Engineering

Blue Print Reading

(Scale/Notes/Symbols/Dimension/Tolerances)

April 23, 2020

Blue Print Reading

(**Scale/Notes/Symbols/Dimension/Tolerances**)

April 23, 2020

Objective/Learning Target:

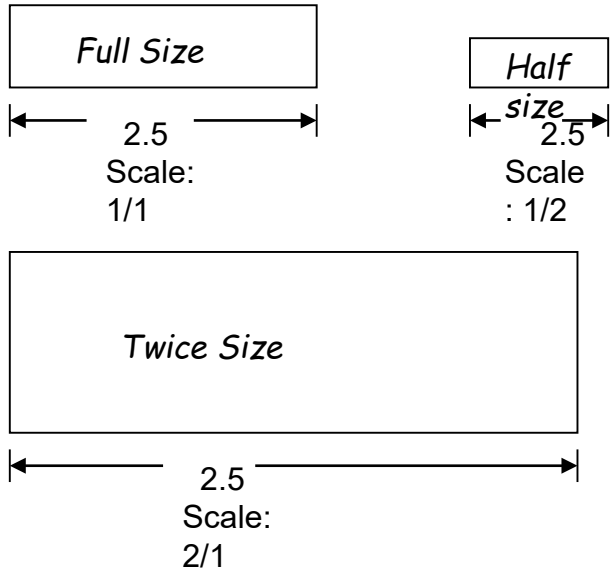
Students will read the following PPT to understand Blueprint Reading. Following the PPT information covering Blueprint Reading students will test their knowledge by answering Five questions.

Scale

Some parts are so large they won't fit on a drawing sheet. Some parts are so small; you would need a magnifying glass to see them.

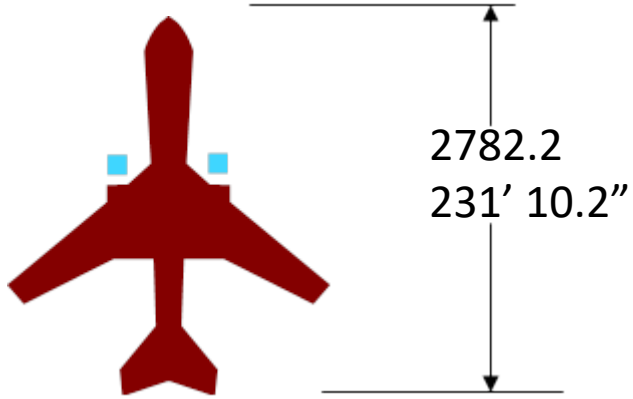
To help you figure out what the part needs to look like, the "scale" of the drawing is important.

Scale is the relationship between the actual size of the part to the part shown on the print. Large parts may be drawn half size (scale ½), so they will fit on the drawing sheet. Small parts can drawn at twice size (scale 2/1), so you can see every detail. Most drawings are drawn full size- for every inch on the part; there is an inch on the drawing. Some drawings may have views that are drawn at different scales. Any view that is not drawn at full size (scale 1/1) will have a note underneath, calling out the scale

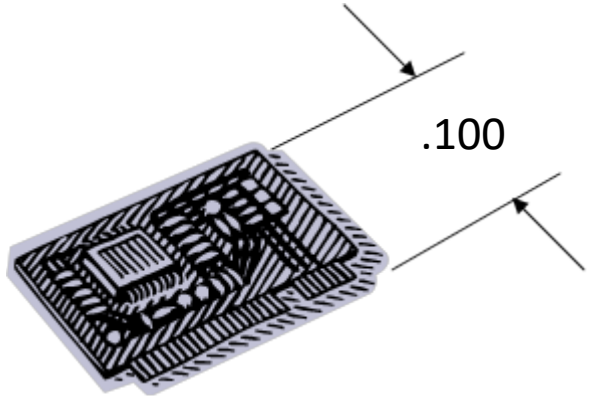


Examples of scale callouts:

Scale Type	Scale Callout
View not to scale	Scale: None
Full	1/1
Reduced	½, ¼, 1/10
Enlarged	2/1, 4/1
Multiple	Noted, 1/1 & Noted



Airplanes, houses, and buildings are drawn smaller than they are, so you can see the whole structure on one piece of paper.



4 inches = 1 inch

Computer chips are drawn larger than they are, to show all the details. The dimensions are accurate, just the picture is larger.

Drawing Notes and Symbols

Sometimes you need more information to build a part then just dimensions. **Notes** are often used on drawings to provide you with more details for a part or a process. Most of the notes that used to be located on the picture sheets have been moved to the Parts List, but some notes are still essential on the picture sheet.

There are two types of notes; **General Notes** which can apply to the entire drawing, or just to a specified area, and **Flag Notes** which are shown by a symbol  and apply only where they are called out.

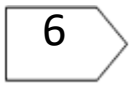
Examples of general drawing notes:

125 RA micro inches or better surface finish

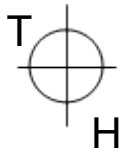
Typical fillet except as noted

Flag notes,  are used on the face of the drawing to avoid repeating information. They generally use numbers to tell them apart. To find out what a particular flag note means, you look in up in the Flagnotes- General Notes section of the Parts List.

Examples of Flag notes:
On the picture sheet
Notes are in Parts List

Symbol found on DWG	Definitions of Flagnotes-General are located in Parts list.
	FL 1 This area finished with F-17.33
	FL 6 Shim gap in excess of .03

Common symbols



is a Tool Hole, a 0.247-0.250 hole used by Manufacturing

G  C is a PCM Grid Check point

Ø means diameter, the distance across a hole

R means radius, the distance from the center to the edge of the hole

F/P means flat pattern

 Is a fastener symbol, where a rivet or bolt will be installed.

 Is a hole location for a fastener. This diameter will always be in 32nds.

TYP means Typical, that the callout will be the same in several places

Dimensions and Tolerances

Most major industries do not manufacture all of the parts and sub- assemblies required in their products. For instance, there are 3 million parts in a Boeing 777, provided by more than 900 suppliers. Frequently these parts are manufactured by specialty industries, to specifications provided by the major industry. The key to successful operation of the various parts and sub-assemblies in the major product is the ability of two or more nearly identical duplicate parts to be used in an assembly and function satisfactorily.
Here are some standard terms used on and about prints.

Tolerance is the amount of variation permitted from the design size of a part.
Tolerances can be shown by the variations between limits,

← 1.525- 1.530 →

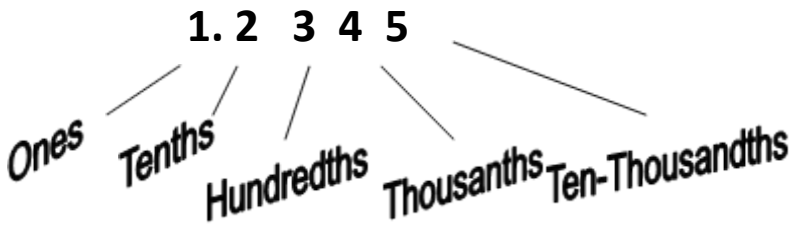
as the dimension size followed by the tolerance,

← 1.455 ± .002 →

and when one tolerance value is given (the other is assumed to be zero)

← 1.825 + .003

Decimal Place Value



The numbers to the left of the decimal are whole numbers. The numbers on the right side of the decimal are fractions of a whole number.

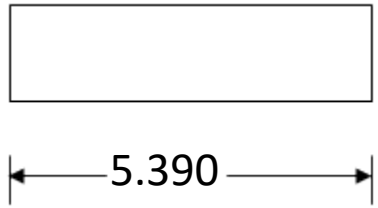
1.25 could be said as “one and a quarter inch”, or “one point two five”, or “one and twenty five hundredths”.

5.389 could be said as “five and three hundred eight-nine thousandths”.

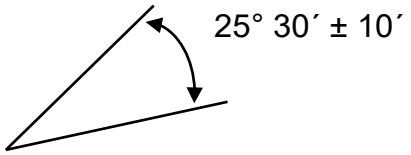
Types of Dimensions

Linear Dimensions on drawings are given in inches and decimal fractions.

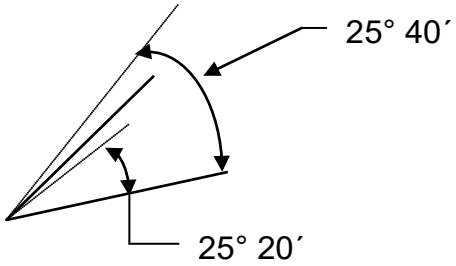
For example:



Angular Dimensions are used on prints to indicate the size of angles in degrees (°), and the fractional parts of a degree; minutes (´) and seconds (´´). A complete circle contains 360 ° (degrees), one degree contains 60 ´ (minutes), and one minute contains 60´´ (seconds).

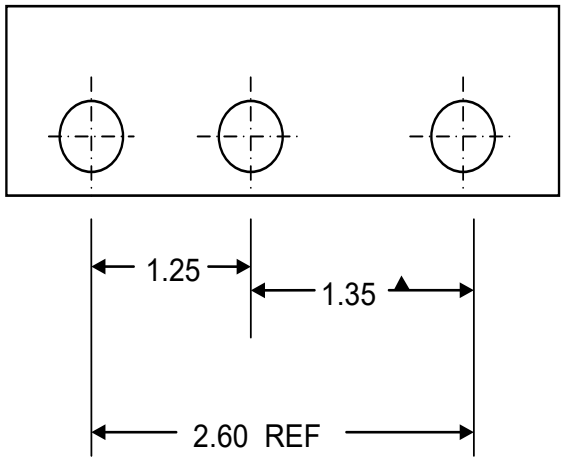


Callout on print



Tolerances applied

Reference Dimensions are occasionally given on drawings for reference and checking purposes. These dimensions are followed by the word REF. They will be without tolerance, and are not to be used for layout, machining or inspection operations.



References

- https://www.construct-ed.com/beginners-guide-how-to-read-construction-plans/
- https://www.letsbuild.com/blog/blueprints
- https://craftjack.com/toolbox/how-to-read-blueprints/

Blueprint Reading Quiz

Question #One

1. The relationship between the actual size of the part to the part shown on the print?

A. Scope
B. Linear
C. Size
D. Scale

Answer

Scale

Question #Two

2. These are often used on drawings to provide you with more details for a part or a process.

A. Sketches
B. Quips
C. Notes
D. Quotes

Answer

Notes

Question #Three

3. The amount of variation permitted from the design size of a part?

    A. Variation
    B. Tolerance
    C. Space
    D. Skip

Answer

Tolerance

Question #Four

4. List the Three different Dimension Lines.
    A. _____
    B. _____
    C. _____

Answer

Linear

Angular

Reference

Question #Five

5. What type of Number is to the left of a decimal point?
    A. Whole
    B. Half
    C. Fractions
    D. Thousandths

Answer

Whole