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SI Systems of Units

The International System of Units (Système Internationale d' Units, SI) is the accepted system of measurement in all scientific fields including pharmacy. It is the developed version of metric system. However, still we find the use of many common units in the measurement. For the benefit of readers/students in the following table a conversion factor is given for converting the commonly used units in physical pharmacy experiments into SI units.

Physical Quantity	Commonly Used Unit	SI Unit	Conversion Factor (to be multiplied with)
Mass	g (gram)	kg (kilogram)	10^{-3}
Length	m (meter)	m (meter)	-----
Time	Minute	s (second)	60
Amount of substance	-----	mol (mole)	-----
Area	cm ² (square centimeter)	m ² (square meter)	10^{-4}
Volume	cc (cubic centimeter)	m ³ (cubic meter)	10^{-6}
Density	g/cc	kg / m ³ (kilogram per cubic meter)	10^3
Concentration	-----	mol/ m ³	-----
Force	dyn (dyne) = g cm/s ²	N (newton) = kg.m/s ²	10^{-5}
Pressure	dyn/ cm ²	Pa (pascal) = N/ m ²	10^{-1}
Dynamic viscosity	poise (dyn. cm ⁻² . second)	Pa.s (pascal.second)	10^{-1}
Kinematic viscosity	-----	m ² /s (square meter per second)	-----
Surface tension	dyn/cm	N/m (newton per meter)	10^{-3}
Temperature	°C	kelvin	+ 273.16 (here, it is to be added)

2 Physical Pharmacy Practical Text

Guidelines for Writing Units

1. Unit symbols are printed in roman upright. The values of quantities are expressed in acceptable units using Arabic numerals and symbols for units. Example: $m = 5 \text{ kg}$ [not as $m = \text{five kilograms}$]
2. Capitalization: Unit symbols are printed in lower – case letters except that:
 - (i) the symbol or the first letter of the symbol in an upper-case letter when the name of the unit is derived from the name of the person:
Example – Pa (Pascal);
 - (ii) the accepted symbol for the litre is L. Example: mL (milliliter)
3. Space between numerical value and unit symbol: Being two different terms, a space is kept between numerical value and unit symbol, even if the value is used as adjective.
Examples: 30 mL (not 30mL), 30.2 °C (not 30.2°C), 66.7 % (not 66.7%)
4. Plurals: Unit symbols are unaltered in the plural. Examples: 75 cm [not as 75 cms]; 12 h [not as 12 hours].
5. Unit symbols are written in roman type and the quantity symbols are written in *italic* type. The constants are usually physical quantities and thus their symbols are *italic*.
Examples: Symbols of Units - m meter (not as *m* meter);
Symbols of quantities - $t = 3 \text{ s}$ (not as $t = 3 \text{ s}$).
6. Using %: A space is to be kept between the symbol % and the number.
Example: 57.1 % (not as 57.1%).
7. Angles: an angle of 2°3'4" *but not*: an angle of 2 °3 '4 “

Table Dos and Don'ts in writing symbols

Sl. No.	Symbols: Right presentation (✓)	Symbols: Wrong presentation (✗)
1.	$m = 5 \text{ kg}$	$m = \text{five kilograms}$, $m = \text{five kg}$, $m = 5 \text{ kg}$
2.	Pa(Pascal)	Pa (pascal)
3.	30 mL	30mL
4.	30.2 °C	30.2°C
5.	66.7 %	66.7%
6.	75 cm	75 cms
7.	12 h	12 hours, 12 hrs

Table Contd...

8.	m meter	m meter
9.	$t = 3 \text{ s}$	t = 3 s
10.	kg/m^3 or $\text{kg} \cdot \text{m}^{-3}$ or kilogram per cubic meter	kilogram/m³, kg per m³, kg/cubic meter, kilogram/cubic meter, or kilogram per meter³.
11.	Current: 15 A	15 amperes
12.	An angle of 2°3'4"	an angle of 2°3'4"