

Freehand Lettering Techniques and ASME Standards

A SME STANDARDS ensure that important information is clearly understood and communicated through drawings and lettering. The goal of freehand lettering is to create simple and easy to read letters and numbers for technical drawings. It is important that all drafters and designers learn basic hand-lettering techniques. Freehand lettering makes your sketches look more professional. This unit shares the preferred pencils and drawing techniques for freehand lettering.



Objective:



Explain the ASME standards and basic freehand lettering techniques.

Key Terms:



ASME	freehand sketch	standard
ASME standards	lettering	technical lettering
font	single stroke Gothic	technique
freehand lettering	lettering	

ASME and Basic Freehand Lettering Techniques

ASME (The American Society of Mechanical Engineers) is a professional association that promotes the art, science, and practice of multidisciplinary engineering and allied sciences around the globe. ASME provides continuing education, training, professional development, codes and standards, research and other outreach forms. A **standard** is a set of technical definitions, instructions, rules, guidelines, or characteristics that provide consistent and comparable results.

ASME STANDARDS

ASME standards establish the line and lettering practices for use in the preparation of engineering drawings, including the recognition of the requirements of CAD and manual preparation for their reduction and reproduction. There are several topics covered under this section for lettering they include: lettering type, letter style, letters—upper and lowercase, letter height, letter spacing, and legibility. The ASME standard for lettering is the “Line Conventions and Lettering Standard Y14.2-2014.” Topics addressed under this section for lettering include:

- ◆ Lettering type
- ◆ Letter style
- ◆ Upper and lowercase letters
- ◆ Letter height
- ◆ Letter spacing
- ◆ Legibility

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). Single stroke Gothic lettering is the common font for freehand lettering is opaque 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.

Popular sans serif fonts are Helvetica, Arial, Geneva, and Avant Garde.

Popular serif fonts are Times New Roman, Courier, and Palatino.



FIGURE 1. Single Stroke Gothic Lettering is a common sans-serif font used in freehand lettering. A sans-serif font is formed by a series of short strokes. Note the serif feature shown in red color. (Courtesy, Stannered and Chmod007 at English Wikipedia. Permissions can be viewed at <https://creativecommons.org/licenses/by-sa/3.0/deed.en>)

Lettering Style

The lettering style should be drawn consistently for all drawings/drawing sets: vertical (straight up) or inclined (leaning) lettering.

The preferred slope for the inclined characters is 68° from the horizontal.

Upper case letters are generally used for all freehand lettering on drawings unless lower case letters are required.

Letter Heights

Minimum letter heights vary depending on what they indicate. For example:

- ◆ Drawing Title: The drawing title's size and number, and any revision notes and code information, should be a minimum height of 6 mm ($\frac{1}{4}$ -inch) on sheet sizes of A0 and A1. The minimum height of sheet sizes A2, A3, and A4 are a minimum of 3 mm ($\frac{1}{8}$ -inch).
- ◆ Section and View: Section and view letters and numerals in borders and zone letters is a minimum of 6mm.
- ◆ Heading and Other Characters: The drawing block heading is a minimum of 2.5 mm. All other characters are a minimum of 3 mm ($\frac{1}{8}$ -inch).

Letters Within Words

The letters within words are spaced so the background areas between the letters are approximately equal, and words are clearly separated. For example:

- ◆ Two numbers having a decimal between them have a minimum of two-thirds the height of the letter.
- ◆ The horizontal (or vertical) spaces between lines of letters has a maximum height equal to that of the lettering and a minimum height equal to one-half of the lettering height.

Legibility

The basic drawing requirement for all letters is that each produces fully legible (readable, clear) copies.

FREEHAND LETTERING TECHNIQUES

Lettering is the creation of hand-drawn letters applied to an object or surface. A **technique** is the process of carrying out a particular task, especially the execution or performance of an artistic work or a scientific procedure. 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 lettering is drawing or executing legible letters without the assistance of tools: guides, measurement tools, and other aides. 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 is the process of forming letters and other characters for a mechanical drawing.

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.

Freehand Lettering Technique Tips

TIP 1: Determine the angle that works best and practice drawing letters and numbers while rotating the pencil at an angle.

TIP 2: Practice using the arm and wrist rather than moving fingers. Movement of the fingers tends to create arcs rather than straight lines.

TIP 3: Freehand lettering is accomplished with a pulling rather than a pushing motion of the pencil. Pushing tends to curve lines in a forced direction.



FURTHER EXPLORATION...

ONLINE CONNECTION: Lettering Tips for Beginners

It takes time and practice to learn technical lettering and numbering techniques. To develop specific lettering techniques try using a sheet of standard technical lettering, such as single stroke Gothic, and practice “drawing over” the letters while using the correct strokes. Then, watch the “Hand Lettering Tips for Beginners” video on YouTube at <https://www.youtube.com/watch?v=I9OLDCyARBI> for examples of more artistic ways to use hand lettering.

A B C D E F
G H I J K L
M N O P Q R
S T U V W
X Y Z

ABCDEFGHIJKLMNOPQRSTUVWXYZ
ABCDEFGHIJKLMNOPQRSTUVWXYZ
ABCDEFGHIJKLMNOPQRSTUVWXYZ

Remember, freehand lettering makes your sketches look more professional and technical drawings typically use a sans serif font.

TIP 4: Each line or arc of the letter or the number is completed in a single stroke. For example:

- ◆ An uppercase “A” is drawn in three strokes.
 - The first stroke starts from the top center of the “A” down to the left.
 - The second stroke is drawn from the top center of the “A” down to the bottom right.
 - The third stroke is straight across the center of the two drawn lines.
- ◆ An upper and lower case “O” takes two strokes and, with practice, one stroke.
 - The stroke for the left side of the arc is from a top starting point to the bottom.
 - The second stroke is drawn from the top starting point around the right to the bottom.
 - With some practice you can make an “O” in one stroke.
- ◆ Fractions are created with a division line (/) and the whole fraction is usually twice the height of regular numbers. Numbers in the fraction do not touch the division line.

TIP 5: To achieve the desired line thickness takes practice. Beginners must practice until they “feel” how much pressure to apply to the lead to achieve the desired line thickness.

TIP 6: Height-to-width ratio is an important consideration in freehand lettering. All the letters for technical drawings should be consistent: none visibly thinner or wider than other letters or numbers.

- ◆ Condensed letters are narrow compared to their height.
- ◆ Extended letters are wide compared to their height.

TIP 7: Spacing of letters and numbers is critical to ease of reading. Most letters have equal spacing in a word. The amount of background space (white space between strokes) and the letter itself (black strokes) have equal spacing in a word. Balancing the perceived spacing of letters and numbers can be difficult. Some letters and numbers do not appear to occupy exactly the same space or have the same “spread” as other characters in the line. There are times the line may appear unbalanced. Learning to visually space different letters takes practice.

Summary:



ASME (American Society of Mechanical Engineers) is a professional association that promotes the art, science, and practice of multidisciplinary engineering and allied sciences around the globe. The ASME standards establish the line and lettering practices for use in the preparation of engineering drawings, including the recognition of the requirements of CAD and manual preparation for their reduction and reproduction. Topics include lettering type, letter style, uppercase and lowercase letters, letter height, letter spacing, and legibility.

Lettering is the creation of hand-drawn letters to apply to an object or surface. Free-hand lettering is drawing or executing legible letters without the assistance of tools: guides, measurement tools, and other aides. In design and drafting freehand lettering is typically drawn in a “Gothic” style. Freehand lettering skills are developed through practice.

Checking Your Knowledge:



1. Differentiate between serif and sans serif fonts.
2. What makes single-stroke Gothic lettering a typical choice for technical drawings?
3. List the basic strokes used in freehand lettering.
4. List four tips for freehand lettering beginners to follow.
5. When freehand lettering the pencil is twisted while making each stroke. Why?

Expanding Your Knowledge:



Developing your freehand lettering skills just takes practice. Once you learn the basic techniques, simply draw those letters and numbers over and over. A great way to practice your technical lettering is to take your school notes in single stroke Gothic lettering.

Web Links:



Architectural Hand Lettering - Architecture Daily Sketches video

https://www.youtube.com/watch?v=wBMUWILhw_I

Drafting Fundamentals and Techniques

http://navybmr.com/study%20material/14069a/14069A_ch4.pdf

Engineering Lettering

<https://www.ucvts.tec.nj.us/cms/lib5/NJ03001805/Centricity/Domain/611/Lesson%203%20Lettering.pdf>

Lettering Styles Used In Engineering Drawing

<http://www.lifelarn.com/2014/09/basic-engineering-drawing-lettering/>

SDO: American Society of Mechanical Engineers

https://www.standardsportal.org/usa_en/sdo/asme.aspx