

ENG 004 Lecture 13, Nov 8, 2012

Announcements

- Homework #5 due Tuesday, Questions?
- Read Chapter 9 (through 9.5)

Topics

- Teamwork
- Dimensions

Dimensioning

Dimensions

They define the size and/or location of a feature.

All features must have a dimension associated with it.

Datum

A point or origin of a reference frame.

Units of Measure

You must specify the units of measure: inches, millimeters, degrees, radians, etc.

Tolerances

An allowable deviation in size, location, and/or geometry of a feature.

All dimensions must have a tolerance associated with it.

Dimension Guidelines

Adopted from ANSI Y 14.5M-1994

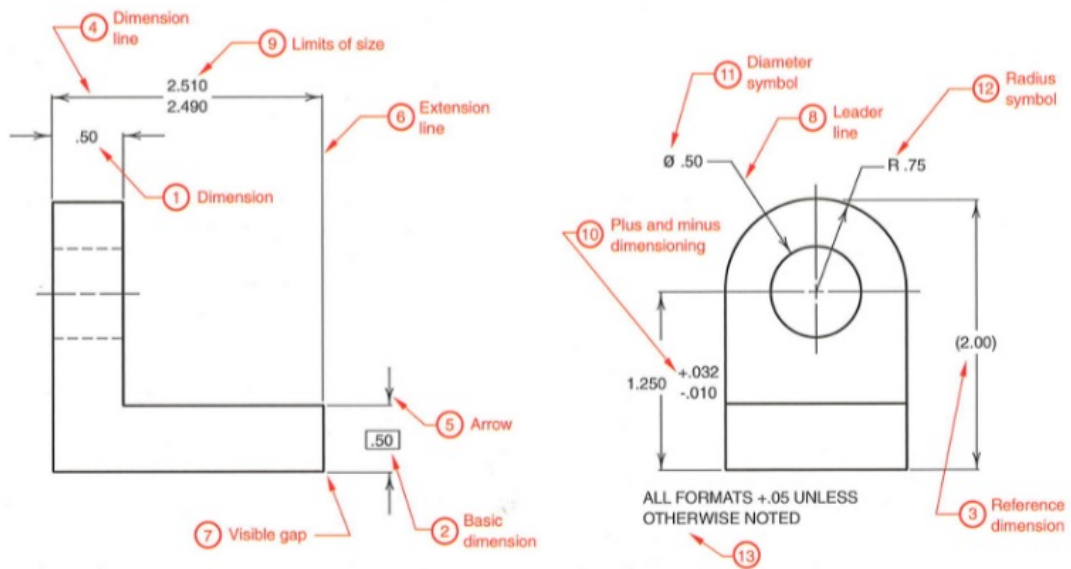
- Each dimension shall indicate the allowable variation in size, i.e., a tolerance, unless the dimension is a reference dimension or a basic dimension
- All features must be fully dimensioned so that there is no ambiguity of the feature's size, location, and form (geometry or shape)
- All dimensions required to document the design are necessary, however, only a necessary set of dimensions should be used. That is, no redundant dimensioning. All dimensions should be directly referenced to the view with the most detail of the feature.
- Dimensions shall be selected and arranged to suit the function of the feature or its relationship to other features and shall not be interpreted to more than one interpretation.

Dimension Guidelines

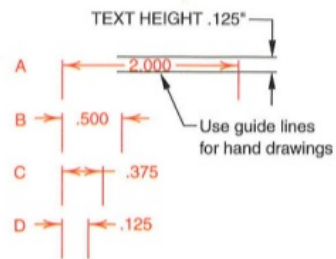
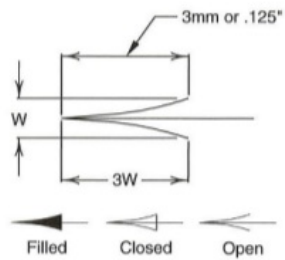
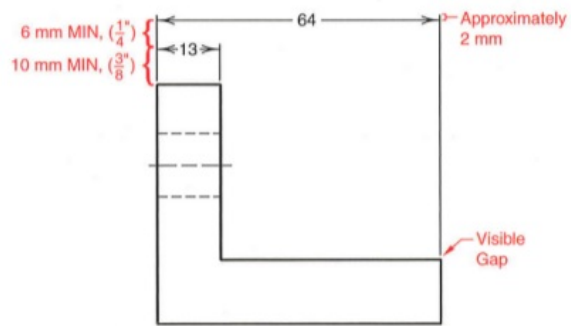
Continued

- The drawing shall not specify the method of manufacture. If this information is required, it shall be specified in a specification document referenced on the drawing
- Dimensions shall be shown in true size using orthographic multi-views and/or auxiliary views.
- Wires, cables, sheets, etc. shall be specified by linear dimensions indicating the object's diameter or thickness.
- A 90° angle is implied at locations shown on a drawing at right angles and no angle is specified.
- All dimensions are applicable at 20° C.

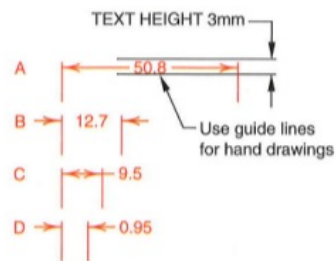
Dimension Elements



Dimension Details



Decimal dimensioning

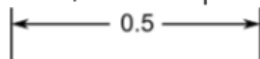


Millimeter dimensioning

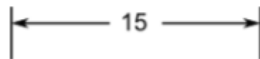
Dimension Units

SI Units (mm)

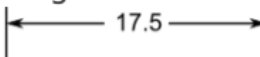
- If the dimension is less than 1 mm, a zero precedes the decimal point:



- If the dimension is a whole number, neither the decimal point nor a zero is shown:



- If the dimension exceeds a whole number by a decimal fraction of one millimeter, the last digit to the right of the decimal point shall be non-zero:



- Neither commas nor spaces shall be used to separate digits into groups:



Dimension Units

US Customary Units (decimal inches)

- A zero is not used before a decimal point for values less than one inch:

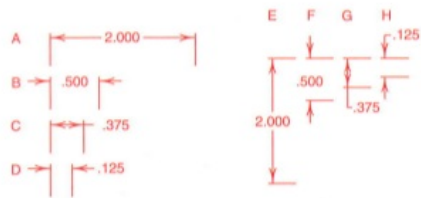
$$\left| \longleftarrow .25 \pm .02 \longrightarrow \right|$$

- A dimension is expressed to the same number of decimal places as its tolerance. Zeros are added to the right of the decimal point where necessary:

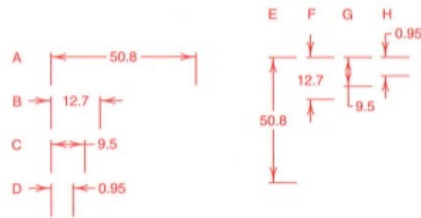
$$\left| \longleftarrow .250 \pm .005 \longrightarrow \right|$$

- All decimal points used in the above must be clearly visible

Dimension Placement



Decimal dimensioning

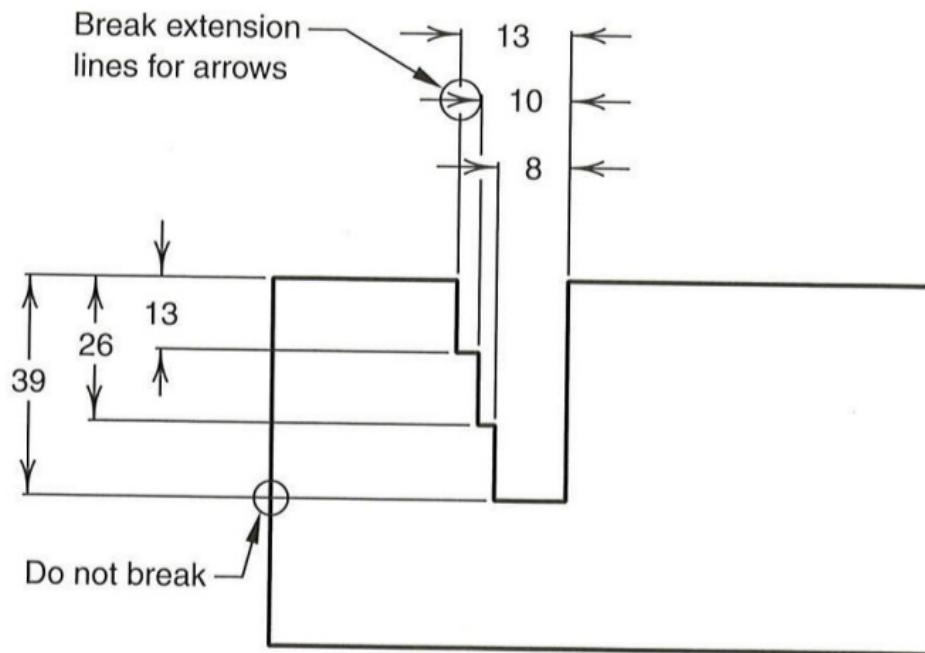


Millimeter dimensioning

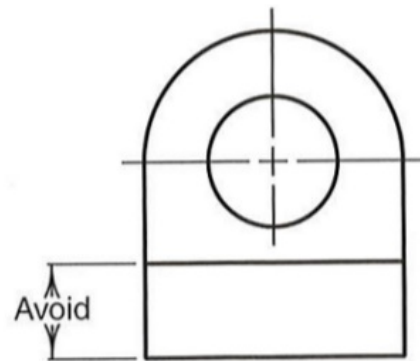
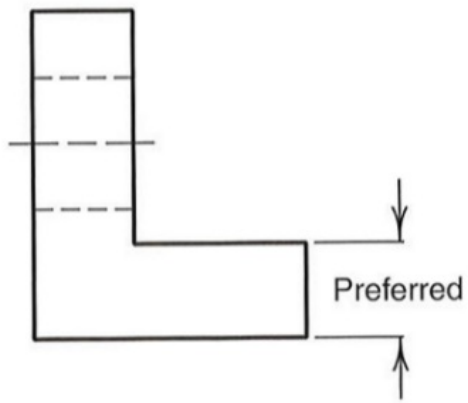
Common Symbols

GENERAL DIMENSIONING SYMBOLS		
CURRENT PRACTICE	ABBREVIATION IN NOTES	PARAMETER
∅	DIA	DIAMETER
S∅	SPHER DIA	SPHERICAL DIAMETER
R	R	RADIUS
CR	CR	CONTROLLED RADIUS
SR	SR	SPHERICAL RADIUS
⌊	CBORE of SFACE	COUNTERBORE SPOTFACE
∨	CSK	COUNTERSINK
⌞	DP	DEEP
○	—	DIMENSION ORIGIN
□	SQ	SQUARE
()	REF	REFERENCE
x	PL	PLACES, TIMES
)	—	ARC LENGTH
∇	—	SLOPE
∇	—	CONICAL TAPER

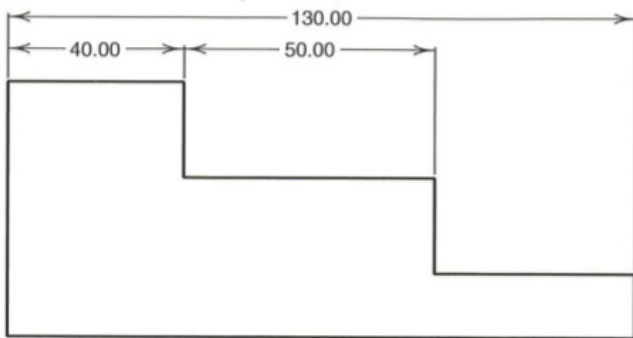
Extension Lines



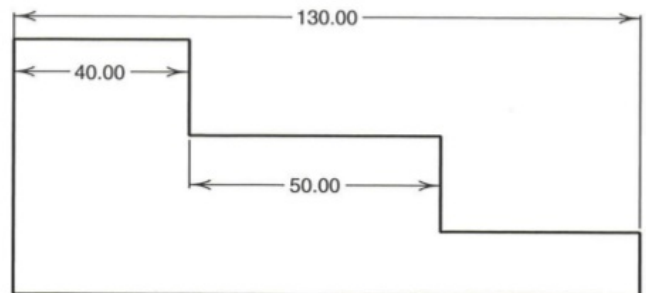
Most Descriptive Views



Extension Lines Not Object Lines

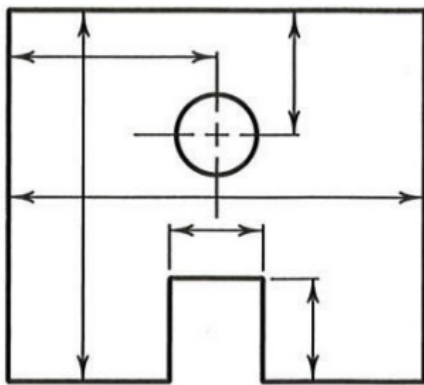


(A) Yes

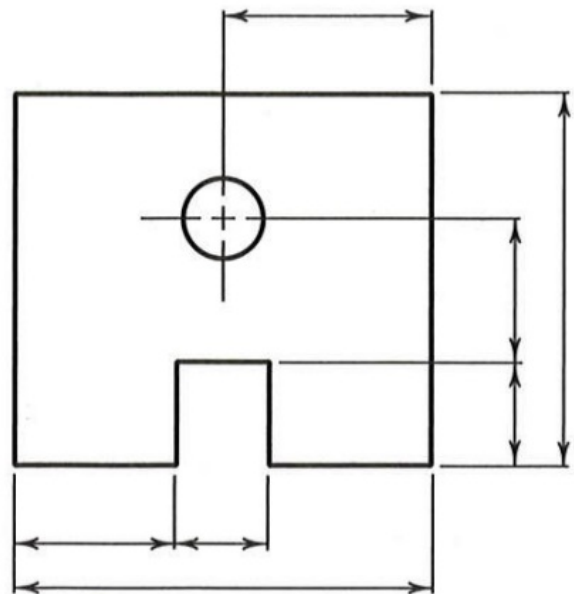


(B) No!

Dimensions Outside Object

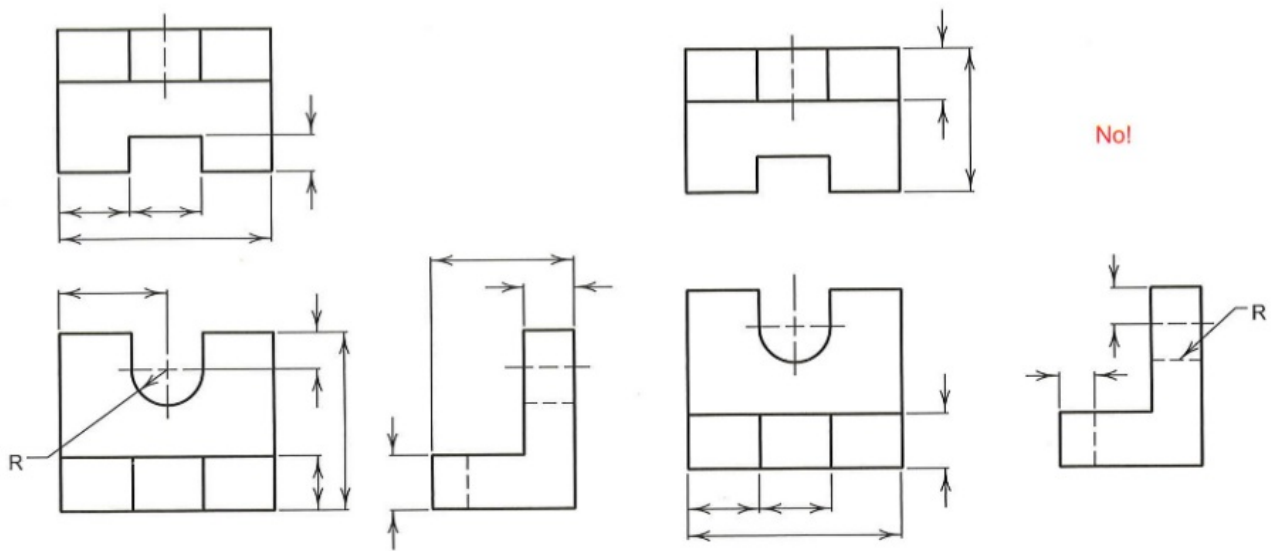


(A) No!



(B) Yes

Contour Dimensioning

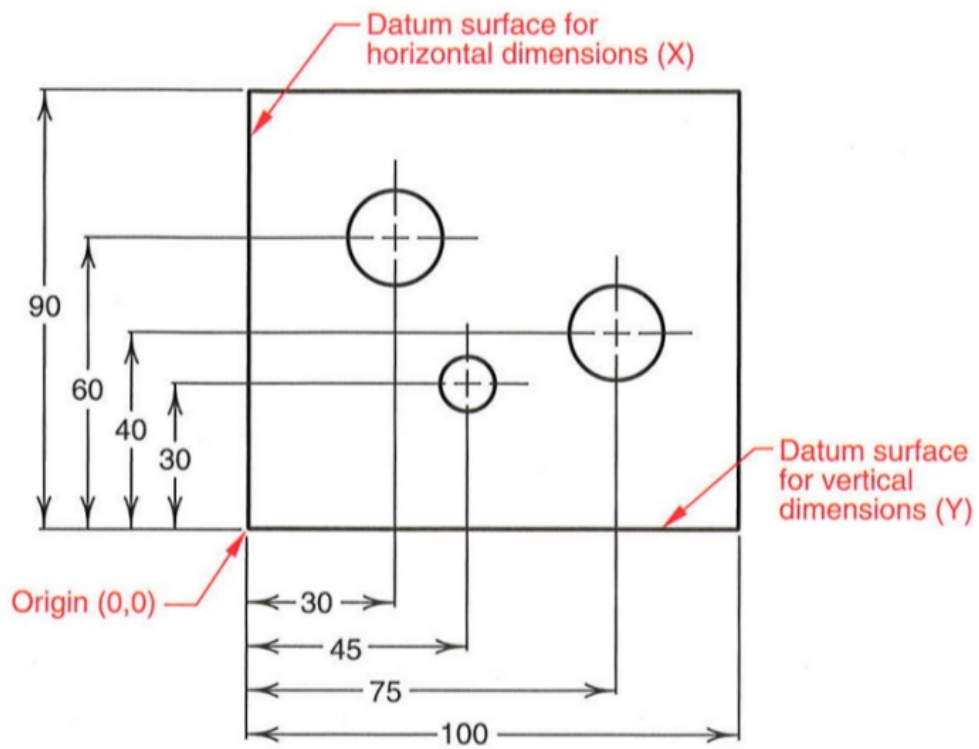


(A) Correct contour dimensioning

(B) Incorrect contour dimensioning

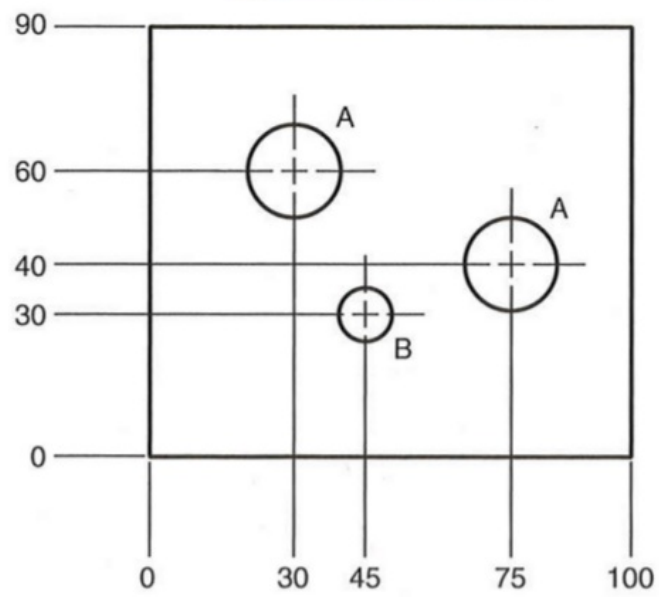
No!

Datum Dimensioning

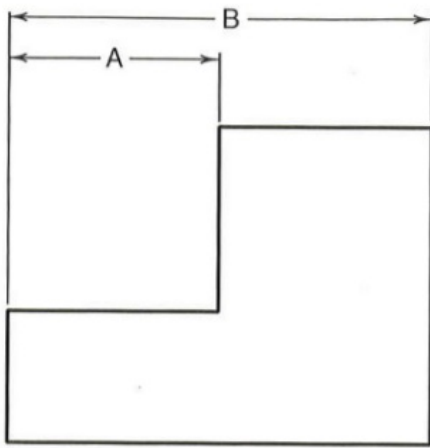


Ordinate Dimensioning

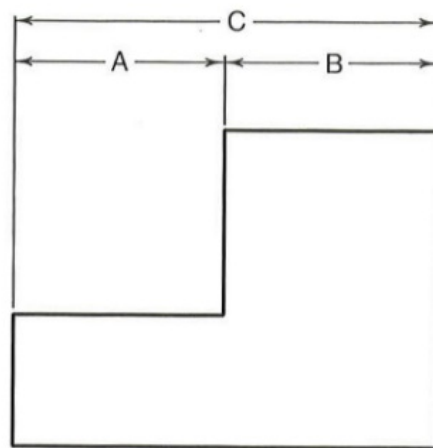
Symbol	A	B
Hole diameter	20	10



Over Dimensioning

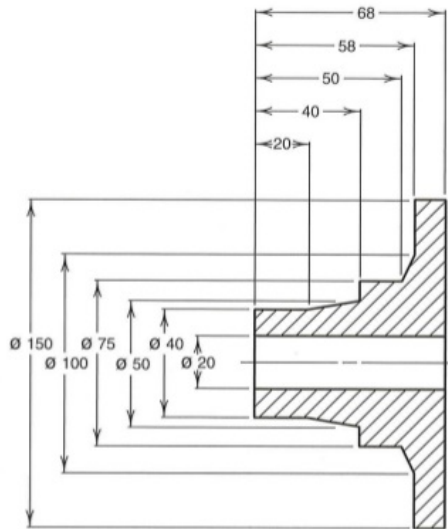


(A) Correct

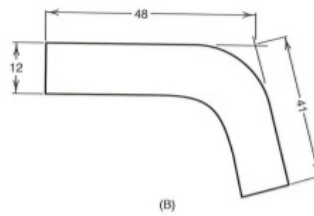
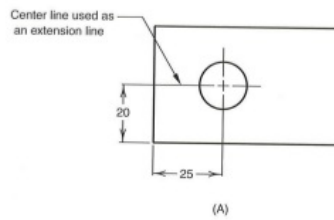


(B) Avoid

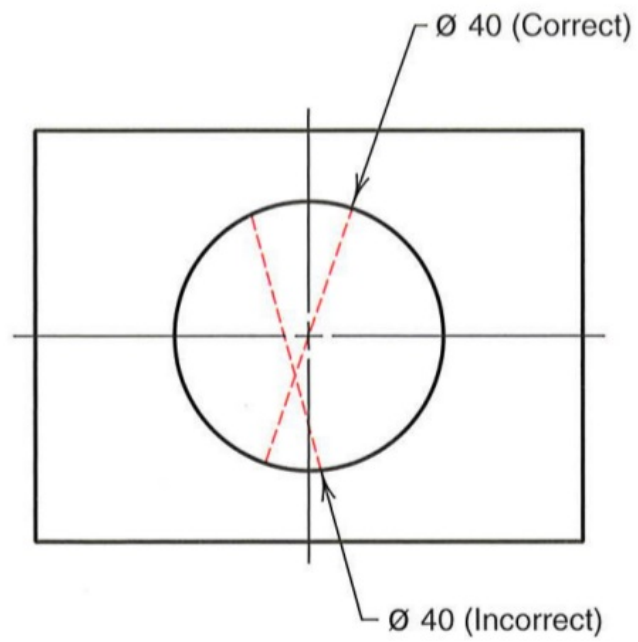
Stagger Dimensions



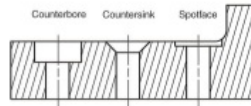
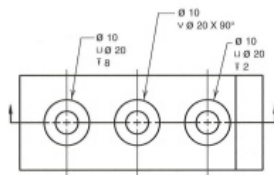
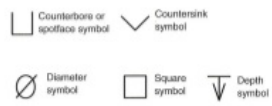
Dimensioning Center Lines



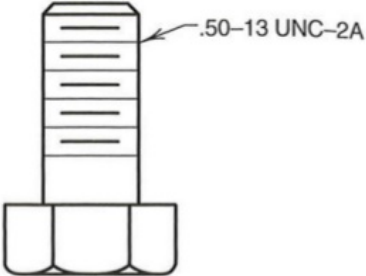
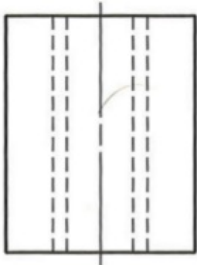
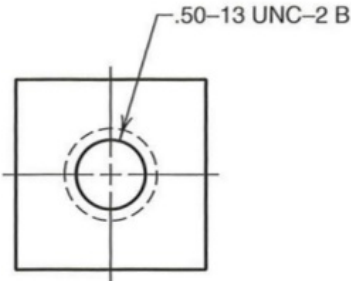
Radial Leaders



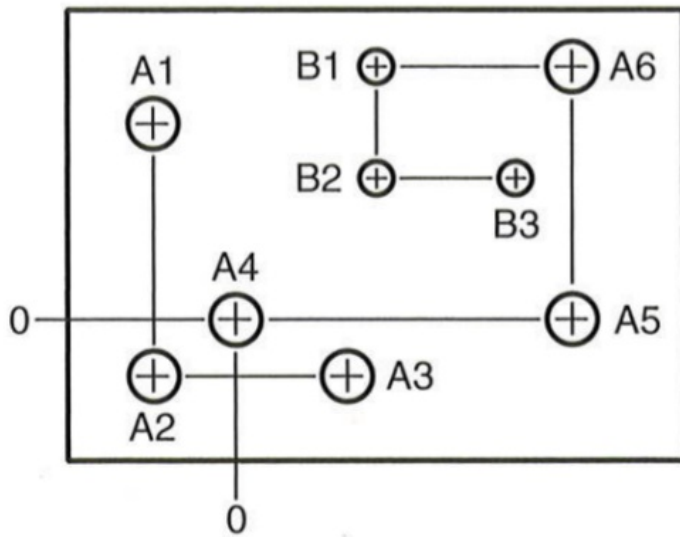
Holes



Threads

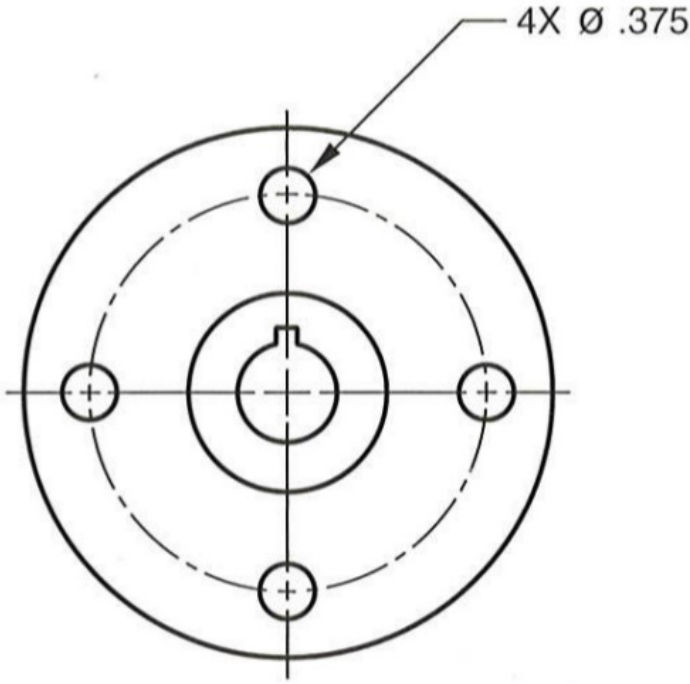


Tables

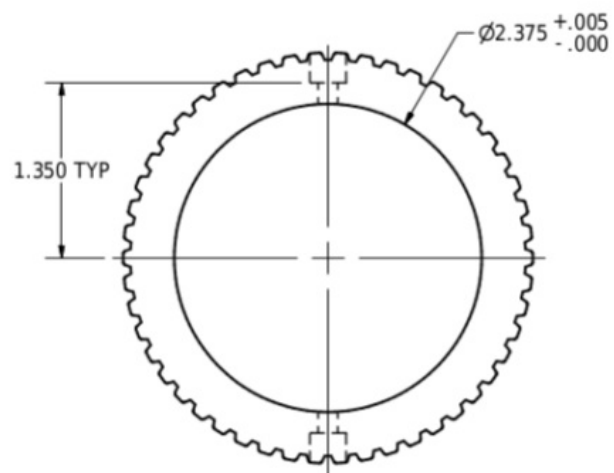


Hole	X	Y	Size
A1	-1.00	2.00	Ø.50
A2	-1.00	-.50	Ø.50
A3	1.10	-.50	Ø.50
A4	0	0	Ø.50
A5	3.38	0	Ø.50
A6	3.38	2.62	Ø.50
B1	1.50	2.62	Ø.25
B2	1.50	1.50	Ø.25
B3	2.88	1.50	Ø.25

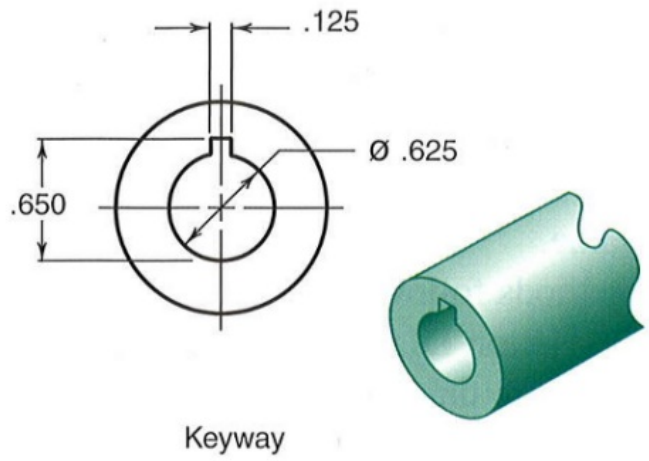
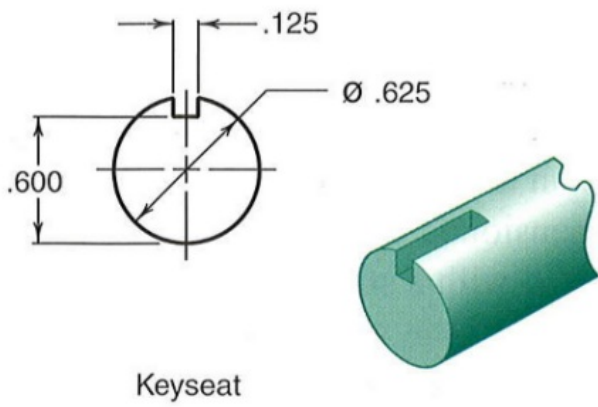
Multiplicity



Typical



Keyway



Drawing Review

Cell Shearer