Hand and Power Tool Safety 145

Many manufacturers are either using measurements in the metric system in their manufacturing processes or are in the process of converting their processes over to the metric system, since the metric system is used prominently world-wide. For this reason, it is becoming more important for employees to understand the conversion process between the U. S. Customary (English) measurements, and the metric system of measurements. One particular conversion to be proficient in is the conversion between inches and millimeters. Manufacturers use the following conversion factor:

1 inch (in) = 25.4 millimeters (mm)

To express one measurement as an equal measurement in another unit of measure that is necessary is a multiplication by a well-chosen fractional equivalent of one. The well-chosen fraction equal to one is derived from the conversion factor between the unit needing to be changed and the desired unit. When the original measurement is multiplied by the fraction equal to one, the unwanted unit of measure will cancel and the desired unit will remain.

Example 1: Change 3/8 inch to millimeters.

1. The conversion factor between the inches and millimeters is 1 inch = 25.4 millimeters.

2. After changing 3/8 inch to 0.375 in, set up a multiplication by a fraction derived from the conversion factor in step 1 so that the inch cancels.

$$0.375 \text{ in} \times \frac{25.4 \text{ mm}}{1 \text{ in}}$$

3. Multiply across the top and bottom and then divide if necessary.

$$\frac{0.375 \times 25.4 \text{ mm}}{1} = 9.525 \text{ mm}$$

4. The desired result is 9.525 mm.

Example 2: The dimension on a blueprint reads 80 millimeters. Change this dimension to the nearest thousandth of an inch.

1. The conversion factor between the millimeters and inches is 1 inch = 25.4 millimeters.

2. Set up the multiplication of the original unit by the conversion fraction so that the millimeters will cancel.

$$80 \text{ mm} \times \frac{1 \text{ in}}{25.4 \text{ mm}}$$

3. Multiply across the top and bottom and then divide if necessary.

$$\frac{80 \times 1 \text{ in}}{25.4} = 3.1496 \text{ in}$$

4. The desired result rounded to the nearest thousandth is 3.150 in.

1. When fasteners are applied with a hand or power tool, such as a powder tool, OSHA regulations state that the fastener must be a certain distance from the edge of the material. If the material is brick or concrete, the fastener must not be more than 3 inches from an unsupported edge or corner. If the material is steel, the fastener must be at least 1/2 inch from an unsupported corner edge.

   Convert both of these OSHA standards into millimeters.

2. a. When working with steel, a fastener is driven 11 mm from an unsupported corner. Would this meet OSHA regulations?

   b. Would OSHA regulations be met if a fastener is driven 15 mm from an unsupported edge on a piece of steel?