

Flammable and Combustible Liquids 155: Safety Cans

OSHA-approved safety cans for holding flammable and combustible liquids cannot hold more than five gallons.

Many of the safety cans are cylindrical in shape. By measuring the dimensions of the can, the volume can be calculated and converted to gallons to determine whether OSHA safety standards have been met.

A right circular cylinder is shown in the diagram. The volume of a cylinder is determined by the formula $V = \pi r^2 h$.

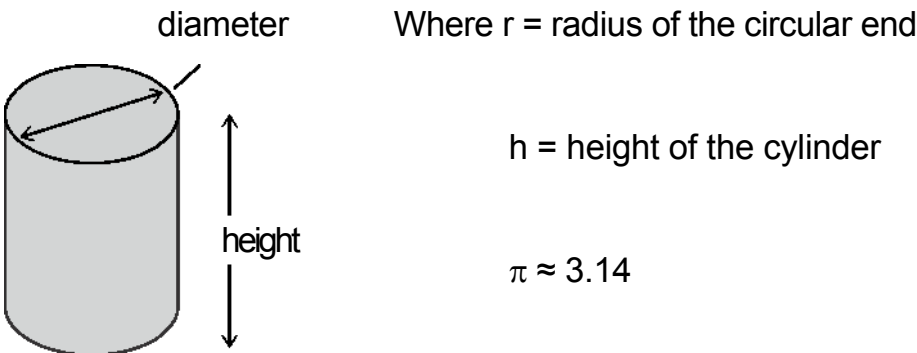


Image illustrated by the author

The diagram above shows the diameter of the circular end which is the distance across the circular end. The formula for volume uses the radius which is the distance from the center of the circular end to the outside edge. Once the diameter is measured, the radius, being half the diameter, is found by dividing the diameter by two.

$$\text{radius} = \frac{\text{diameter}}{2}$$

EXAMPLE:

A cylindrical safety can is found to have a diameter of 12 inches and a height of 15 inches. If the can is filled to a height of 15 inches with a flammable liquid, will it meet OSHA standards?

SOLUTION:

$$\text{Diameter} = 12 \text{ in}$$

$$\text{Radius} = \frac{\text{diameter}}{2} = \frac{12 \text{ in}}{2} = 6 \text{ in}$$

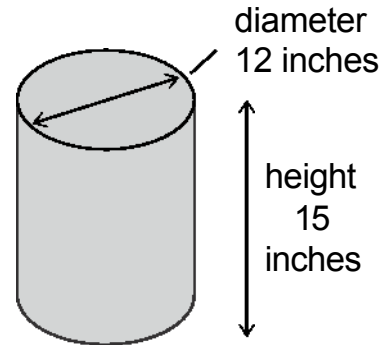


Image illustrated by the author

$$V = \pi r^2h = (3.14)(6 \text{ in})^2(15 \text{ in}) = 1695.6 \text{ in}^3$$

(Be sure to follow the order of operations by squaring the radius before performing the multiplications. Also, be sure to label the volume with the appropriate units since cubic units indicate a volume or three-dimensional space.)

$$V = 1695.6 \text{ in}^3$$

Is this less than the 5 gallon OSHA standard?

To determine whether the volume of 1695.6 in^3 is less than the 5 gallon standard, the volume in cubic inches must be converted to gallons. The conversion between gallons and cubic inches is

$$1 \text{ gallon} = 231 \text{ in}^3$$

Therefore, 5 gallons is five times as much

$$5 \text{ gallons} = 5 \times 231 \text{ in}^3 = 1155 \text{ in}^3$$

If filled to a height of 15 inches, the safety can in this

example contains more than the allowed amount by OSHA standards.

$$1695.6 \text{ in}^3 > 1155 \text{ in}^3 \text{ standard}$$

EXERCISES:

1. A cylindrical safety can is found to have a diameter of 14 inches and a height of 8 inches.

If the can is filled to the height of 8 inches with a combustible fluid, will it meet OSHA standards?

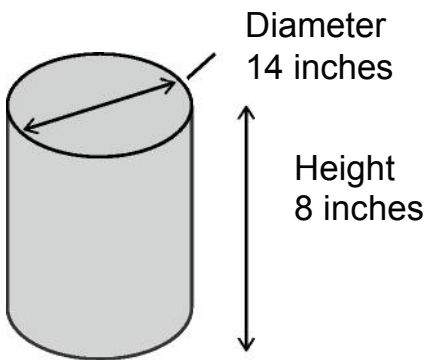


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2. A 12-inch diameter safety can contains 5 gallons of a flammable liquid, meeting OSHA standards. What is the allowable height of liquid to meet the 5 gallon standard?

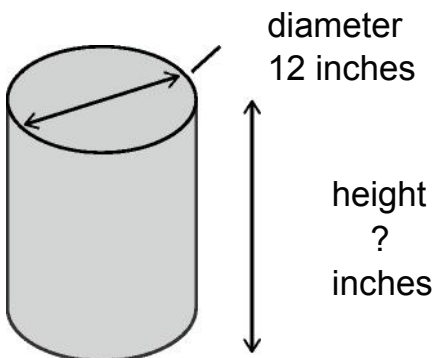


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