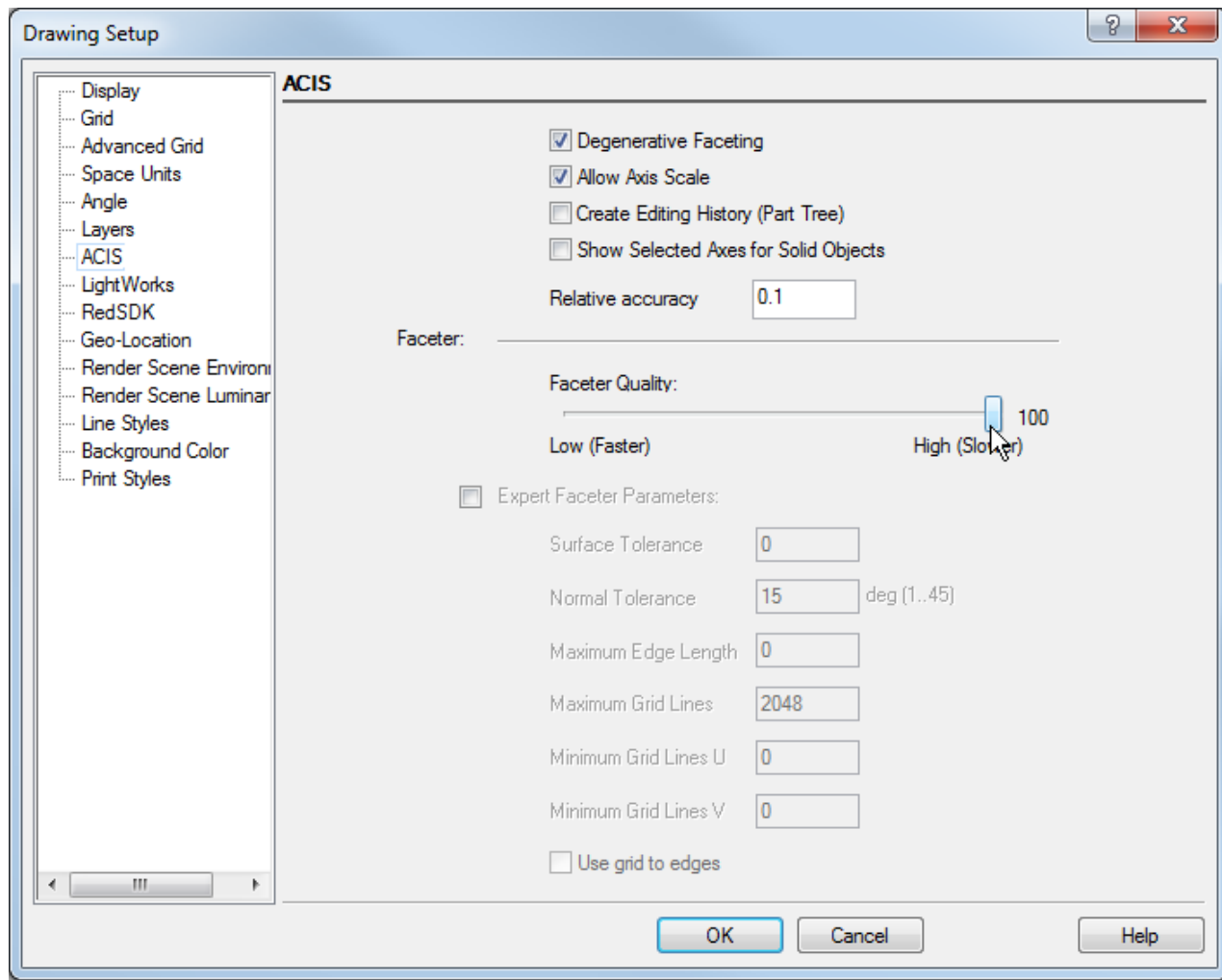
Size X	Size Y	Size Z
1.5 in	1.5 in	0.44 in

Part opened and selected.

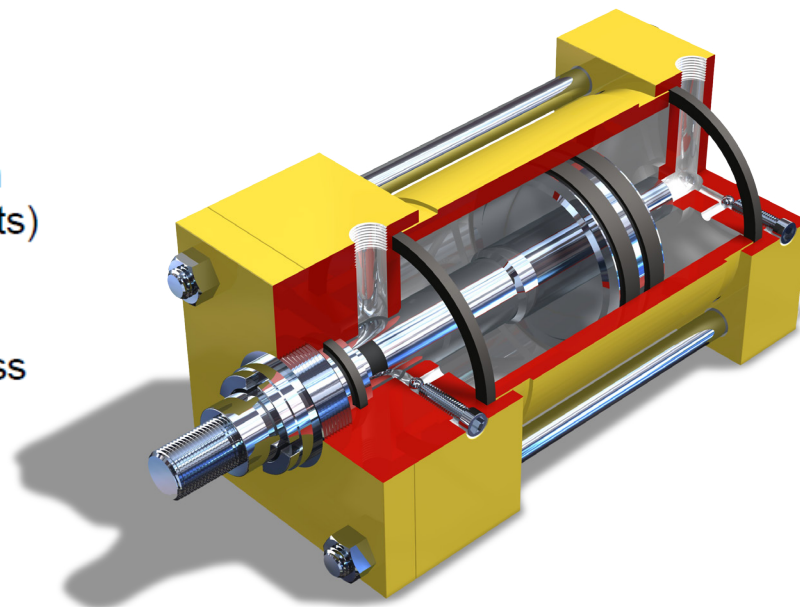
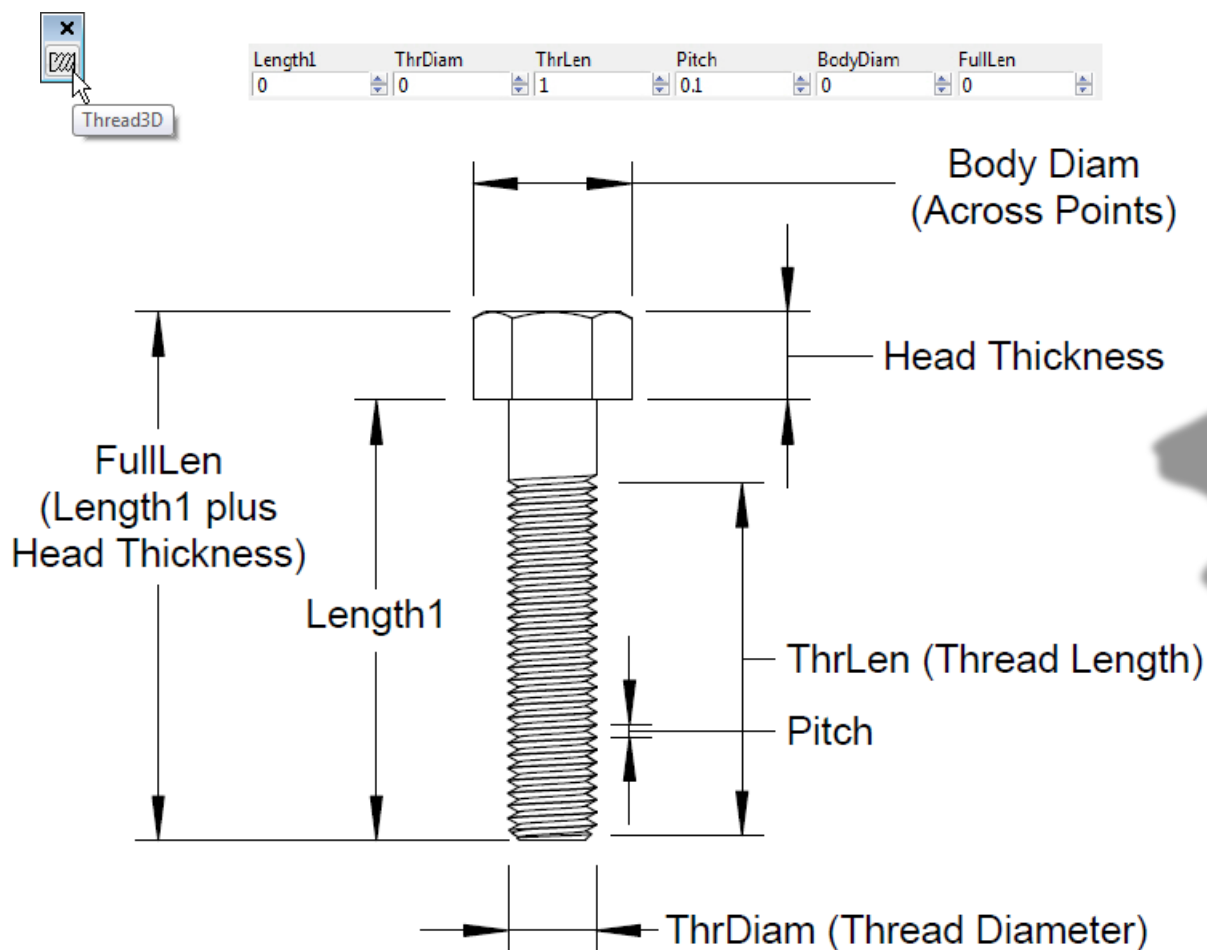
Steel Ball Bearing

Plain Open for 1/2" Shaft Diameter, 1-1/2" OD, 7/16" Wide

Like STEP files, one would do right to increase precision and set a higher ACIS to smooth curve generation.



Keep in mind that the TurboCAD user does have many tools to help create those non-standard parts when required. One such tool is the Thread3D tool.



If you found this TurboCAD tip helpful, please consider purchasing a full Textual Creations TurboCAD project tutorial that will lead you through an entire project, keystroke by keystroke. You won't be disappointed! Visit the [Textual Creations Shopping Page](#)