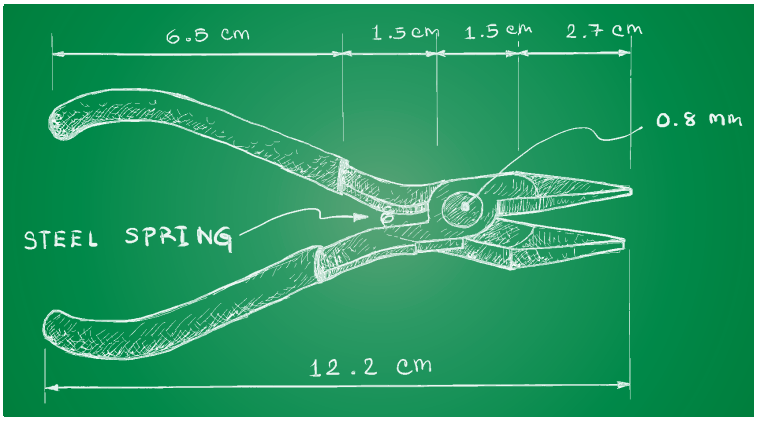
Draw Freehand Letters, Numbers, and Fractions

THE GOAL of freehand lettering is to create simple and easy to read letters and numbers for technical drawings. It is both a technical skill and an art form. All drafters and designers need basic freehand lettering and numbering skills to communicate information through a sketch. Freehand lettering and numbering makes your sketches look more professional.



Objective:

Draw freehand letters, numbers, and fractions.

Key Terms:

drawing
font
freehand lettering
freehand sketch
guidelines
inclined
kerning
lettering
sequence
single stroke Gothic lettering
technical lettering

Freehand Drawing of Letters, Numbers, and Fractions

Drawing is the art or technique of representing an object or outlining a figure, plan, or sketch by means of lines. **Lettering** is the creation of hand-drawn letters applied to an object or surface. In technical drawings, lettering is used to provide titles, dimensions, notes, and other details to a freehand sketch. It adds detail to the basic ideas and concepts of a freehand sketch. A **freehand sketch** is the initial transfer of an idea from an engineer's abstract idea

into a 2D and/or 3D working drawing. Freehand technical lettering ability has little relationship to a drafter or designer's typical penmanship ability.

DRAWING FREEHAND LETTERS

Freehand Lettering

Freehand lettering is drawing or executing legible letters without the assistance of tools: guides, templates, mechanical pantographs, measurement tools, and other aides. Freehand lettering describes or provides detailed specifications for an object. In an engineering drawing, freehand lettering provides information regarding sizes and instructions in the form of notes and dimensions. With the goals of legibility and uniformity, styles are standardized. In design and drafting freehand lettering is typically drawn in a "Gothic" style with the following characteristics:

- Consistent/constant line thickness
- "Straight Gothic" (vertical strokes perpendicular to the baseline) or "inclined Gothic" (vertical strokes at about 70 to 75°).

Technical Lettering

Technical lettering is the process of forming letters and other characters for a mechanical drawing. All lines and letters should be equally spaced and should not touch other lines.

Standard lettering techniques require use of the appropriate pencil. Pencils ideal for lettering are grades H, HB, and F. [These choices are "in the middle" in terms of softness and hardness.]

The pencil is held and positioned at an angle: approximately 65 to 75° off the paper. Pencil lead wears down during drawing, so holding the pencil at an angle is important.

The pencil is twisted (or slowly spun) in the fingers as each stroke is drawn. In this way the tip size remains the same. For example, should the pencil be held at 90° to the paper and not spun, the pencil tip quickly wears down. As a result, the beginning of the stroke will be thinner than the end of the stroke.

Common Freehand Lettering Errors

Common freehand lettering errors include the following:

- Letters are at different heights.
- Letter bases are unequal.
- Accidently mixing upper and lower case styles.
- Unequal spacing between letters—too close or too far apart.
- Use of vertical and angled letters in the same line.

Upper Case Freehand Lettering

VERTICAL CAPITAL LETTERS: Drafters prefer the vertical capital (upper case) letters for technical drawings. Letters are often formed in a 6 × 6 grid square to help keep the strokes and spaces in proportion. Most drafters practice drawing letters using grid paper and lightly dotting-in the 6 × 6 grid. Most letters are 5 units wide by 6 units tall. With experience drafters can use a larger grid pattern and eventually none at all. For example:

- Letters T O M Q V A X and Y are all 6 units by 6 units.
- The letter W is 8 units wide and 6 units tall.
- The letter "I" and numeral "1" are only the width of a single stroke.

FONT: **Single stroke Gothic lettering** is a sans serif font formed by a series of short strokes: a typeface with no serifs (small lines at the end of a letter or number character). It is the standard technical lettering style with well-spaced characters. The term "single stroke" means that the width of the stroke of the pencil is also the width of the stem of the letter whether drawn horizontally, obliquely, or vertically. The same letter font and style should be maintained throughout a drawing/set of drawings. A **font** is a specific typeface of a particular size and style. It is one of the most straightforward and clear fonts. In general, the upper case letters are divided equally between the top, middle, and bottom of the character.

LETTER WIDTH: Letters have different widths. In other word, each letter will not "take up" the full grid or square. For example, the letters "I" and "L" are slightly narrow compared to their width. Properly spacing the letters, so they are not too close or too far apart, takes practice. **Kerning** is the process of adjusting the spacing between characters in a proportional font, usually to achieve a visually pleasing result.

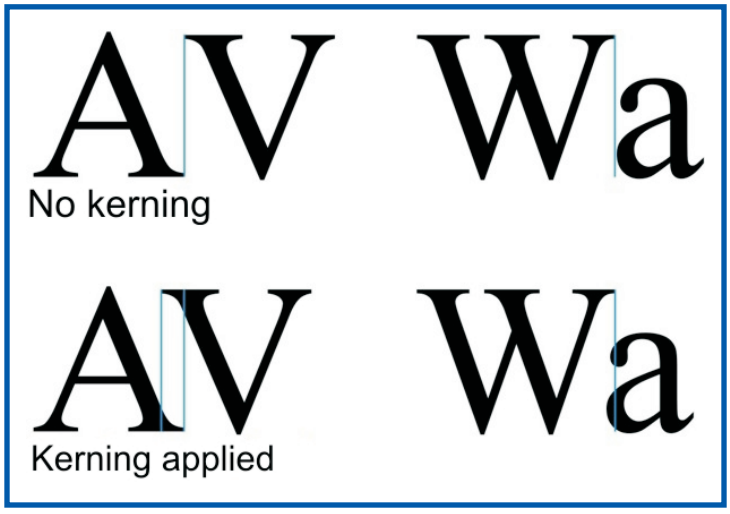


FIGURE 1. Kerning adjusts the space between the letters. In a well-kerned font, the spaces between each pair of characters all have a visually similar area.

INCLINED LETTERS: Technical lettering often uses slightly **inclined** (leaning or sloping) letters, to the top right. This practice can make the text more dramatic and drafters often develop a personal style in terms of straight vertical or inclined letters.

GUIDELINES: Upper case letter practice includes the use of lightly drawn guidelines. **Guidelines** are spaced, lightly drawn lines that help ensure consistency in the size of the letter characters. Grid paper has its own lines to follow. [NOTE: To draw inclined letters, drafters

often draw an angled line across each gridline as an assist.] Guidelines often consist of four types:

- The cap line is the uppermost horizontal guideline drawn for upper case letters.
- The "waist" line indicates the upper limit of the lower case letters. (The ascender is the part of the lower case letter that extends above the body of the letter. All ascenders are as high as the capital letters.)
- The base line is the location where all letters rest or stand.
- The drop line indicates the lower limit of the lower case letters. (The descender is the part of the lower case letter that extends below the body of the letter.)

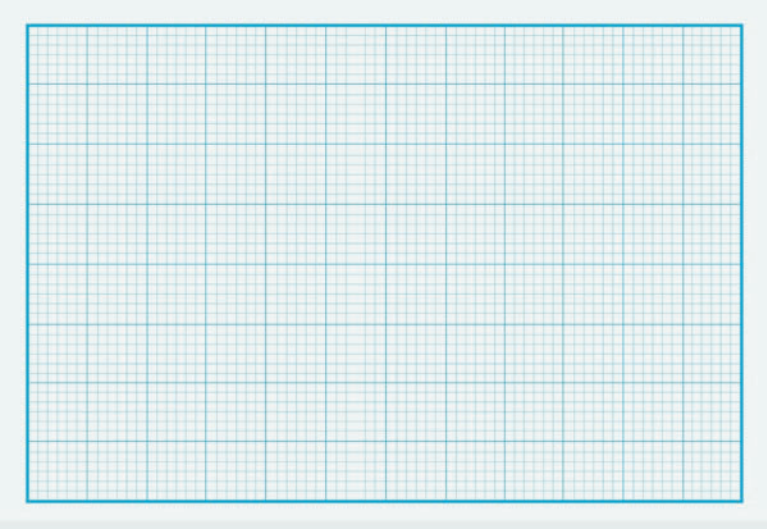


FIGURE 2. Guidelines, such as this 6 × 6 gridded graph paper, make it easier to learn how to draw technical letters and numbers. Practice drawing one letter or number in each of the 6 × 6 boxes. The guidelines also help you correctly space the letters and numbers.

Lower Case Freehand Lettering

Single stroke Gothic lettering is the preferred font. Lower case letters follow the same standards and techniques as upper case letters. The size of lower case letters is typically three-fourths the size of upper case letters.

In general, lower case letters are more difficult to draw than upper case letters as their widths and heights vary more than their upper case counterparts. It also takes more practice to become proficient drawing lower case letters. However, it is unusual to find lower case letters on technical drawings.

TIP: Learn to draw lower case letters using grid paper. The grid paper offers a reference for each letter and line of text.

Stroke Sequence

Sequence is a particular order in which related events, movements, or things follow each other. Following the correct stroke sequence in creating freehand letters helps ensure that overall letter size is correct. To develop freehand lettering skills:

- First, practice drawing all the straight-line letters. They are all letters without curves. Most of the straight-line strokes begin with a line on the left side of the letter, then any lines on the right side, and finishes with those in the middle. This sequence ensures that the overall width of the letter is drawn correctly.

FURTHER EXPLORATION...

ONLINE CONNECTION: How to Create Technical Letters

When creating technical lettering it is important that the letters are standard and uniform. Techniques and sequences have been developed to help you create technical letters. Learning the proper stroke sequence can help you to quickly learn how to create accurate and proportionate letters. Watch the "Technical Lettering Practice" video about creating standard, uniform technical letters at https://www.youtube.com/watch?v=Qnio5sk7BiI.

- Second, practice the strokes for letters with curved lines. Follow the general sequence as for straight-line letters. Curved lines and straight lines are never completed in the same stroke. RULE OF THUMB: One half of a circle or an arc is considered a stroke.

DRAW FREEHAND NUMBERS AND FRACTIONS

Numbers

Single stroke Gothic is the most common style of freehand numbering. Numbers are drawn in the exact same way as letters.

Most numbers include multiple arcs or circles and it may take more practice to become proficient with the strokes.

Standard sequence, as for letters, is followed when learning to draw numbers. To draw numbers well takes practice.

Fractions

Fractions are drawn in the same stroke manner as letters.

- Spacing: Fractions require the appropriate spacing between all the numbers to ensure they are easy to read.
- Technical Drawing Requirements: Typically, the size of the numbers for fractions are drawn slightly smaller than for whole numbers. A full fraction (numerator and denominator) is twice the height of a whole number. The vertical space for the fraction includes the two numbers (that are slightly smaller than whole numbers), the fraction bar, and a small space between the fraction bar and the numbers.
- Mixed Number Fractions: A whole number and a fraction (a mixed number) are drawn with the whole number located to the left of the fraction and centered from top to bottom on the fraction. A visible space is recommended between the fraction bar and the numbers and the fraction bar may be angled. A mixed number fraction that is inline with letters or text, it will be slightly above and below the line of text.

Summary:

Technical lettering is the process of forming letters, numerals, and other characters in technical drawing. The standard style of technical lettering is single stroke Gothic lettering. The letters can be formed in a 6 × 6 gridded square to help keep the strokes and spaces in proportion.

The goal of freehand lettering is to create simple and easy to read letters and numbers for technical drawings. It is both a technical skill and an art form. All drafters and designers need basic freehand lettering and numbering skills to communicate information through a sketch. Freehand lettering and numbering makes your sketches look more professional.

Checking Your Knowledge:

1. What is the most common lettering form for numbers?
2. What are inclined letters?
3. Is drawing a straight line and curved line in one stroke common?
4. How many strokes does a circle take?
5. Are all letters the same width?

Expanding Your Knowledge:

The best way to develop your freehand lettering skills is to practice. It is also helpful to see how others draw numbers and letters especially specific techniques that may help you improve strokes that cause you problems. For more freehand lettering and numbering ideas and tips practice and watch online tutorials.

Web Links:

Drafting Tools 101—Using a Lettering Guide
https://www.youtube.com/watch?v=1equHBlCGAQ

Engineering Lettering (pages 2, 20, and 21)
https://www.ucvts.tec.nj.us/cms/lib5/NJ03001805/Centricity/Domain/611/Lesson%203%20Lettering.pdf

Freehand Sketching and Lettering Techniques (page 21)
http://www.ceet.niu.edu/faculty/kim/mee270/mee270-ch3.pdf

How to Hand Letter Like an Architect A to Z
https://www.youtube.com/watch?v=PRR9Rn7id6c

Lettering (page 13)
http://media.scc.losrios.edu/FitzpaK/300/Lettering.pdf