US Weights and Measures and some Technical Jargon in the Aviation Industry

1. The pound or pound-mass (lb, lbm) is a unit of mass in the imperial/US system.

   \[ 1 \text{ pound-mass} = 0.45359237 \text{ kg}. \]

2. The pound-force or simply pound (lb, lbf) is a unit of force. The pound-force is equal to the gravitational force exerted on a mass of one pound-mass. Taking standard gravity to be 9.81 m/s²,

   \[ 1 \text{ pound-force} = 0.45359237 \text{ kg} \times 9.80665 \text{ m/s}^2 = 4.448 \text{ N} \]

3. A tonne (t) or metric ton is 1,000 kilograms. The US ton (T) is 2,000 lbm whereas the UK ton is 2,240 lbm.

4. A nautical mile is a unit of length. It corresponds approximately to one arc-minute of latitude along any meridian.

   \[ 1 \text{ nautical mile} = 6076 \text{ ft} = 1852 \text{ m} \]

   A knot (kn) is a speed of 1 nautical mile per hour

   \[ 1 \text{ knot} = 1.852 \text{ km/h} = 0.514 \text{ m/s} \]

   There are different kinds of speeds in aviation

   a) KTAS is "knots true airspeed", the airspeed of an aircraft relative to undisturbed air.

   b) KIAS is "knots indicated airspeed", the speed shown on an aircraft's pitot-static airspeed indicator.

   c) KCAS is "knots calibrated airspeed", the indicated airspeed corrected for position error and instrument error.

   d) KEAS is "knots equivalent airspeed", the calibrated airspeed corrected for adiabatic compressible flow for the particular altitude

5. The U.S. liquid gallon is legally defined as 231 cubic inches,

   \[ 1 \text{ US gallon} = 231 \times (0.3048/12)^3 = 0.003785 \text{ m}^3 \]

   or 3.785 litres

   Note that the UK gallon is defined as 4.546 litres
6. One horsepower is 550 foot-pounds per second is equivalent to 745.7 watts

\[ 1 \text{ hp} = 550 \times (0.3048 \times 4.448) = 0.7457 \text{ kW} \]

Note that an engine’s power depends on where it is measured e.g.

Brake horsepower (bhp) = Power delivered directly to and measured at the engine's crankshaft

Shaft horsepower (shp) = Power delivered to and measured at the output shaft of the transmission