

## DIMENSÕES E UNIDADES

Quantidade Física	Dimensões		Unidades	
	Sistema MLT	Sistema FLT	Sistema Internacional	Sistema Inglês
Comprimento	L	L	m	ft
Massa	M	$FL^{-1}T^{-2}$	kg	lb <sub>m</sub>
Tempo	T	T	s	s
Velocidade	$LT^{-1}$	$LT^{-1}$	m/s	ft/s
Aceleração	$LT^{-2}$	$LT^{-2}$	$m/s^2$	$ft/s^2$
Força	$MLT^{-2}$	F	$kg\ m/s^2 = N$	$lb_m ft/s^2 = \text{poundal}$
Momento, Impulso	$MLT^{-1}$	FT	$kg\ m/s = N\ s$	$lb_m ft/s = \text{pdl}\ s$
Energia, Trabalho	$ML^2T^{-2}$	FL	$kg\ m^2/s^2 = N\ m = J$	$lb_m ft^2/s^2 = \text{ft}\ \text{pdl}$
Potência	$ML^2T^{-3}$	$FLT^{-1}$	$kg\ m^2/s^3 = J/s = w$	$lb_m ft^2/s^3 = \text{ft}\ \text{pdl}/s$
Densidade	$ML^{-3}$	$FL^{-4}T^2$	$kg/m^3$	$lb_m ft^3$
Velocidade Angular	$T^{-1}$	$T^{-1}$	rad/s	rad/s
Aceleração Angular	$T^{-2}$	$T^{-2}$	$rad/s^2$	$rad/s^2$
Torque	$ML^2T^{-2}$	FL	$kg\ m^2/s^2 = N\ m$	$lb_m ft^2/s^2 = \text{ft}\ \text{pdl}$
Momento Angular	$ML^2T^{-1}$	FLT	$kg\ m^2/s$	$lb_m ft^2/s$
Momento de Inércia	$ML^2$	$FLT^2$	$kg\ m^2$	$lb_m ft^2$
Pressão	$ML^{-1}T^{-2}$	$FL^{-2}$	$kg/m\ s^2 = N/m^2$	$\text{pdl}/ft^2$
Viscosidade( $\mu$ )	$ML^{-1}T^{-1}$	$FL^{-2}T$	$kg/m\ s = N\ s/m^2$	$lb_m/ft\ s = \text{pdl}\ s/ft^2$
Viscosidade Cinemática( $\nu$ )	$L^2T^{-1}$	$L^2T^{-1}$	$cm^2/s$	$ft^2/s$
Tensão Superficial	$MT^{-2}$	$FL^{-1}$	$kg/s^2 = N/m$	$lb_m/s^2 = \text{pdl}/ft$

## CONVERSÃO DE UNIDADES

### Comprimento:

1km = 1.000m	1in = 2,540cm	1ft = 12in
1m = 100cm	1ft = 30,48cm	1 $\mu$ m = 10 <sup>-9</sup> m
1cm = 10 <sup>-2</sup> m	1mi = 1,609km	1Å = 10 <sup>-10</sup> m
1mm = 10 <sup>-3</sup> m	1mil = 10 <sup>-3</sup> in	1m = 39,37in
1 $\mu$ = 10 <sup>-6</sup> m	1cm = 0,3937in	1km = 0,6214mi

### Área:

$$1\text{m}^2 = 10,76\text{ft}^2 \quad 1\text{ft}^2 = 929\text{cm}^2$$

### Volume:

$$\begin{aligned} 1\text{L} &= 1.000\text{cm}^3 = 1,057\text{qt} = 61,02\text{in}^3 = 0,03532\text{ft}^3 & 1\text{m}^3 &= 1.000\text{L} = 35,32\text{ft}^3 \\ 1\text{ft}^3 &= 7,481\text{U.S.gal} = 0,02832\text{m}^3 = 28,32\text{L} & 1\text{U.S.gal} &= 231\text{ft}^3 = 3,785\text{L} \\ 1\text{British gallon} &= 1,201\text{U.S.gal} = 277,4\text{in}^3 \end{aligned}$$

### Massa:

$$1\text{kg} = 2,2046\text{lb}_m = 0,06852\text{slug} \quad 1\text{lb}_m = 453,6\text{g} = 0,03108\text{slug} \quad 1\text{slug} = 32,174\text{lb}_m = 14,59\text{kg}$$

### Velocidade:

$$1\text{km/h} = 0,2778\text{m/s} = 0,6214\text{mi/h} = 0,9113\text{ft/s} \quad 1\text{mi/h} = 1,467\text{ft/s} = 1,609\text{km/h} = 0,447\text{m/s}$$

### Densidade:

$$1\text{g/cm}^3 = 10^3\text{kg/m}^3 = 62,43\text{lb}_m/\text{ft}^3 = 1,940\text{slug}/\text{ft}^3 \quad 1\text{lb}_m/\text{ft}^3 = 0,01602\text{g/cm}^3 \quad 1\text{slug}/\text{ft}^3 = 0,5154\text{g/cm}^3$$

### Força:

$$\begin{aligned} 1\text{N} &= 10^5\text{dynas} = 0,1020\text{kg}_f = 0,2248\text{lb}_f & 1\text{U.S.short ton} &= 2.000\text{lb}_f & 1\text{long ton} &= 2240\text{lb}_f \\ 1\text{lb}_f &= 4,448\text{N} = 0,4536\text{kg}_f = 32,17\text{poundals(pdl)} & 1\text{kg}_f &= 2,205\text{lb}_f = 9,807\text{N} & 1\text{metric ton} &= 2205\text{lb}_f \end{aligned}$$

### Energia:

$$\begin{aligned} 1\text{J} &= 1\text{N.m} = 10^7\text{ergs} = 0,7376\text{ft.lbf} = 0,2389\text{cal} = 9,481 \times 10^{-4}\text{Btu} & 1\text{ev} &= 1,602 \times 10^{-19}\text{J} \\ 1\text{ft.lbf} &= 1,356\text{J} = 0,3239\text{cal} = 1,285 \times 10^{-3}\text{Btu} & 1\text{cal} &= 4,186\text{J} = 3,087\text{ft.lbf} = 3,968 \times 10^{-3}\text{Btu} \\ 1\text{Btu} &= 778\text{ft.lbf} = 1055\text{J} = 0,293\text{W.h} & 1\text{kW.h} &= 3,60 \times 10^6\text{J} = 860\text{kcal} = 3413\text{Btu} \end{aligned}$$

### Potência:

$$\begin{aligned} 1\text{W} &= 1\text{J/s} = 10^7\text{ergs/s} = 0,2389\text{cal/s} \\ 1\text{hp} &= 550\text{ft.lbf/s} = 33000\text{ft.lbf/min} = 745,7\text{W} \\ 1\text{kW} &= 1,341\text{hp} = 737,6\text{ft.lbf/s} = 0,9483\text{Btu/s} \end{aligned}$$

### Pressão:

$$\begin{aligned} 1\text{N/m}^2 &= 1\text{Pa} = 10\text{dynas/cm}^2 = 9,869 \times 10^{-6}\text{atm} = 2,089 \times 10^{-2}\text{lb}_f/\text{ft}^2 \\ 1\text{lb}_f/\text{in}^2 &= 1\text{psi} = 6,895\text{N/m}^2 = 5,171\text{cmHg} = 27,68\text{inH}_2\text{O} \\ 1\text{atm} &= 1,013 \times 10^5\text{N/m}^2 = 1,013 \times 10^6\text{dynas/cm}^2 = 14,70\text{lb}_f/\text{in}^2 = 76\text{cmHg} = 406,8\text{inH}_2\text{O} = 1,013\text{bar} \end{aligned}$$

### Ângulo:

$$1\text{rad} = 57,296^\circ \quad 1^\circ = 0,017453\text{rad}$$

### Temperatura:

$$T(^{\circ}\text{F}) = 1,8 T(^{\circ}\text{C}) + 32 \quad T(\text{K}) = T(^{\circ}\text{C}) + 273,15 \quad T(\text{R}) = T(^{\circ}\text{F}) + 459,67$$

### Constante dos gases:

$$\begin{aligned} R &= 8,314\text{J/mol.K} = 8,314\text{m}^3.\text{Pa/mol.K} & R &= 1,987\text{cal/mol.K} & R &= 82,06\text{atm.cm}^3/\text{gmol.K} \\ R &= 83,14\text{cm}^3.\text{bar/mol.K} & R &= 8,314\text{cm}^3.\text{kPa/mol.K} & R &= 62,356\text{cm}^3.\text{torr/mol.K} \\ R &= 1,986\text{Btu/lbmol.R} & R &= 0,7302\text{ft}^3.\text{atm/lbmol.R} & R &= 10,73\text{ft}^3.\text{psia/lbmol.R} \\ R &= 1,545\text{ft.lbf/lbmol.R} \end{aligned}$$

$$\mathbf{g_c(\text{inglês})= 32,174 \text{ lb}_m \cdot \text{ft}/\text{lb}_f \cdot \text{s}^2} \quad \mathbf{g_c(\text{SI})= 1 \text{ kg} \cdot \text{m}/\text{N} \cdot \text{s}^2} \quad \mathbf{g_c(\text{SBEng.})= 9,81 \text{ kg}_m \cdot \text{m}/\text{kg}_f \cdot \text{s}^2}$$