# INTERNATIONAL SYSTEM OF UNITS (SI)

SI is the abbrevation of "Systeme International d'Unites"
This is the international system of units is based upon :
- seven base units as "length", "time", "temperature", "mass", etc
- two supplementary units
- derived units

## Base units of SI

| Base Unit | Name | Name |
|---|---|---|
| Length | metre | m |
| Mass | kilogram | kg |
| Time | second | s |
| Electric Current | ampere | A |
| Temperature | kelvin | K |
| Luminous Intensity | candela | cd |
| Amount of Substance | mole | mol |

## Supplementary units of SI

| Supplementary Units | Name | Name |
|---|---|---|
| Plane Angle | radian | rad |
| Solid Angle | steradian | sr |

The derived units may be divided into three groups :
- units which are expressed in terms of base and supplementary units
- units which have been given special names and symbols
- units which are expressed in terms of other derived units

Some **derived units** expressed in terms of base and supplementary units.

| Derived Unit | Name | Name |
|---|---|---|
| Acceleration | metre / second squared | m / s² |
| Angular Acceleration | radian / second squared | rad / s² |
| Area | square metre | m² |
| Density | kilogram / cubic metre | kg / m³ |
| Kinematic Viscocity | square metre / second | m² / s |
| Mass Flow Rate | kilogram / second | kg / s |
| Molar Mass | kilogram / mole | kg / mol |
| Specific Volume | cubic metre / kilogram | m³ / kg |
| Velocity | metre / second | m / s |
| Volume | cubic metre | m³ |

Some derived units have special names and symbols.

| Derived Units | Name | Symbol |
|---|---|---|
| Force | Newton | 1 N = 1 kg.m / s |
| Pressure, Stress | Pascal | 1 Pa = 1 N / m |
| Energy, Work, Quantity of Heat | Joule | 1 J = 1 N.m |
| Power, Radiant Flux | Watt | 1 W = 1 J / s |
| Electric Potential, Potential Differ- | Volt | 1 V = 1 W / A |
| ence | Ohm | 1 Ω = 1 V / A |
| Electrical Resistance | | |

Onwards are :

kilopascal (kPa) = $10^3$ N / m² = kN / m²
kilonewton (kN) = $10^3$ kg.m / s²
kilojoule (kJ) = $10^3$ N.m = kN.m

## Conversion Table

From the old (metre-kilogram-second-ampere) system to units of SI.

| | |
|---|---|
| 1 Bar | = 100 kPa (0.1 N / mm²) |
| 1 Btu (British Thermal Unit) | = 1.055 kl = 1055 J |
| 1 cP (Centipoise) | = $10^{-3}$ Pa.s |
| 1 cSt. (Centistokes) | = $10^{-6}$ m² / s |
| 1 dyne | = 1 g.cm / s² = 10 N |
| 1 erg | = 1 dyn.cm = 10 J |
| 1 hp (Horsepower) | ≈ 745.7 W |
| 1 kcal | = 4.1868 kJ = 4186.8 J |
| 1 kcal / h | = 1.163 W |
| Kelvin | ≈ °C + 273 |
| 1 mbar (Milibar) | = 100 Pa |
| 1 mmHg (Torr) | ≈ 133.32 Pa |
| 1 mwc | ≈ 9.81 kPa (9.81 kN / m²) |
| 1 pk (paardekracht NL) | ≈ 735.5 W |
| 1 psi | ≈ 6.89 kPa (6.89 kN.m²) |
| 1 kgf | ≈ 9.81 N |
| 1 kgf / cm² | ≈ 98.07 kPa |

| | | |
|---|---|---|
| 1 in | = 1 inch | = 25.4 x $10^{-3}$ m |
| 1 ft | = 1 foot | = 0.3048 m |
| 1 in² | = 1 inch² | = 0.64516 x $10^{-3}$ m² |
| 1 ft² | = 1 foot² | = 0.0929 m² |
| | 1 lb | = 0.454 kg |
| | 1 lb /h | ≈ 0.12599 x $10^{-3}$ kg / s |
| | 1 in³ | ≈ 16.387 x $10^{-6}$ m³ (= 16.387 cm³) |
| | 1 UK gal | ≈ 4.546 x $10^{-3}$ m³ (= 4.546 dm³) |
| | 1 US gal | ≈ 3.785 x $10^{-3}$ m³ (= 3.785 dm³) |