

# ENG 004 Lecture 16, Nov 19, 2012

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## Announcements

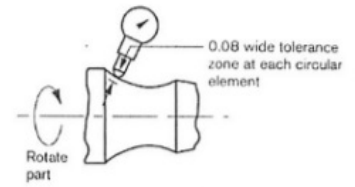
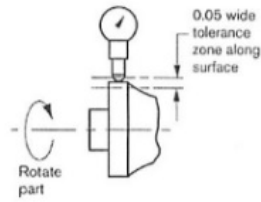
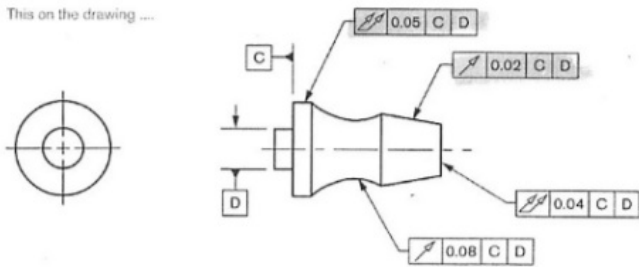
- Homework #6 due now
- Homework #7 will be posted this afternoon
- Read Chapter 11

## Topics

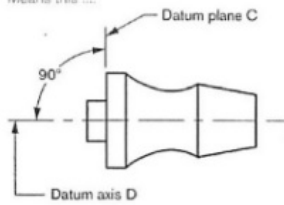
- Geometric Dimensioning and Tolerancing
- Working Drawings

# Runout

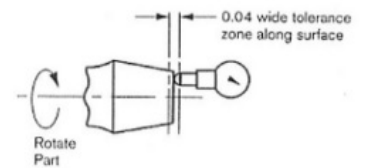
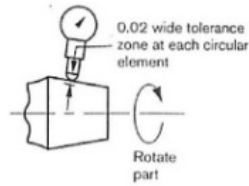
This on the drawing ....



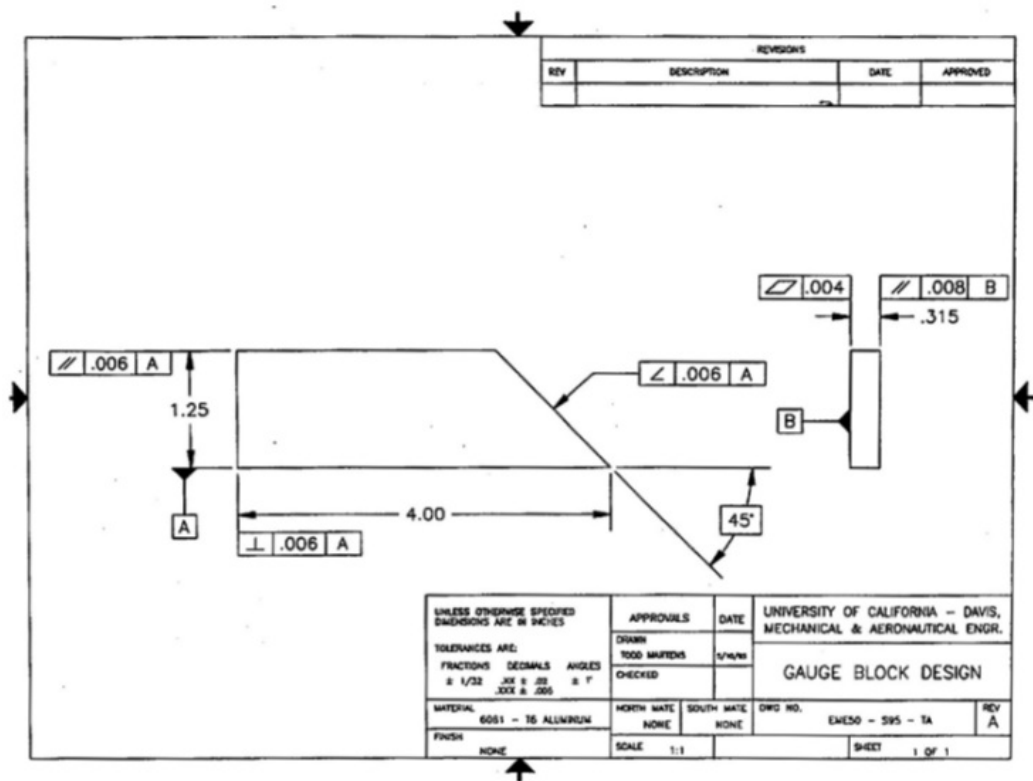
Means this ....



At any measuring position, each circular element (for circular runout) and each surface (for total runout) must be within specified runout tolerance when the part is mounted on datum surface C and rotated 360° about datum axis D.



# Gage Block Example



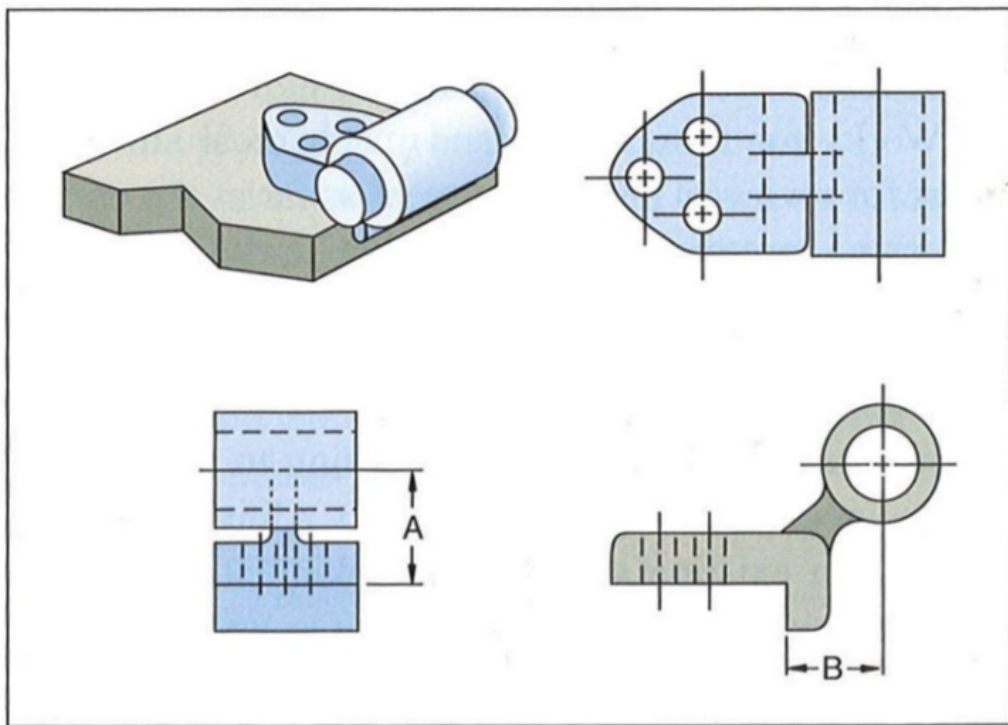
# Five Step Process

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1. Isolate and define the functions of the feature/part.
2. Prioritize the functions.
3. Identify the datum reference frame based on the functional properties and control the datum features.
4. Select the proper control.
5. Calculate the tolerance values.

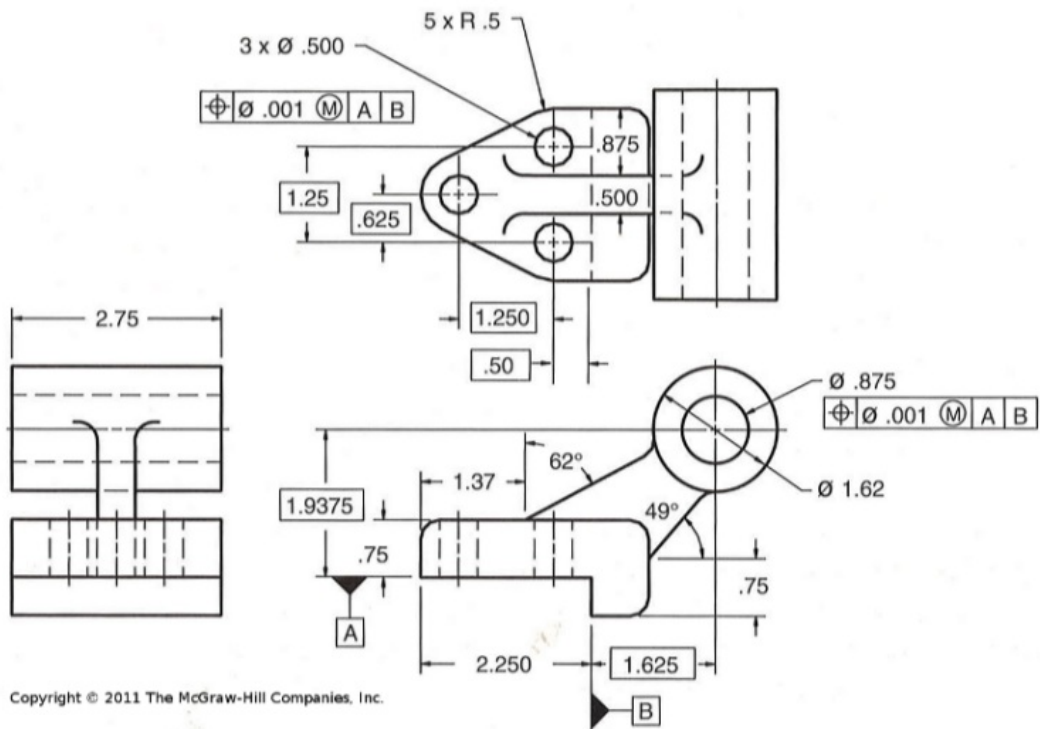
# Rail Mount Example

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# Rail Mount Example



# Working Drawings

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## Other Names

Detail drawings, production drawings, final drawings

## Definition

The complete set of standardized drawings specifying the manufacture and assembly of a product based on its design.

Working drawings are either multi-view drawings of a single part providing all the detail necessary to manufacture the part of an assembly drawing showing how previously manufactured parts are put together.

Includes: detail drawings of each non-standard part, an assembly or subassembly drawing showing all the standard and nonstandard parts in a single drawing, a bill of materials, a title block.

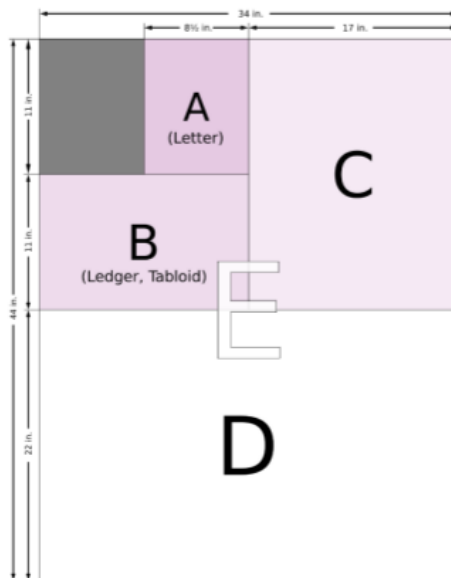
## Assembly drawings

are sometimes represented as an exploded pictorial drawing.

## Specifications

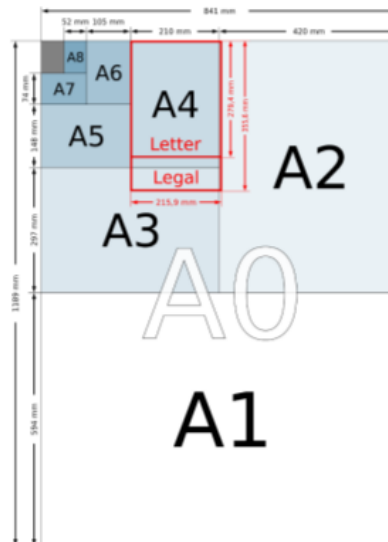
Written instructions

## ANSI Paper Size





## ISO Paper Size



# Scale

Views should be scaled to fit on the paper.

Block in boundaries of views to space

Stay within the borders

Views should be aligned, if not they should be labeled


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BILL OF MATERIALS			
ITEM	QUANT	DRAWING NO. OR PART NAME	DESCRIPTION

1. PIN DOWEL

2. SLINGER

3. BRACKET

NUMBER REQ:	MATERIAL:	FINISH:	RICHARD D. IRWIN
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES. TOLERANCES ARE: FRACTIONS = ± XX DECIMALS = ± XXX DECIMALS = ± ANGLES: ± X.X METRIC = ± X.XX METRIC = ±	WEIGHT:	NAME	DATE
	DRAWN BY: Kevin		
	CHECKED BY: Bryan		
	APPROVED BY: Carolyn		
	SCALE: 		
			TITLE
			SLINGER ASSEMBLY
			REFERENCE DRAWING
			DRAWING NUMBER

# Common Scales

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## English

- 1 = 1: Full
- 1 = 2: Half
- 1 = 4: Quarter
- 1 = 8: Eighth
- 1 = 10: Tenth
- 2 = 1: Double

## Metric

- 1:1 Full
- 1:2 Half
- 1:5 Fifth
- 1:10 Tenth
- 1:20 Twentieth
- 1:50 Fiftieth
- 1:100 Hundredth

# Title Blocks

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Used to record all the important information necessary for the working drawings.

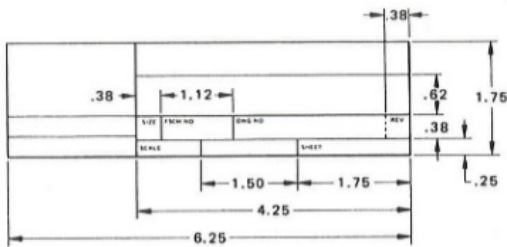
- Usually located in the lower right corner
- ANSI Standards
- Continuation block on other sheets may not have as much detail as first sheet

# Common Elements in Title Blocks

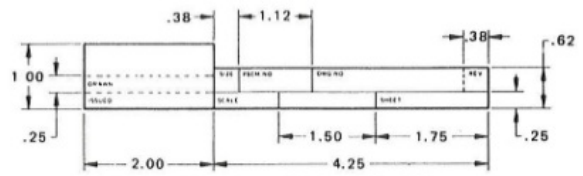
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- Name and address of Organization/Company
- Title of the drawing
- Drawing number
- Names and dates of the drafters, designer, checker, engineer, issue date, contract number, etc.
- Design approval
- Predominant scale
- Sheet number and sheet size
- Default tolerances
- Units of measure
- Material
- Special finishes
- Weight of the item

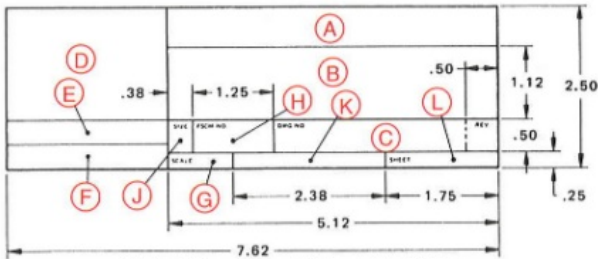
# Title Block Standards



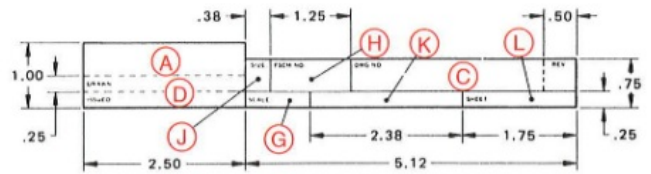
NOTE: All dimensions are in inches. 1 inch = 25.4 mm.  
**TITLE BLOCK FOR A, B, C, AND G – SIZES**



NOTE: All dimensions are in inches. 1 inch = 25.4 mm.  
**CONTINUATION SHEET TITLE BLOCK FOR A, B, C, and G – SIZES**



NOTE: All dimensions are in inches. 1 inch = 25.4 mm.  
**TITLE BLOCK FOR D, E, F, H, J, AND K – SIZES**



NOTE: All dimensions are in inches. 1 inch = 25.4 mm.  
**CONTINUATION SHEET TITLE BLOCK FOR D, E, F, H, J, AND K – SIZES**

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# Example Working Drawings

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- revision blocks
- borders/zone
- common parts
- parts list
- notes
- hole tables
- detail views
- general tolerances
- exploded view

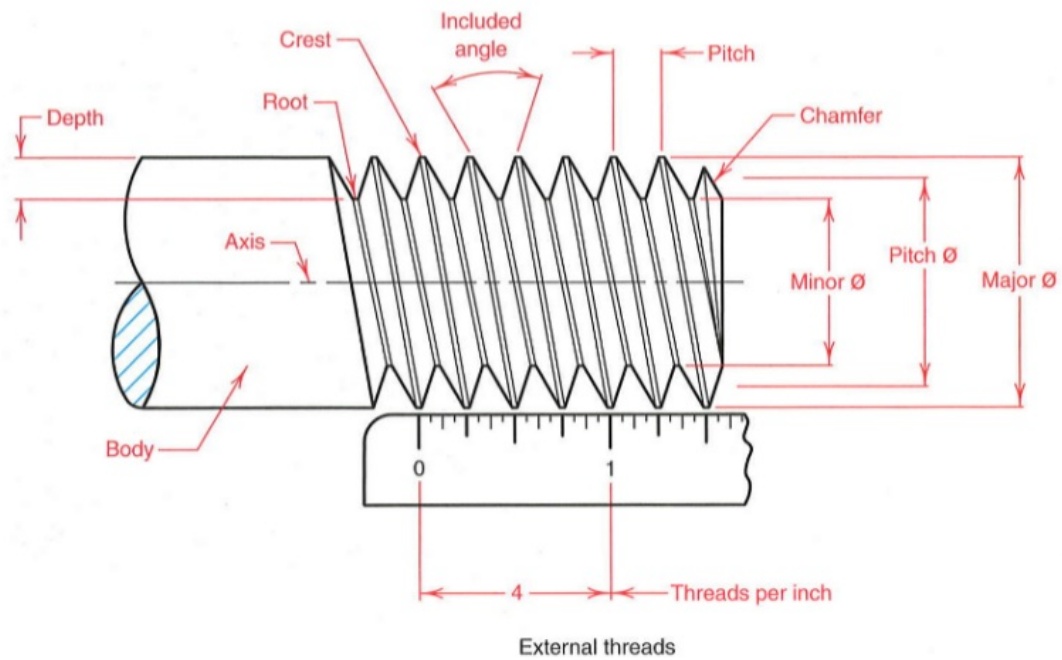
# Example Working Drawings

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- [14x22-trapeze.pdf](#)
- [QS-01-01.pdf](#)
- [TF-00.pdf](#)
- [TP-00.pdf](#)
- [R1-00.pdf](#)
- [CA-00.pdf](#)
- [cell-shearer.pdf](#)
- [cell-shearer-assembly.pdf](#)

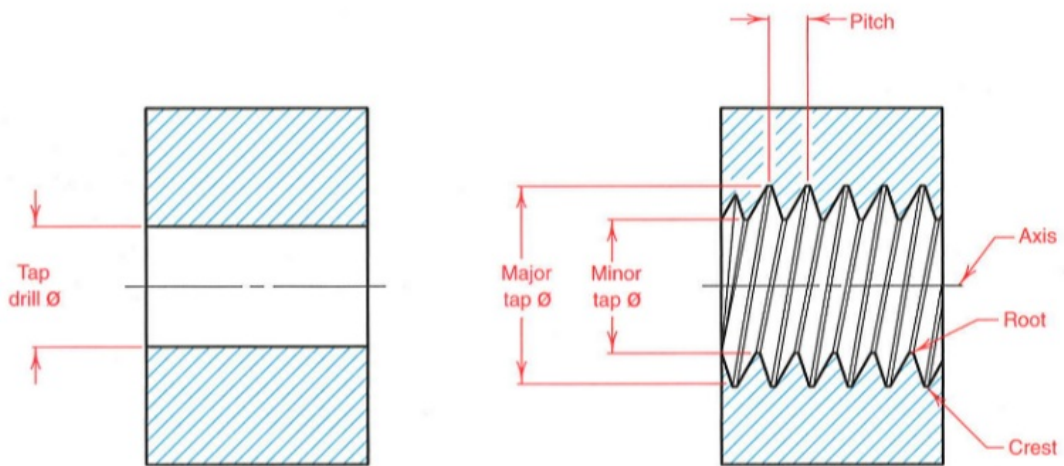


# External Threads



# Internal Threads

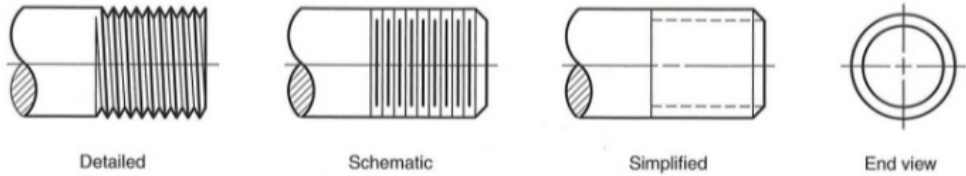
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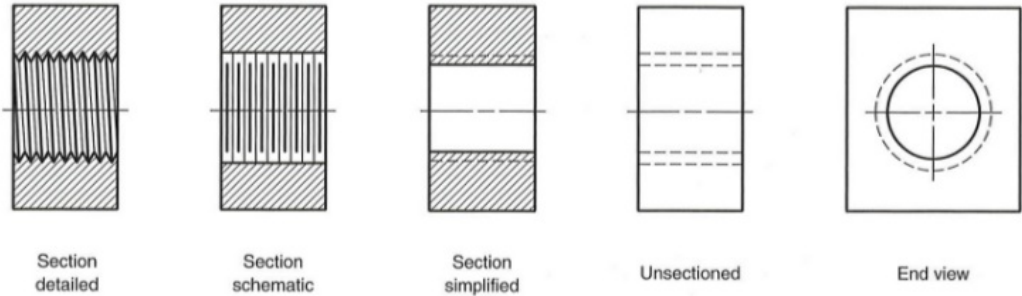
Internal threads

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# Simplified Threads



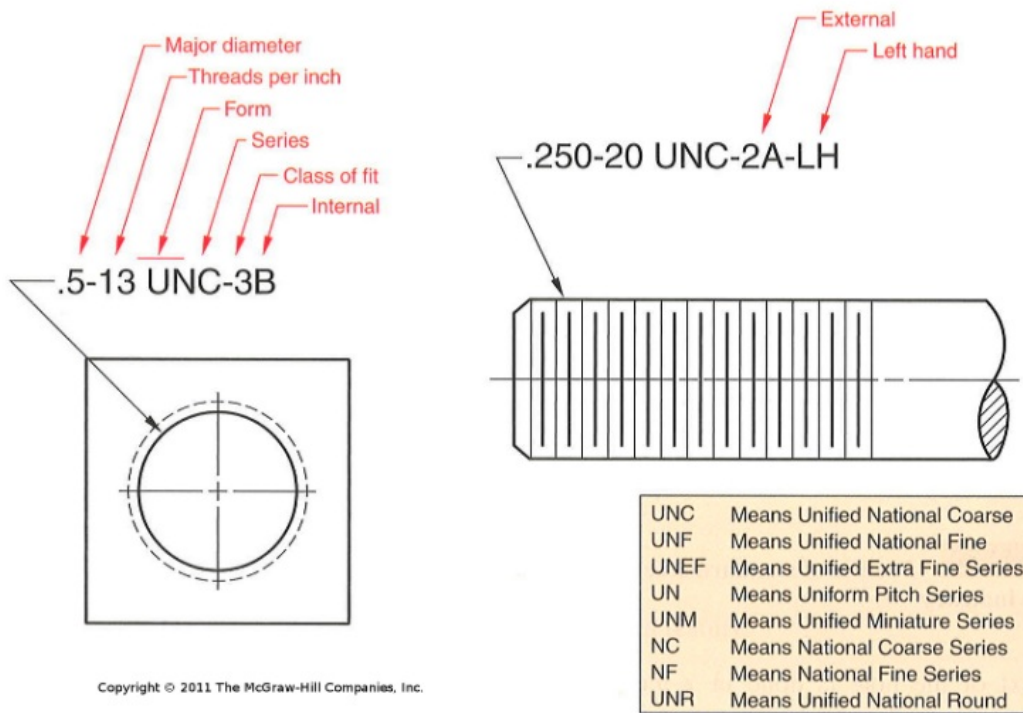
### External threads



### Internal threads

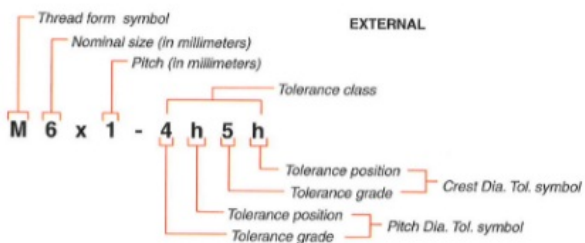
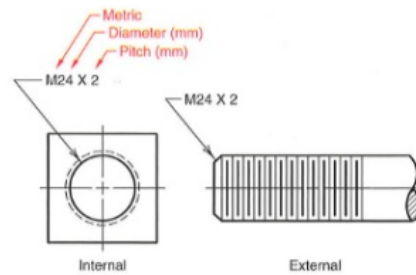
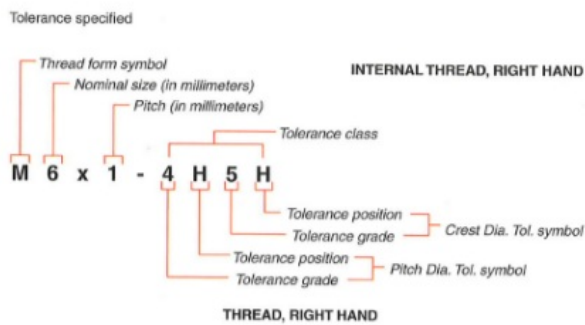
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# English Threads



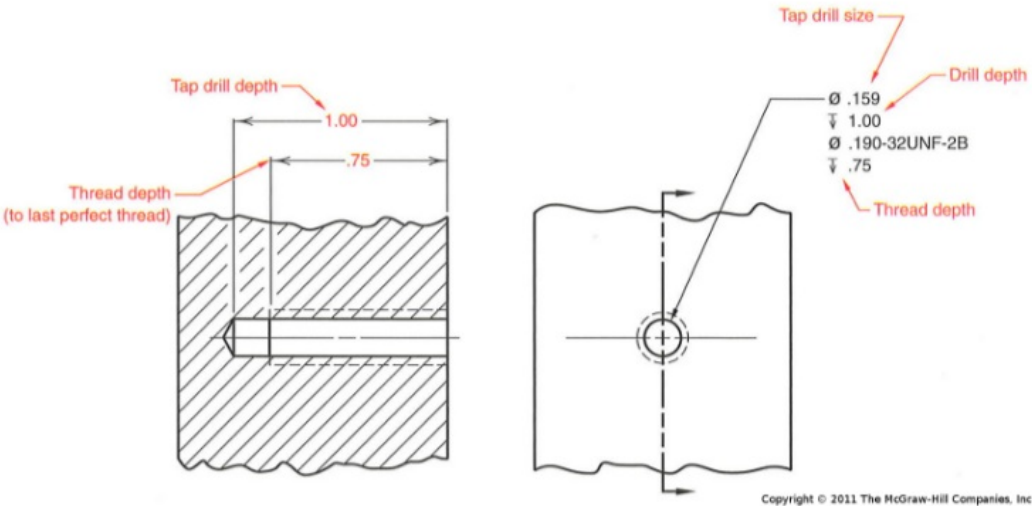
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# Metric Threads



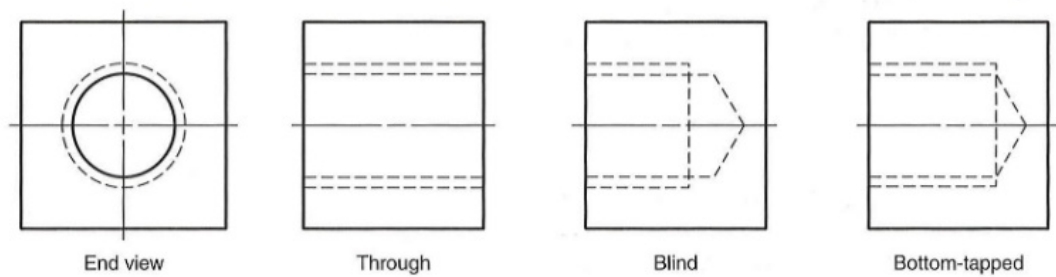
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# Tap Dimensions

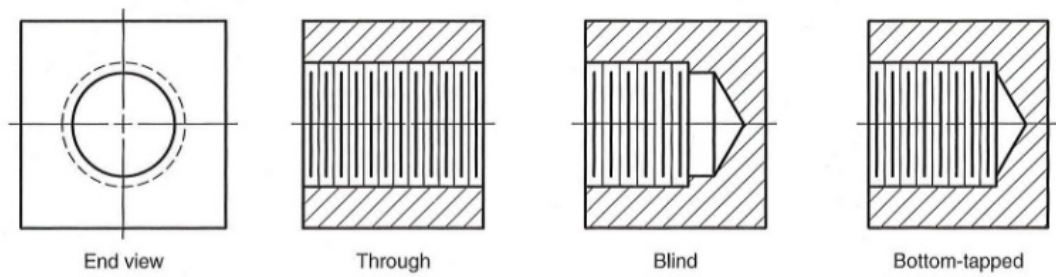


# Hole Types

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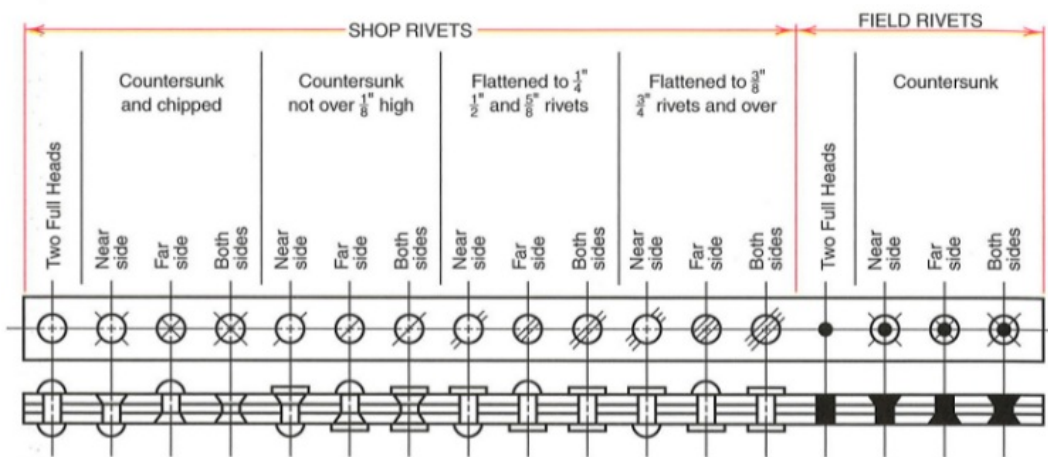
**Simplified views**



**Sectional views**

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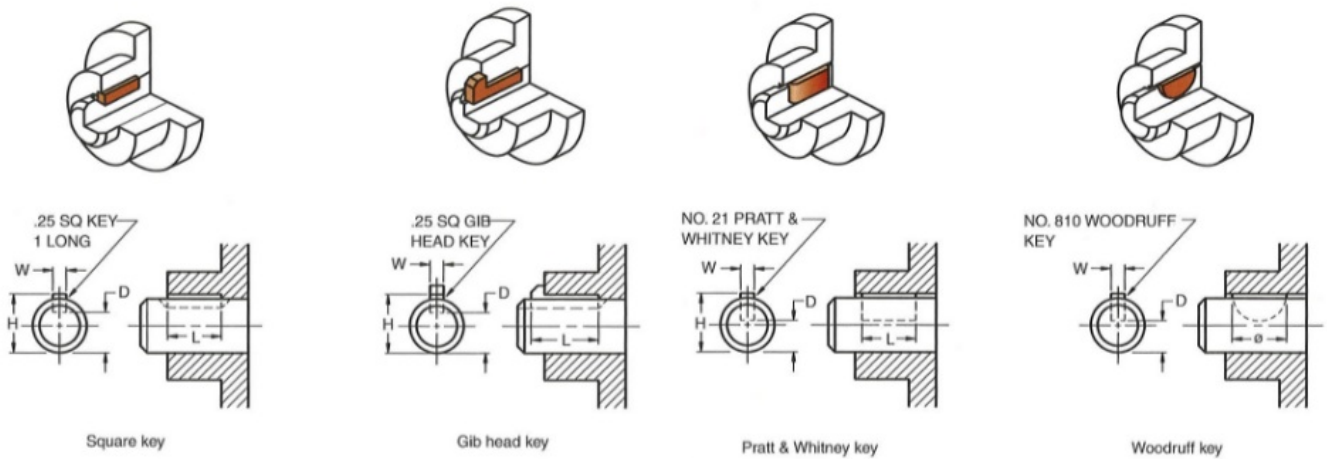
# Rivets



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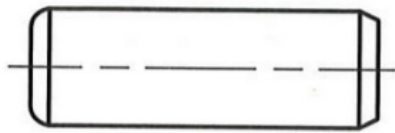
# Keys and Keyways



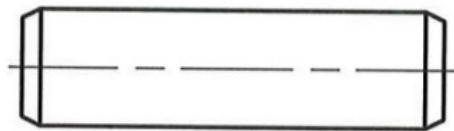
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# Pins

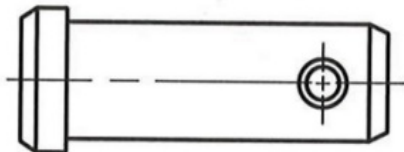
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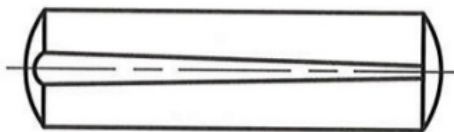
Ground dowel



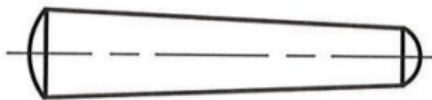
Straight



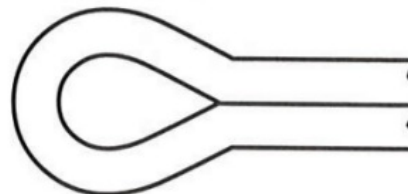
Clevis



Grooved



Taper

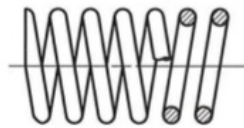


Cotter

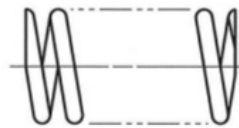
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# Springs

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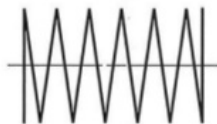


Round-wire spring

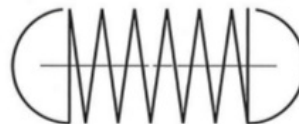


Use of phantom lines

## Detailed



Compression spring

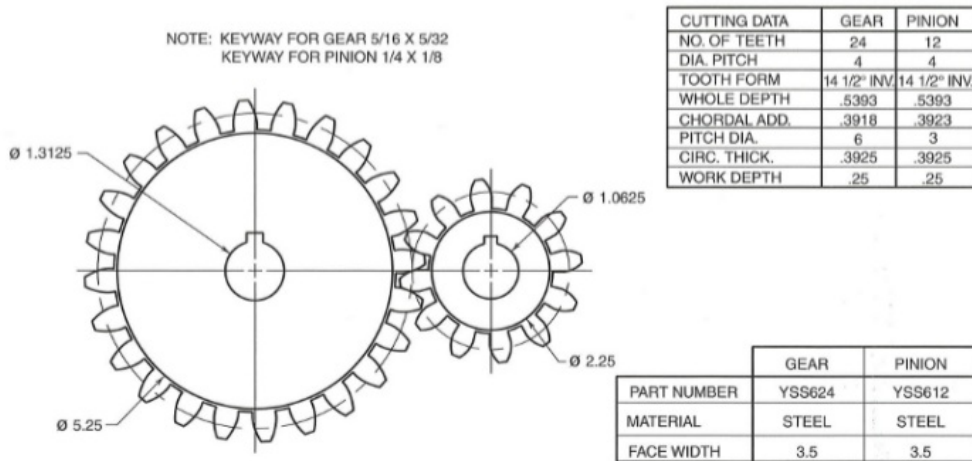


Tension spring

## Schematic

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# Gears



**Figure 11.51** Detail drawing of a spur gear

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