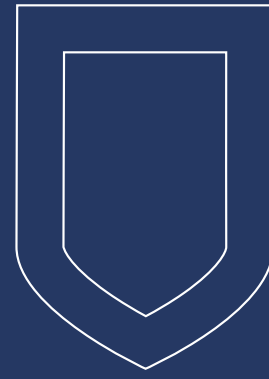


Units of Measurement in Architecture

The building industry is a confusing place because while most of the world (including Canada) uses metric or SI (Système international) units, the United States uses Imperial units. Moreover while Canada is officially metric, Imperial units are often still used on the building site. To make matters worse, many of the textbooks used in Athabasca University's architecture courses are American and hence have Imperial measurements.

Students must learn to move between these systems; know which units belong to which system; and how to convert between them. The tables below will help you with this task.



DISTANCE

Metric		Imperial		Metric
Multiply	By	To Obtain/Multiply	By	To Obtain
Millimetres (mm)	.0394	Inches (in)	25.4	Millimetres (mm)
Centimetres (cm)	.3937	Inches (in)	2.54	Centimetres (cm)
Metres (m)	3.28	Feet (ft)	.30	Metres (m)
Metres (m)	39.37	Inches (in)	025	Metres (m)
Metres (m)	1.094	Yards (yd)	.9144	Metres (m)
Kilometres (km)	.62	Miles (mi)	1.61	Kilometres (km)

AREA

Metric		Imperial		Metric
Multiply	By	To Obtain/Multiply	By	To Obtain
Square Centimetres (cm ²)	.16	Square Inches (sq.in.)	6.45	Square Centimetres (cm ²)
Square Metres (m ²)	10.76	Square Feet (sf)	.093	Square Metres (m ²)
Square Kilometres (km ²)	.39	Square Miles (sq. mi.)	2.59	Square Kilometres (km ²)
Hectares (ha)	2.471	Acres (ac)	.405	Hectares (ha)

A hectare is equal in area to a square which is 100 m on each side or 10,000 m²

SOLID VOLUME

Metric		Imperial		Metric
Multiply	By	To Obtain/Multiply	By	To Obtain
Cubic Centimetres (cm ³)	.061	Cubic Inches	16.39	Cubic Centimetres (cm ³)
Cubic Metres (m ³)	35.31	Cubic Feet (cf)	0.028	Cubic Metres (m ³)

LIQUID OR GAS VOLUME

Metric		Imperial		Metric
Multiply	By	To Obtain/Multiply	By	To Obtain
Litre (l)	1.06	US Quart (qt)	.95	Litre (l)
Litre (l)	.26	US Gallon (gal)	3.79	Litre (l)

WEIGHT

Metric		Imperial		Metric
Multiply	By	To Obtain/Multiply	By	To Obtain
Gram (g)	.035	Ounce (ou)	28.35	Gram (g)
Kilogram (kg)	2.21	Pound (lb)	.45	Kilogram (kg)

FLOW

Metric		Imperial		Metric
Multiply	By	To Obtain/Multiply	By	To Obtain
Litres per second (l/s)	2.12	Cubic Feet per Minute (cfm)	.47	Litres per second (l/s)

FORCE

Metric		Imperial		Metric
Multiply	By	To Obtain/Multiply	By	To Obtain
Newton (N)	.22	Pound-Force (lbf)	4.45	Newton (N)

PRESSURE

Metric		Imperial		Metric
Multiply	By	To Obtain/Multiply	By	To Obtain
Pascal (Pa)	.00015	Pound-Force per square inch (psi)	6894.8	Pascal (Pa)

ENERGY

Metric		Imperial		Metric
Multiply	By	To Obtain/Multiply	By	To Obtain
Joule (J)	.00095	British Thermal Units per hour (BTU/hr)	6894.8	Pascal (Pa)

POWER

Metric		Imperial		Metric
Multiply	By	To Obtain/Multiply	By	To Obtain
Watt (w)	3.41	British Thermal Units per hour (BTU/hr)	.29	Watt (w)
Kilowatt (kW)	3412.14	BTU/hr	.00029	Kilowatt (kW)

TEMPERATURE

Metric		Imperial		Metric
Multiply Then Add	By	To Obtain/Multiply	By	To Obtain
Celsius (°C)	1.8 + 32	Fahrenheit (°F)	-32 x .56	Celsius (°C)

- Many scientific equations use the Kelvin Temperature Scale (K). This is also a Metric Unit.
- To convert from °C to K simply subtract 273.15. To convert from K to °C add 273.15.
- The difference between the two scales has to do with their zero points. 0°C is the temperature at which water freezes and 0 K or Absolute Zero is the lowest temperature possible.
- Note the Kelvin degrees are written with a K not °K.

THERMAL RESISTANCE

Metric		Imperial		Metric
Multiply	By	To Obtain/Multiply	By	To Obtain
RSI	5.68	R	.18	RSI
RSI/mm	144	R/in	.007	RSI/mm
RSI/mm	1.64	¢/R/ft ²	.61	\$/RSI/m ²

- Thermal resistance measures how well a material resists heat flow. Specifically it measures the thermal resistance of a unit area (like 1 square metre (m²) of a particular material.
- In the metric of SI system it measures (m²K)/W or square metres-Kelvin degrees per Watt.
- In the Imperial system it measure (ft²*°F.hr)/BTU or square feet-Fahrenheit degrees-hours/British Thermal Unit.

ILLUMINANCE

Metric		Imperial		Metric
Multiply	By	To Obtain/Multiply	By	To Obtain
Lux (lx)	.093	Foot Candle (fc)	10.76	Lux (lx)