AEM Pictorial Review & Advisory Task Force (PRATF) Guidance for Pictorial Submissions to the AEM Pictorial Database

1. **Purpose of this guidance document**
    The purpose of this guidance document is to provide some general rules and information to assist in the submittal process of pictorials for inclusion into the AEM Pictorial Database.
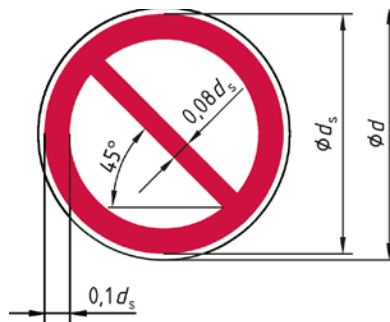
2. **Pictorial Drawing Construction**
    2.1   General Rules
    Pictorials in the AEM pictorial database should contain only as much detail as needed to provide a clear meaning of the pictorial message.

    2.2   Prohibition circle design
    The prohibition circle design should comply with the layout requirements shown in the Figure below. *(refer to ISO 3864-1 for more information)*

The colors of this sign should be as follows:
Background color: white
Circular band and diagonal bar: PMS Red 485
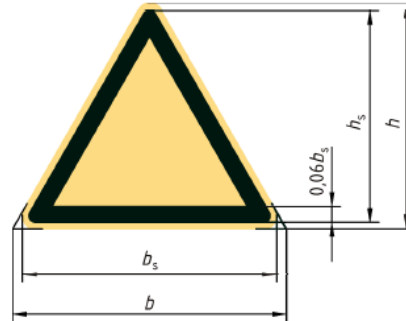Graphical symbol or pictorial: black
Border: white

The safety color red shall cover at least 35 % of the total area of the sign.

The use of the "**X**" prohibition has limited acceptability and should only be used in special cases where use of the prohibition sign above would diminish the intent of the pictorial.

2.3   Warning triangle design

The design of the warning triangle should comply with the layout requirements given in the Figure below. *(refer to ISO 3864-1 for more information)*

The colors of this sign should be as follows:
Background color: PMS Yellow 109
Triangle: black
Graphical symbol or pictorial: black
Border: PMS Yellow 109

2.4   Mandatory action circle design

The design of the mandatory action circle should comply with the layout requirements given in the Figure below. *(refer to ISO 3864-1 for more information)*
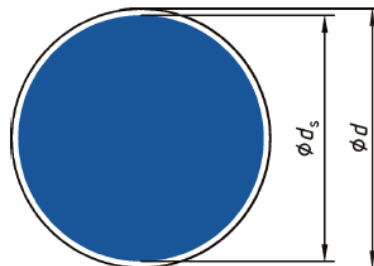

The colors of this sign should be as follows:
Background color: PMS Blue 2945
Graphical symbol or pictorial: white
Border: white

3. Use and Drawing of the Human Figure

3.1 General

The standard pictorial figure is based on a grid system of squares of uniform size or "units". The full human figure is 12 units tall, 2 units wide at the trunk, and has a circular head 1.75 units in diameter. The precise unit measurements for drawing the figure are shown above. The hands and feet end in 1 unit semicircles.
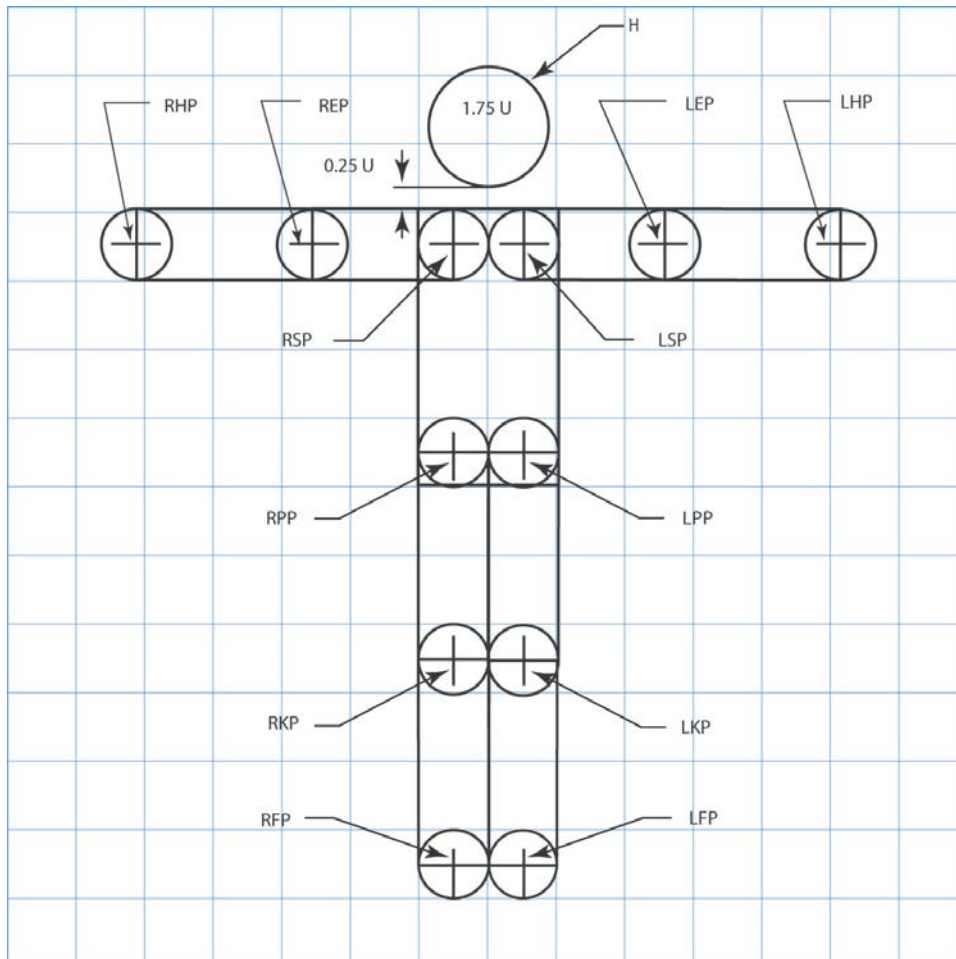
Key

|	
H	Head
LEP	Left Elbow Pivot
LFP	Left Foot Pivot
LHP	Left Hand Pivot
LKP	Left Knee Pivot
LPP	Left Pelvic Pivot
LSP	Left Shoulder Pivot
REP	Right Elbow Pivot
RFP	Right Foot Pivot
RHP	Right Hand Pivot
RKP	Right Knee Pivot
RPP	Right Pelvic Pivot
RSP	Right Shoulder Pivot

3.2 Human figure animation

Action or movement of the figure can be depicted by using pivot points shown in the Figure above. The unit proportions remain the same, except in situations where the overlapping of limbs causes a visual foreshortening of the limbs. When foreshortening occurs, it is compensated for by adding 0.5 unit to the limb.

The Figures below show the human figure in various positions. The position the figure will assume in the pictorial is usually determined by the nature of the hazard, the direction or orientation of the hazard, movements or positions resulting from involvement with the hazard, the type of injury caused by the hazard, and movements or positions involved in the operation of equipment.


3.3 Drawing of the Human Head Profile

Whenever the head is involved with the hazard, the profile version is used facing either left or right. The profile head can also be used whenever the full figure or upper torso is to appear in profile to create an impression that the figure or torso itself is in the profile position. The figure below gives examples of hazard pictorials that use the profile head.
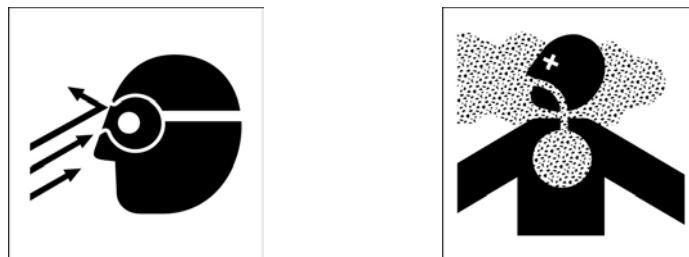
3.4 Upper torso

Hazards that involve the arms, hands or head can best be dramatized by using the upper torso rather than the full torso. In most cases, the upper torso would appear in profile and the profile head would be used rather than the frontal or circular head. When depicted in a profile position, the upper torso can also be effective in conveying directional movement with the hazard. If hands are involved in the hazard, or if the depiction of hands would aid in visual dramatization, they should be added to the figure. The Figure below gives examples of hazard pictorials that use the upper torso.
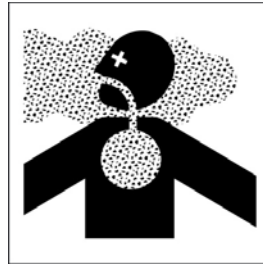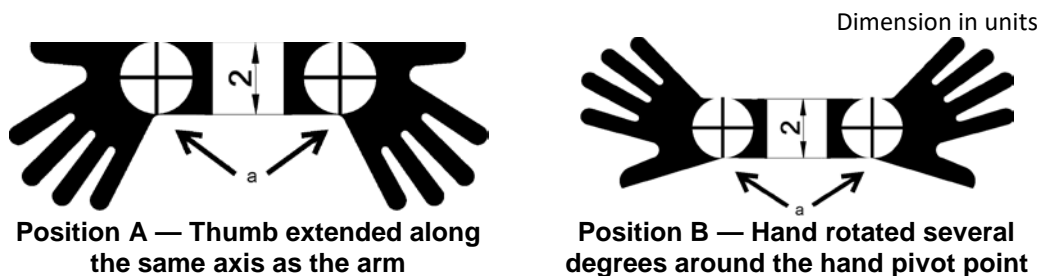
4. Hands

4.1 Drawing the human hand and fingers

The complexity of the human hand and the many possible finger movements make hands one of the most difficult pictorial elements to work with. The design shown in the Figure below gives careful attention to the simplification of shape and form for easy recognition. In the full palm view, the fingers and thumb do not move to other positions. In other full-hand views, fingers may be spread.
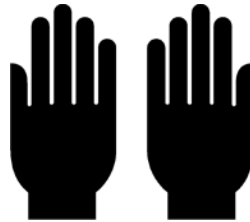

4.2 Adding hands to a human figure

When hazards involve the hands or arms, hands are added to the figure to increase the recognition value of the limb elements. Two basic hand positions are shown in the figure below.

Dimension in units

Position A — Thumb extended along the same axis as the arm

Position B — Hand rotated several degrees around the hand pivot point

a   Hand pivot points (HPP).

4.3 Pictorials using a human figure with hands

Selection of position A versus position B in the Figure above should be based on which of the positions is judged to best dramatize the involvement with the hazard. For design consistency, hands are added to both arms (when both arms are shown) even when only one arm is involved with the hazard. See the Figure below for examples of hazard pictorials where hands have been added to the human figure.
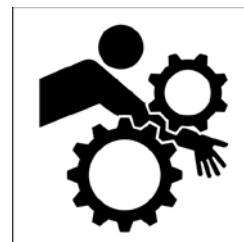
4.4   Hand profiles

Hand profiles are used to convey a feeling of depth, which can add realism, dramatization and comprehensibility to the pictorial. Although the hand is not actually drawn in perspective, the positioning of the fingers can create a three-dimensional impression. Hand profiles are the most difficult elements of the human figure to design. The hand profiles shown in the Figure below represent the design style to be used in pictorials to maintain visual consistency. Valuable time can be saved when creating hand profiles by taking existing pictorials and modifying or repositioning elements of the hand as necessary. Situations that require various finger movements can be depicted by selecting the hand closest to the desired position and modifying it. Note the finger treatment. The fingers are not tapered, although they may appear to be. Fingertips are created using a quarter circle. The profile view uses only three fingers plus the thumb.
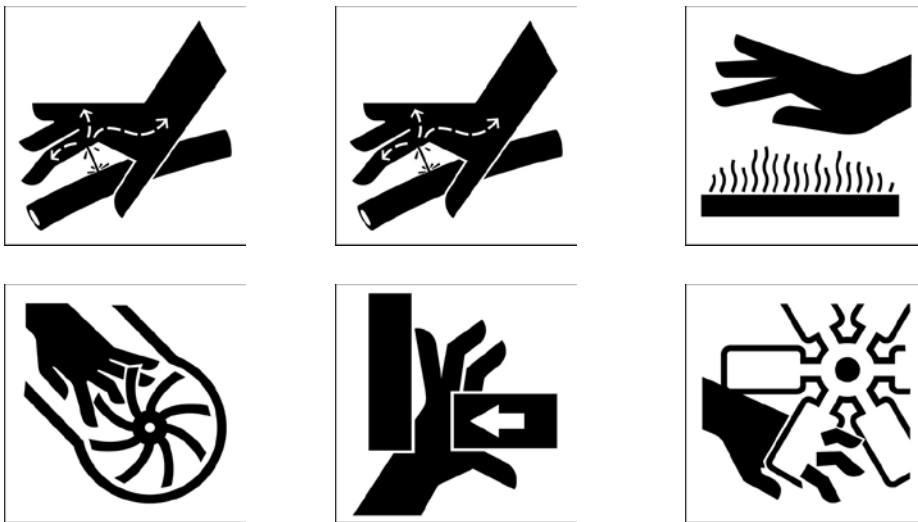
5.   Feet

5.1   Foot development

When a pictorial illustrates only the lower leg or foot, the stylized shoe or boot (foot) shown below should be used. It can be used facing either left or right.


5.2   Adding feet to the human figure

Some hazards that involve the feet or lower limbs are most effectively dramatized by using the full human figure: adding feet to the figure increases recognition value of the limb elements. For such pictorials, the feet shown in

the Figure below should be added to the foot pivot points. For design consistency, they should not be altered or distorted.
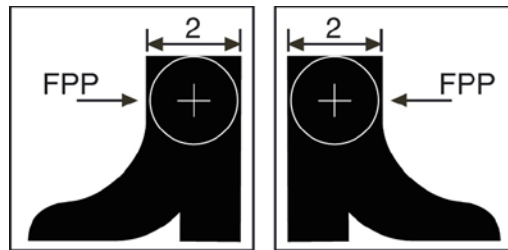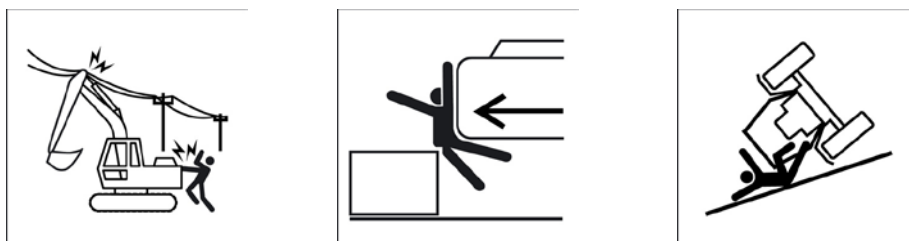
The Figure below gives an example of a hazard pictorial where feet have been added to the human figure.

6.   **Representation of machines, equipment and components**
      In general, use outline representations for whole machines or substantial portions of machines. This is to avoid large filled (black) areas that may detract from recognition of the human figure relative to the machine or the hazard-creating component or equipment on the machine — especially relevant when the human figure is depicted in close proximity to the machine representation. Representations of individual components may be outline or filled, depending upon which alternative provides better visual recognition and graphical clarity. In general, filled areas result in the perception of greater mass and solidity; however, outlines of machines often encourage inclusion of enough graphical detail that the identity of actual components and the nature of the hazards they present can be discerned more easily. Smaller filled areas, or outlines using a wider line thickness, can assist in highlighting the hazard-creating component or equipment on a machine. The Figure below gives examples of pictorials that use whole machines or major components of machines in their graphical description of hazards.

The Figure below gives examples of pictorials that use individual hazard-creating machine components, not in the context of their machine location, in their graphical description of hazards.

7. Arrows

7.1 Use and Drawing of Arrows

Guidance may be taken from specific standards such as ISO 9244 for earth-moving equipment, ISO 11684 for agricultural equipment, ISO 15870 for industrial trucks and others. Care must be taken when selecting the appropriate arrow and its size relationship with the rest of the pictorial.

In order to communicate basic safety sign information, use visual elements to represent a variety of things, conditions and ideas. Important among these are flying or falling objects and their direction of motion, the direction of motion of machine components, the direction of motion of entire machines, the exertion of pressure or force and the idea of keeping a safe distance away from a hazard. Five types of arrow design are used to denote these elements of pictorial communication.
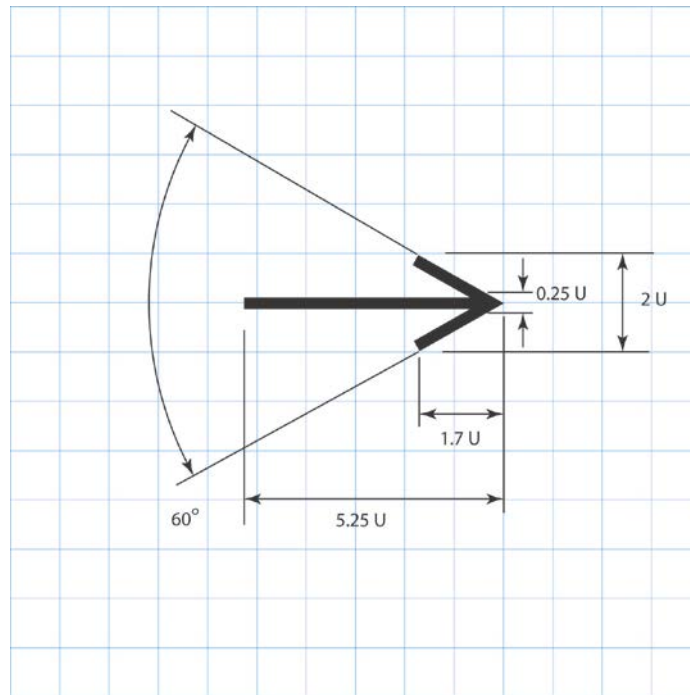
7.2 Arrow Representing Falling or Flying Objects and Their Direction of Travel

A black arrow on a white background (for safety signs with text) or a black arrow on a yellow background (for safety signs without text) is generally used. It can be straight, angled or curved. The tail of the arrow should appear solid when a single object or a few objects are involved; the tail should be broken when a continuous barrage of objects or particles is involved. The arrowhead has a 45° included angle. The length of the arrow shaft may be 7.65 units or lengthened as needed. See Figure below for arrow dimensions. This arrow is normally sized in proportion to the size of the falling or flying object that it represents in a given pictorial.
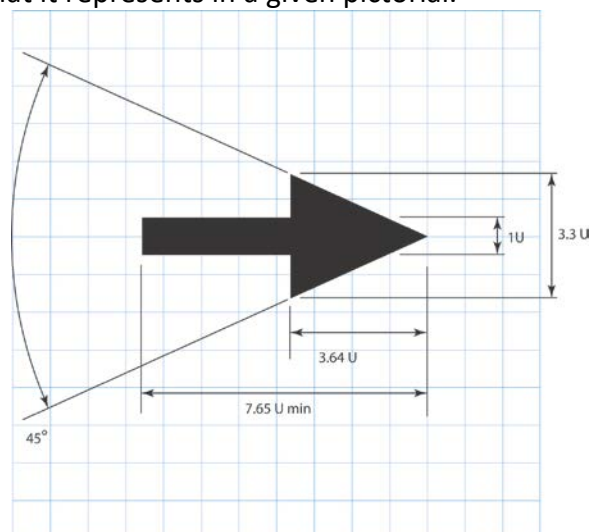
7.3   **Arrow Representing Direction of Motion of Machine Component**
A black arrow on a white background (for safety signs with text) or a black arrow on a yellow background (for safety signs without text) is generally used. It can be straight, angled or curved. See Figure below for arrow dimensions. This arrow is normally used at 100 % of actual size as shown in Figure below, although it may be sized differently as appropriate to individual pictorials. The arrowhead has a 60° included angle. The length of the arrow shaft may be 5.25 units or lengthened as needed.

7.4   **Arrow Representing Direction of Motion of Entire Machine**
A black arrow on a white background (for safety signs with text) or a black arrow on a yellow background (for safety signs without text) is generally used. It can be straight, angled or curved. See Figure below for arrow dimensions. This arrow is normally used at 100 % of the actual size as shown in Figure below, although it may be sized differently as appropriate to individual pictorials. The arrowhead has a 60° included angle. The length of the arrow shaft may be 5.25 units or lengthened as needed.
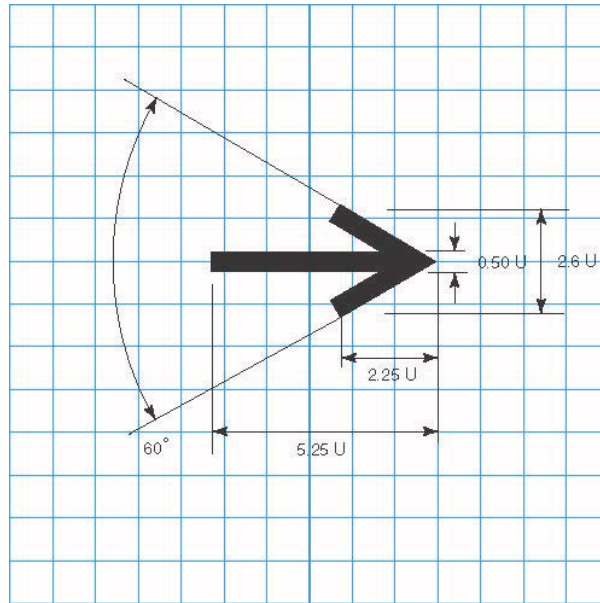
7.5 Arrow Representing Exertion of Pressure or Force

A white arrow in a black silhouette representing the source of the force or pressure is generally used. It may also appear as a black arrow on a white background when the specific source of the force or pressure is depicted. See Figure below for arrow dimensions. This arrow is normally used at 100 % of the actual size as shown in Figure below, although it may be sized differently as appropriate to individual pictorials. The arrowhead has an 84° included angle. The length of the arrow shaft may be 6.2 units or lengthened as needed.
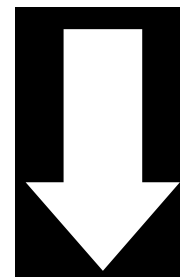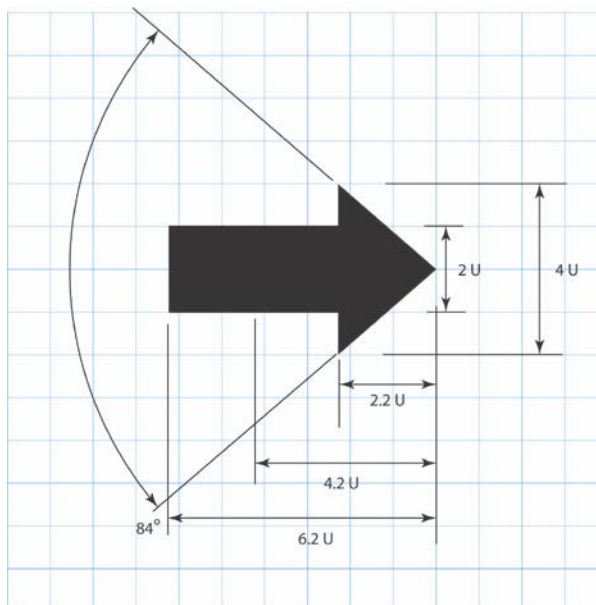
7.6 Arrow Representing the Idea of Keeping a Safe Distance Away From a Hazard

A black arrow on a white background (for safety signs with text) or a black arrow on a yellow background (for safety signs without text) is generally used. See Figure below for arrow dimensions. This arrow is normally used at 60 % of the actual size shown in Figure below, although it may be sized differently as appropriate to individual pictorials. The arrowhead has an 84° included angle. The left portion of the arrow is a mirror image of the right portion.
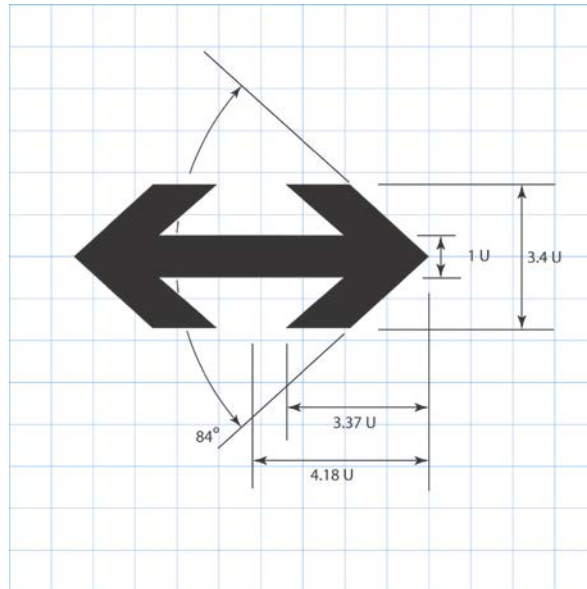
8. **Line Weights and Fill Colors**

The key rule should be consistency within the artwork itself. Many different line weights and fill values within individual submissions can wreak havoc on the submittal process. Follow the guidelines below to ensure consistency.

8.1 **Line Weights (or Stroke Values)**

1) Line weights used for components such as arrows can vary depending on their purpose; however, similarly expressed line weights should be consistent throughout e.g., "heavy" lines should all be the same weight; "light" lines should all be the same weight.
2) All lines should be drawn as stroked and vectored paths.
3) Limit your line weights to one or two stroke values as a maximum.
4) If your drawing program offers "Hairline" as a stroke value, DO NOT USE IT! Use values that can be represented in points or other measuring units.

8.2 **Fill Colors**

1) Objects should be drawn as vectors and filled with solid colors at their full value – Do not use screen or transparency settings. *(Black is always represented as **100% Black**.)*
2) Never use "Registration" as a fill color (or stroke color).

3) Use spot colors to represent other colors, not CMYK or RGB values (e.g., Red is PMS 485 Red or another solid value, not 100% Magenta and 100% Yellow).
4) Do not set fill colors to overprint.

9. Acceptable File Formats for Submittals

9.1 Initial submittals

When an individual, group or organization wishes to submit a pictorial for consideration, the following rules should be followed:

1) The pictorial graphic should be in an <u>electronic format</u> such as .jpg, .tiff or scalable .pdf. No photo copies or decals will be accepted.
2) The pictorial graphic should not be in a hazard triangle or embedded in a safety sign.
3) The pictorial graphic should not contain any text.
4) A description should be included including the type of hazard or avoidance, intended meaning (how and where the pictorial is used) along with an explanation or rationale, if needed.
5) Contact information for the submitter.

NOTE: Keep in mind that the PRATF does not make modification to the artwork. This would be the responsibility of the submitter.

9.2 Final submittals

Following acceptance by the PRATF, all pictorial artwork being submitted for upload by AEM to the Pictorial Database should be in a vector format and be compatible with Adobe Illustrator Version 11. Encapsulated Post Script (.eps) files or Adobe Illustrator (.ai) are the easiest for AEM to work with. The PRATF will use this format to create the DXF files for the database, so it is not necessary for submitters to supply this format. Please note that DWG and DXF files submitted as original artwork typically do not have the necessary artwork characteristics for the database, and therefore are not desirable.