CONVERTING FROM IMPERIAL TO METRIC

INTRO TO MEASUREMENT SYSTEMS BY MEYERFIRE UNIVERSITY | OCTOBER 2022

SUMMARY

This summary covers common unit conversions in fire protection for **Imperial** to **Metric** conventions. Tools for doing this quickly include Google, MeyerFire.com (see the Unit Converter under Toolkit) or other engineering websites. Here are some common conversions:

WATER SUPPLIES

FLOW

- 1 m^3/hr = 4.4 gpm
- 1 L/min = 0.264 gpm
- 1 L/s, or 1 kg/s =- 15.85 gpm
  Example: 2,000 L/min = 528 gpm, and 341 m^3/h = 1,500 gpm

PRESSURE

- 1 bar = 14.5 psi
  Example: 12 bars = 175 psi
- 1 m_{H2O} is 3.28 ft_{H2O}
- 1 bar = 33.44 ft_{H2O}

POWER

- 1 kW = 1.34 hp
  Example: 150 kW = 201 hp

VOLUME

- 1 m^3 = 264.2 gallons
- 1 L = 0.26 gallon
  Example: 500 m^3, or 500,000 liter tank = 132,100 gallons

SPRINKLER SYSTEMS

TEMPERATURE

- Deg C = 5/9 (deg F - 32)
- Example, 0°C = 32°F, and 100°C = 212°F.

K-FACTOR

- K-factor units defined by $Q = K\sqrt{P}$.
- Example: K-factor of 1 in the metric system (L/min/$bar^{1/2}$) corresponds to a K factor of 0.07 in the Imperial system.
  Example: K80 = K5.6, and K115 = K8.0.

PIPE DIMENSIONS

- Thread and pipe diameters in millimeters.
- 1 millimeter = 0.039 inches
  Example: 13 mm thread - ½ inch, and a 100 mm pipe = 4 inch

DESIGN DENSITY

- One mm/min = 0.0245 gpm/sqft
- Example: 10.2 mm/min = 0.25 gpm/sq ft.

SPACING & DISTANCE

- One meter = 3.28 feet = 1.1 yard
- Example: 15 m = 49 ft

AREA

- 1 m^2 = 10.75 sqft
- Example: 10 m^2 = 107 sqft, or 300 m^2 is 3,225 sqft

VELOCITY

- 1 m/s = 3.28 ft/s
  Example: 6 m/s = 19.7 ft/s

GAS SYSTEMS

VOLUME

- 1 m^3 = 35.7 ft^3
  Example: 90 m^3 is 3,214 ft^3

WEIGHT

- 1 kg = 2.22 pounds
  Example: 100 kg = 222 lbs

HEAT AND ENERGY

ENERGY

- 1 kJ = 0.95 BTU
- 1 kCal = 3.97 BTU
- Example: 50,000 kJ = 47,500 BTU and 12,500 kCal = 49,625 BTU.

POWER

- 1 W = 1 J/s = 3.41 BTU/h
- Example: 3,000 W = 10,230 BTU/h

HEAT FLUX

- 1 kW/m^2 = 317.5 BTU/h/sqft
  Note: a kilowatt spread over 1 m^2 is approximately equal to the radiant heat flux outdoors on a sunny day.

VIDEO LINK

www.meyerfire.com/university/how-to-convert-from-imperial-to-metric

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