

| Unidades de Comprimento (principais) |                      |                      |                      |                       |                  |                  |                 |                       |                       |                       |             |
|--------------------------------------|----------------------|----------------------|----------------------|-----------------------|------------------|------------------|-----------------|-----------------------|-----------------------|-----------------------|-------------|
| → ↑                                  | Km                   | hm                   | dam                  | m                     | fm               | cm               | mm              | yd                    | ft                    | in                    | Observações |
| Km                                   | 1                    | 10                   | 10 <sup>2</sup>      | 10 <sup>3</sup>       | 10 <sup>4</sup>  | 10 <sup>5</sup>  | 10 <sup>6</sup> | 1093,6                | 3281                  | 39370                 | quilômetro  |
| hm                                   | 10 <sup>-1</sup>     | 1                    | 10                   | 10 <sup>2</sup>       | 10 <sup>3</sup>  | 10 <sup>4</sup>  | 10 <sup>5</sup> | 109,4                 | 328                   | 3937                  | hectômetro  |
| dam                                  | 10 <sup>-2</sup>     | 10 <sup>-1</sup>     | 1                    | 10                    | 10 <sup>2</sup>  | 10 <sup>3</sup>  | 10 <sup>4</sup> | 10,94                 | 32,8                  | 393,7                 | decâmetro   |
| m                                    | 10 <sup>-3</sup>     | 10 <sup>-2</sup>     | 10 <sup>-1</sup>     | 1                     | 10               | 10 <sup>2</sup>  | 10 <sup>3</sup> | 1,094                 | 3,28                  | 39,37                 | metro       |
| dm                                   | 10 <sup>-4</sup>     | 10 <sup>-3</sup>     | 10 <sup>-2</sup>     | 10 <sup>-1</sup>      | 1                | 10               | 10 <sup>2</sup> | 0,109                 | 0,328                 | 3,94                  | decímetro   |
| cm                                   | 10 <sup>-5</sup>     | 10 <sup>-4</sup>     | 10 <sup>-3</sup>     | 10 <sup>-2</sup>      | 10 <sup>-1</sup> | 1                | 10              | 1,09x10 <sup>-2</sup> | 3,28x10 <sup>-2</sup> | 0,394                 | centímetro  |
| mm                                   | 10 <sup>-6</sup>     | 10 <sup>-5</sup>     | 10 <sup>-4</sup>     | 10 <sup>-3</sup>      | 10 <sup>-2</sup> | 10 <sup>-1</sup> | 1               | 1,09x10 <sup>-3</sup> | 3,28x10 <sup>-3</sup> | 0,39x10 <sup>-1</sup> | milímetro   |
| yd                                   | 9x10 <sup>-7</sup>   | 9x10 <sup>-6</sup>   | 9x10 <sup>-5</sup>   | 0,9144                | 9,144            | 91,44            | 914,4           | 1                     | 3                     | 36                    | jarda       |
| ft                                   | 3x10 <sup>-7</sup>   | 3x10 <sup>-6</sup>   | 3x10 <sup>-5</sup>   | 0,3048                | 3,048            | 30,48            | 304,8           | 0,333                 | 1                     | 12                    | pé          |
| in                                   | 2,5x10 <sup>-5</sup> | 2,5x10 <sup>-4</sup> | 2,5x10 <sup>-3</sup> | 2,54x10 <sup>-2</sup> | 0,254            | 2,54             | 25,4            | 0,278                 | 8,3x10 <sup>-2</sup>  | 1                     | polegada    |

Notas: 1 Milha marítima = 1,852 Km  
1 Milha terrestre = 1,609 Km

| Massa  |                       |         |                       |                       |                       |                       |                          |
|--------|-----------------------|---------|-----------------------|-----------------------|-----------------------|-----------------------|--------------------------|
| ↑<br>→ | Kg                    | g       | utm                   | lb                    | oz                    | slug                  | Observações              |
| Kg     | 1                     | $10^3$  | 0,102                 | 2,205                 | 35,28                 | $6,85 \times 10^{-2}$ | quilograma               |
| g      | $10^{-3}$             | 1       | $1,02 \times 10^{-4}$ | $2,2 \times 10^{-3}$  | $35,3 \times 10^{-3}$ | $6,85 \times 10^{-5}$ | grama                    |
| utm    | 9,80665               | 9806,65 | 1                     | 21,62                 | 346                   | 0,67                  | Unidade Técnica de Massa |
| lb     | 0,4535                | 453,5   | $4,62 \times 10^{-2}$ | 1                     | 16                    | $3,1 \times 10^{-2}$  | libra-massa              |
| oz     | $2,83 \times 10^{-2}$ | 28,3    | $2,9 \times 10^{-3}$  | $6,25 \times 10^{-2}$ | 1                     | $1,9 \times 10^{-3}$  | onça                     |
| slug   | 14,59                 | 14589   | 1,49                  | 32,17                 | 514,7                 | 1                     | -                        |

| Velocidades   |       |        |      |      |                     |
|---|-------|--------|------|------|---------------------|
| $\begin{matrix} \uparrow \\ \rightarrow \end{matrix}$ | Km/h  | m/s    | nó   | ft/s | Observações         |
| Km/h  | 1     | 0,28   | 0,54 | 0,91 | quilômetro/hora     |
| m/s   | 3,6   | 1      | 1,94 | 3,28 | metro/segundo       |
| nó  | 1,852 | 0,51   | 1    | 1,59 | milha marítima/hora |
| ft/s  | 1,1   | 0,3048 | 0,59 | 1    | pé/segundo          |

### Massa Específica (densidade absoluta)

| $\begin{matrix} \uparrow \\ \rightarrow \end{matrix}$ | $\text{Kg/m}^3$ | $\text{g/cm}^3$     | $\text{lb/ft}^3$      |
|---|-----------------|---------------------|-----------------------|
| $\text{Kg/m}^3$                                       | 1               | $10^{-3}$           | $6,25 \times 10^{-2}$ |
| $\text{g/cm}^3$                                       | $10^3$          | 1                   | 62,5                  |
| $\text{lb/ft}^3$                                      | 16              | $16 \times 10^{-2}$ | 1                     |

| Volume Específico                                     |                      |                     |                      |                          |
|---|----------------------|---------------------|----------------------|--------------------------|
| $\begin{matrix} \uparrow \\ \rightarrow \end{matrix}$ | m <sup>3</sup> /Kg   | dm <sup>3</sup> /Kg | ft <sup>3</sup> /lb  | Observações              |
| m <sup>3</sup> /Kg                                    | 1                    | 10 <sup>3</sup>     | 16                   | -                        |
| dm <sup>3</sup> /Kg                                   | 10 <sup>-3</sup>     | 1                   | 1,6x10 <sup>-2</sup> | ℓ/Kg= cm <sup>3</sup> /g |
| ft <sup>3</sup> /lb                                   | 6,2x10 <sup>-2</sup> | 62,4                | 1                    | -                        |

| Força   |                    |           |                        |                       |                      |                  |
|---|--------------------|-----------|------------------------|-----------------------|----------------------|------------------|
| $\begin{matrix} \uparrow \\ \rightarrow \end{matrix}$ | dina               | N         | Kgf                    | Pdl                   | lbf                  | Observações      |
| dina  | 1                  | $10^{-5}$ | $0,102 \times 10^{-5}$ | $7,23 \times 10^{-5}$ | $2,3 \times 10^{-6}$ | dina             |
| N   | $10^5$             | 1         | 0,102                  | 7,23                  | 0,225                | Newton           |
| Kgf   | 980665             | 9,80665   | 1                      | 70,95                 | 2,205                | quilograma-força |
| Pdl   | 13823              | 0,138     | $1,4 \times 10^{-2}$   | 1                     | $3,1 \times 10^{-2}$ | Poundal          |
| lbf   | $4,45 \times 10^5$ | 4,45      | 0,453                  | 32,17                 | 1                    | libra-força      |

Pressão

| ↑<br>→              | Pa               | atm                     | bar                    | ba                      | kgf/m <sup>2</sup>     | at                    | lbt/ft <sup>2</sup>     | psi                   | Torr                  | in Hg                 |
|---------------------|------------------|-------------------------|------------------------|-------------------------|------------------------|-----------------------|-------------------------|-----------------------|-----------------------|-----------------------|
| Pa                  | 1                | 9,869x10 <sup>-6</sup>  | 10 <sup>-5</sup>       | 10                      | 10,2x10 <sup>-2</sup>  | 10,2x10 <sup>-6</sup> | 20,9x10 <sup>-3</sup>   | 1,45x10 <sup>-4</sup> | 7,5x10 <sup>-3</sup>  | 2,95x10 <sup>-4</sup> |
| atm                 | 101325,0         | 1                       | 1,01325                | 1,01325x10 <sup>6</sup> | 10,332x10 <sup>3</sup> | 1,033                 | 2116                    | 14,6959               | 760                   | 29,92                 |
| bar                 | 10 <sup>5</sup>  | 9,869x10 <sup>-1</sup>  | 1                      | 10 <sup>6</sup>         | 10,197x10 <sup>3</sup> | 1,02                  | 2088,5                  | 14,5                  | 750                   | 29,53                 |
| ba                  | 10 <sup>-1</sup> | 9,569x10 <sup>-7</sup>  | 10 <sup>-6</sup>       | 1                       | 10,2x10 <sup>-3</sup>  | 10,2x10 <sup>-7</sup> | 2088,5x10 <sup>-6</sup> | 14,5x10 <sup>-6</sup> | 7,5x10 <sup>-4</sup>  | 29,5x10 <sup>-6</sup> |
| kgf/m <sup>2</sup>  | 9,80665          | 9,6784x10 <sup>-5</sup> | 9,8x10 <sup>-5</sup>   | 98                      | 1                      | 10 <sup>-4</sup>      | 20,5x10 <sup>-2</sup>   | 14,2x10 <sup>-4</sup> | 735x10 <sup>-4</sup>  | 28,9x10 <sup>-4</sup> |
| at                  | 98066,5          | 9,6784x10 <sup>-1</sup> | 9,8x10 <sup>-1</sup>   | 98,0x10 <sup>5</sup>    | 10 <sup>4</sup>        | 1                     | 2048                    | 14,2                  | 735,56                | 28,958                |
| lbt/ft <sup>2</sup> | 47,88            | 47,264x10 <sup>-5</sup> | 4,79x10 <sup>-4</sup>  | 478,8                   | 4,88                   | 4,9x10 <sup>-4</sup>  | 1                       | 69,4x10 <sup>-4</sup> | 35,9x10 <sup>-4</sup> | 14x10 <sup>-3</sup>   |
| psi                 | 6894,8           | 6,80x10 <sup>-2</sup>   | 68,95x10 <sup>-3</sup> | 68,948x10 <sup>3</sup>  | 703                    | 703x10 <sup>-4</sup>  | 144                     | 1                     | 51,7                  | 2,04                  |
| Torr                | 133,3            | 13,16x10 <sup>-4</sup>  | 133,3x10 <sup>-5</sup> | 1333                    | 13,595                 | 13,6x10 <sup>-4</sup> | 2,78                    | 19,3x10 <sup>-3</sup> | 1                     | 39,4x10 <sup>-3</sup> |
| in Hg               | 3386,5           | 3,34x10 <sup>-2</sup>   | 33,9x10 <sup>-3</sup>  | 33865                   | 345,3                  | 345x10 <sup>-4</sup>  | 70,73                   | 49x10 <sup>-2</sup>   | 25,4                  | 1                     |

### Energia e Trabalho

| ↑<br>→ | J                      | Kj                     | atm.e                 | cal                    | kcal                  | kgf.m                  | btu                   | lbf.ft                | kw-h                  | cv-h                  | hph                   | Observações               |   |
|--------|------------------------|------------------------|-----------------------|------------------------|-----------------------|------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|---------------------------|---|
| J      | 1                      | 10 <sup>3</sup>        | 98,7x10 <sup>-4</sup> | 238,8x10 <sup>-5</sup> | 23,9x10 <sup>-5</sup> | 10,2x10 <sup>-2</sup>  | 94,8x10 <sup>-5</sup> | 737,5x10 <sup>3</sup> | 2,78x10 <sup>-7</sup> | 3,78x10 <sup>-7</sup> | 3,7x10 <sup>-7</sup>  | Joule                     | Pascal                                  |
| Kj     | 10 <sup>3</sup>        | 1                      | 98,7x10 <sup>-1</sup> | 238,85                 | 23,9x10 <sup>-2</sup> | 101,97                 | 94,8x10 <sup>-2</sup> | 737,5                 | 2,78x10 <sup>-4</sup> | 3,78x10 <sup>-4</sup> | 3,7x10 <sup>-4</sup>  | quilojoule                | Atmosfera física ou normal              |
| atm.e  | 101,325                | 101,3x10 <sup>-3</sup> | 1                     | 24,2                   | 24,2x10 <sup>-3</sup> | 10,33                  | 96x10 <sup>-3</sup>   | 74,73                 | 28x10 <sup>-6</sup>   | 38,3x10 <sup>-6</sup> | 38x10 <sup>-6</sup>   |                           | bar                                     |
| cal    | 4,1868                 | 4,19x10 <sup>-3</sup>  | 4,13x10 <sup>-2</sup> | 1                      | 10 <sup>3</sup>       | 426,9x10 <sup>-3</sup> | 39,7x10 <sup>-4</sup> | 3,09                  | 1,16x10 <sup>-6</sup> | 1,6x10 <sup>-6</sup>  | 1,56x10 <sup>-6</sup> | caloria                   | Bária                                   |
| kcal   | 4,1868x10 <sup>3</sup> | 4,1868                 | 41,32                 | 10 <sup>3</sup>        | 1                     | 426,9                  | 3,97                  | 3,09x10 <sup>3</sup>  | 1,16x10 <sup>-3</sup> | 1,6x10 <sup>-3</sup>  | 1,56x10 <sup>-3</sup> | quilocaloria              |   |
| kgf.m  | 9,80665                | 9,8x10 <sup>-3</sup>   | 96,8x10 <sup>-3</sup> | 2,34                   | 2,3x10 <sup>-3</sup>  | 1                      | 93x10 <sup>-4</sup>   | 7,2                   | 2,7x10 <sup>-6</sup>  | 3,7x10 <sup>-6</sup>  | 3,65x10 <sup>-6</sup> |                           | Atmosfera técnica=1 Kgf/cm <sup>2</sup> |
| btu    | 1055                   | 1055x10 <sup>-3</sup>  | 10,413                | 252                    | 0,252                 | 107,59                 | 1                     | 778,165               | 2,93x10 <sup>-4</sup> | 4x10 <sup>-4</sup>    | 3,9x10 <sup>-4</sup>  | Unidade Térmica Britânica |   |
| lbf.ft | 1,356                  | 1,36x10 <sup>-3</sup>  | 1,3x10 <sup>-2</sup>  | 0,324                  | 3,2x10 <sup>-4</sup>  | 138,3x10 <sup>-3</sup> | 12,9x10 <sup>-4</sup> | 1                     | 3,8x10 <sup>-7</sup>  | 5x10 <sup>-7</sup>    | 5x10 <sup>-7</sup>    |                           | libra por polegada ao quadrado          |
| kw-h   | 3,6x10 <sup>6</sup>    | 3,6x10 <sup>3</sup>    | 35529                 | 859845                 | 859,85                | 367098                 | 3412                  | 2,655x10 <sup>6</sup> | 1                     | 1,36                  | 1,34                  |                           | Torricelli = mm Hg                      |
| cv-h   | 2,648x10 <sup>6</sup>  | 2,648x10 <sup>3</sup>  | 26132                 | 632415                 | 632,4                 | 2,7x10 <sup>5</sup>    | 2510                  | 1,953x10 <sup>6</sup> | 0,7355                | 1                     | 0,9868                |                           | polegada de mercúrio                    |
| hph    | 2,683x10 <sup>6</sup>  | 2,683x10 <sup>6</sup>  | 26480                 | 640847                 | 640,85                | 2,736x10 <sup>5</sup>  | 2543                  | 1,979x10 <sup>6</sup> | 0,7453                | 1,013                 | 1                     |                           | centímetro de mercúrio                  |



### Potência

| $\rightarrow \uparrow$ | $W = \frac{J}{S}$    | $KW = \frac{KJ}{S}$    | cv                    | hp                     | KJ/h                     | KJ/min                   | Kcal/h                | Kcal/min              | Kcal/s                |
|------------------------|----------------------|------------------------|-----------------------|------------------------|--------------------------|--------------------------|-----------------------|-----------------------|-----------------------|
| $W = \frac{J}{S}$      | 1                    | $10^{-3}$              | $1,36 \times 10^{-3}$ | $1,34 \times 10^{-3}$  | 3,6                      | 0,06                     | 0,8598                | $1,43 \times 10^{-2}$ | $2,39 \times 10^{-4}$ |
| $KW = \frac{KJ}{S}$    | $10^5$               | 1                      | 1,36                  | 1,34                   | $3,6 \times 10^5$        | 60                       | 859,8                 | 14,33                 | 0,239                 |
| cv                     | 735,5                | 0,736                  | 1                     | 0,9868                 | 2647,8                   | 44,13                    | 632,41                | 10,54                 | 0,1757                |
| hp                     | 745,3                | 0,745                  | 1,013                 | 1                      | 2683                     | 44,72                    | 640,8                 | 10,68                 | 0,178                 |
| KJ/h                   | 0,278                | $2,78 \times 10^{-4}$  | $3,78 \times 10^{-4}$ | $3,73 \times 10^{-4}$  | 1                        | $1,7 \times 10^{-2}$     | 0,239                 | $3,98 \times 10^{-3}$ | $6,64 \times 10^{-5}$ |
| KJ/min                 | 16,67                | $1,67 \times 10^{-2}$  | $2,27 \times 10^{-2}$ | $2,24 \times 10^{-2}$  | 60                       | 1                        | 14,33                 | 0,239                 | $3,98 \times 10^{-3}$ |
| Kcal/h                 | 1,163                | $1,163 \times 10^{-3}$ | $1,58 \times 10^{-3}$ | $1,56 \times 10^{-3}$  | 4,187                    | $6,97 \times 10^{-2}$    | 1                     | $1,67 \times 10^{-2}$ | $2,78 \times 10^{-4}$ |
| Kcal/min               | 69,78                | $6,9 \times 10^{-2}$   | $9,49 \times 10^{-2}$ | $9,36 \times 10^{-2}$  | 251,2                    | 4,187                    | 60                    | 1                     | $1,67 \times 10^{-2}$ |
| Kcal/s                 | 4186,8               | 4,186                  | 5,69                  | 5,618                  | 15072                    | 251,2                    | 3600                  | 60                    | 1                     |
| Kgf.m/h                | $2,7 \times 10^{-3}$ | $2,7 \times 10^{-6}$   | $3,7 \times 10^{-6}$  | $3,65 \times 10^{-6}$  | $9,80665 \times 10^{-3}$ | $1,63 \times 10^{-4}$    | $2,34 \times 10^{-3}$ | $3,9 \times 10^{-5}$  | $6,5 \times 10^{-7}$  |
| Kgf.m/min              | 0,1634               | $1,63 \times 10^{-4}$  | $2,22 \times 10^{-4}$ | $2,193 \times 10^{-4}$ | 0,5854                   | $9,80665 \times 10^{-3}$ | 0,141                 | $2,34 \times 10^{-3}$ | $3,90 \times 10^{-5}$ |
| Kgf.m/s                | 9,80665              | $9,8 \times 10^{-3}$   | $1,33 \times 10^{-2}$ | $1,316 \times 10^{-2}$ | 35,3                     | 0,5884                   | 8,432                 | 0,141                 | $2,34 \times 10^{-3}$ |
| Btu/h                  | 0,293                | $2,93 \times 10^{-4}$  | $3,98 \times 10^{-4}$ | $3,93 \times 10^{-4}$  | 1,055                    | $1,76 \times 10^{-2}$    | 0,252                 | $4,2 \times 10^{-3}$  | $7 \times 10^{-5}$    |
| Btu/min                | 17,58                | $1,76 \times 10^{-2}$  | $2,39 \times 10^{-2}$ | $2,36 \times 10^{-2}$  | 63,3                     | 1,055                    | 15,12                 | 0,252                 | $4,2 \times 10^{-3}$  |

### Potência

| $\begin{matrix} \uparrow \\ \rightarrow \end{matrix}$ | $W = \frac{J}{S}$     | $KW = \frac{KJ}{S}$    | cv                    | hp                      | KJ/h                  | KJ/min                | Kcal/h                | Kcal/min              | Kcal/s                |
|---|-----------------------|------------------------|-----------------------|-------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Btu/s   | 1055                  | 1,055                  | 1,435                 | 1,416                   | 3798,3                | 63,3                  | 907,2                 | 15,12                 | 0,252                 |
| lbf.ft/h  | $3,77 \times 10^{-4}$ | $3,77 \times 10^{-7}$  | $5,12 \times 10^{-7}$ | $5,05 \times 10^{-7}$   | $1,36 \times 10^{-3}$ | $2,26 \times 10^{-5}$ | $3,24 \times 10^{-4}$ | $5,4 \times 10^{-6}$  | $9 \times 10^{-8}$    |
| lbf.ft/min  | $22,6 \times 10^{-3}$ | $2,26 \times 10^{-5}$  | $3,07 \times 10^{-5}$ | $3,03 \times 10^{-5}$   | $8,14 \times 10^{-3}$ | $1,36 \times 10^{-3}$ | $1,94 \times 10^{-2}$ | $3,24 \times 10^{-4}$ | $5,4 \times 10^{-6}$  |
| lbf.ft/s  | 1,356                 | $1,355 \times 10^{-3}$ | $1,84 \times 10^{-3}$ | $1,1818 \times 10^{-3}$ | 4,88                  | $8,14 \times 10^{-2}$ | 1,166                 | $1,94 \times 10^{-2}$ | $3,24 \times 10^{-2}$ |

### Potência

| $\rightarrow \uparrow$ | Kgf.m/h             | Kgf.m/min.            | Kgf.m/s                | Btu/h                | Btu/min               | Btu/s                  | lbf.ft/h            | lbft.ft/min         | lbft.ft/s          |
|------------------------|---------------------|-----------------------|------------------------|----------------------|-----------------------|------------------------|---------------------|---------------------|--------------------|
| $W = \frac{J}{S}$      | 367,1               | 6,12                  | 0,102                  | 3,412                | $5,68 \times 10^{-2}$ | $9,48 \times 10^{-4}$  | 2655                | 44,25               | 0,7375             |
| $KW = \frac{KJ}{S}$    | $3,671 \times 10^5$ | 6118                  | 101,97                 | 3412                 | 56,8                  | 0,948                  | $2,655 \times 10^5$ | $4,425 \times 10^4$ | 737,5              |
| cv                     | $2,7 \times 10^5$   | 4500                  | 75                     | 2509,6               | 41,83                 | 0,697                  | $1,953 \times 10^6$ | $3,255 \times 10^4$ | 542,5              |
| hp                     | $2,736 \times 10^5$ | 4560                  | 76                     | 2543                 | 42,38                 | 0,706                  | $1,98 \times 10^6$  | $2,398 \times 10^4$ | 549,7              |
| KJ/h                   | 101,97              | 1,6995                | $2,833 \times 10^{-2}$ | 0,9478               | $1,58 \times 10^{-2}$ | $2,63 \times 10^{-4}$  | 737,53              | 12,29               | 0,205              |
| KJ/min                 | 6118,3              | 101,97                | 1,6995                 | 56,87                | 0,9478                | $1,58 \times 10^{-2}$  | $4,425 \times 10^4$ | 737,5               | 12,29              |
| Kcal/h                 | 426,93              | 7,116                 | 0,1186                 | 3,968                | $6,61 \times 10^{-2}$ | $1,102 \times 10^{-3}$ | 3088                | 51,5                | 0,858              |
| Kcal/min               | $2,562 \times 10^4$ | 426,9                 | 7,12                   | 238,1                | 3,968                 | $6,61 \times 10^{-2}$  | $1,852 \times 10^5$ | 3088                | 51,5               |
| Kcal/s                 | $1,537 \times 10^6$ | $2,562 \times 10^4$   | 426,9                  | $1,428 \times 10^4$  | 238,09                | 3,968                  | $1,112 \times 10^7$ | $1,852 \times 10^5$ | 3088               |
| Kgf.m/h                | 1                   | $1,67 \times 10^{-2}$ | $2,78 \times 10^{-4}$  | $9,3 \times 10^{-3}$ | $1,5 \times 10^{-4}$  | $2,58 \times 10^{-6}$  | 7,23                | 0,12                | $2 \times 10^{-3}$ |
| Kgf.m/min              | 60                  | 1                     | $1,67 \times 10^{-2}$  | 0,558                | $9,3 \times 10^{-3}$  | $1,55 \times 10^{-4}$  | 434                 | 7,23                | 0,12               |
| Kgf.m/s                | 3600                | 60                    | 1                      | 33,46                | 0,5577                | $9,3 \times 10^{-3}$   | 26038               | 434                 | 7,23               |
| Btu/h                  | 107,6               | 1,793                 | $3 \times 10^{-2}$     | 1                    | $1,67 \times 10^{-2}$ | $2,78 \times 10^{-4}$  | 778,15              | 12,97               | 0,216              |
| Btu/min                | 6455,3              | 107,6                 | 1,793                  | 60                   | 1                     | $1,67 \times 10^{-2}$  | 46689               | 778,15              | 12,97              |

| Potência       |                     |                      |                      |                      |                       |                       |                      |                       |                       |
|----------------|---------------------|----------------------|----------------------|----------------------|-----------------------|-----------------------|----------------------|-----------------------|-----------------------|
| → <sup>↑</sup> | Kgf.m/h             | Kgf.m/min.           | Kgf.m/s              | Btu/h                | Btu/min               | Btu/s                 | lbf.ft/h             | lbft.ft/min           | lbft.ft/s             |
| Btu/s          | $3,873 \times 10^5$ | 6455,3               | 107,6                | 3600                 | 60                    | 1                     | $2,8 \times 10^{-6}$ | 46689                 | 778,15                |
| lbf.ft/h       | 0,138               | $2,3 \times 10^{-3}$ | $3,8 \times 10^{-5}$ | $1,3 \times 10^{-3}$ | $2,14 \times 10^{-5}$ | $3,57 \times 10^{-7}$ | 1                    | $1,67 \times 10^{-2}$ | $2,78 \times 10^{-4}$ |
| lbf.ft/min     | 8,296               | 0,138                | $2,3 \times 10^{-3}$ | $7,7 \times 10^{-2}$ | $1,3 \times 10^{-3}$  | $2,1 \times 10^{-5}$  | 60                   | 1                     | $1,67 \times 10^{-2}$ |

### Energia Específica

| → <sup>↑</sup>          | J/Kg            | Kj/Kg                | cal/g                 | Kcal/Kg               | Kgf.m/Kg        | at.m <sup>3</sup> /Kg  | Btu/lb                | lbf.ft/lb | psi.ft <sup>3</sup> /lb |
|-------------------------|-----------------|----------------------|-----------------------|-----------------------|-----------------|------------------------|-----------------------|-----------|-------------------------|
| J/Kg                    | 1               | 10 <sup>-3</sup>     | 2,4x10 <sup>-4</sup>  | 2,4x10 <sup>-4</sup>  | 0,102           | 1,02x10 <sup>-5</sup>  | 4,3x10 <sup>-4</sup>  | 0,334     | 2,3x10 <sup>-3</sup>    |
| Kj/Kg                   | 10 <sup>3</sup> | 1                    | 0,239                 | 0,239                 | 101,9           | 1,02x10 <sup>-2</sup>  | 0,43                  | 334,5     | 2,32                    |
| cal/g                   | 4186,8          | 41868                | 1                     | 1                     | 426,9           | 4,27x10 <sup>-2</sup>  | 1,8                   | 1400      | 9,72                    |
| Kcal/Kg                 | 4186,8          | 4,1868               | 1                     | 1                     | 426,9           | 4,27x10 <sup>-2</sup>  | 1,8                   | 1400      | 9,72                    |
| Kgf.m/Kg                | 9,80665         | 9,8x10 <sup>-3</sup> | 2,34x10 <sup>-3</sup> | 2,34x10 <sup>-3</sup> | 1               | 10 <sup>-4</sup>       | 4,2x10 <sup>-3</sup>  | 3,28      | 2,28x10 <sup>-2</sup>   |
| at.m <sup>3</sup> /Kg   | 98066,5         | 98,0665              | 23,4                  | 23,4                  | 10 <sup>4</sup> | 1                      | 42,15                 | 32800     | 227,78                  |
| Btu/lb                  | 2326,5          | 2,326                | 0,556                 | 0,556                 | 237,2           | 2,37x10 <sup>-2</sup>  | 1                     | 778,15    | 5,4                     |
| lbf.ft/lb               | 2,99            | 2,9x10 <sup>-3</sup> | 7,14x10 <sup>-4</sup> | 7,14x10 <sup>-4</sup> | 0,3048          | 3,048x10 <sup>-5</sup> | 1,29x10 <sup>-3</sup> | 1         | 6,94x10 <sup>-3</sup>   |
| psi.ft <sup>3</sup> /lb | 430,5           | 0,43                 | 0,103                 | 0,103                 | 43,9            | 4,39x10 <sup>-3</sup>  | 0,185                 | 144       | 1                       |

| Entalpia Específica |        |           |                      |                      |
|---------------------|--------|-----------|----------------------|----------------------|
| ↑<br>→              | J/Kg   | Kj/Kg     | Kcal/Kg              | Btu/lb               |
| J/Kg                | 1      | $10^{-3}$ | $2,4 \times 10^{-4}$ | $4,3 \times 10^{-4}$ |
| Kj/Kg               | $10^3$ | 1         | 0,239                | 0,43                 |
| Kcal/Kg             | 4186,8 | 4,1868    | 1                    | 1,8                  |
| Btu/lb              | 2326,5 | 2,326     | 0,556                | 1                    |

| Entropia Específica                                   |        |           |                      |                      |
|---|--------|-----------|----------------------|----------------------|
| $\begin{matrix} \uparrow \\ \rightarrow \end{matrix}$ | J/Kg.K | Kj/Kg.K   | Kcal/Kg.K            | Btu/lb.R             |
| J/Kg.K  | 1      | $10^{-3}$ | $2,4 \times 10^{-4}$ | $2,4 \times 10^{-4}$ |
| Kj/Kg.K   | $10^3$ | 1         | 0,239                | 0,239                |
| Kcal/Kg.K   | 4186,8 | 4,1868    | 1                    | 1                    |
| Btu/lb.R  | 4186,8 | 4,1868    | 1                    | 1                    |

| Viscosidade Dinâmica n : Poise (P)* |                 |                                |                                |                                   |                                   |                                |                                   |
|-------------------------------------|-----------------|--------------------------------|--------------------------------|-----------------------------------|-----------------------------------|--------------------------------|-----------------------------------|
| → ↑                                 | P               | $\frac{\text{Kg}}{\text{m.s}}$ | $\frac{\text{Kg}}{\text{m.h}}$ | $\frac{\text{Kgf.s}}{\text{m}^2}$ | $\frac{\text{Kgf.h}}{\text{m.s}}$ | $\frac{\text{lb}}{\text{m.s}}$ | $\frac{\text{lbf.s}}{\text{m.s}}$ |
| P                                   | 1               | 0,1                            | 360                            | 0,010197                          | $2,833.10^{-6}$                   | 0,06721                        | $2,0885.10^{-3}$                  |
| Kg/m.s                              | 10              | 1                              | 3600                           | 0,10197                           | $2,833.10^{-5}$                   | 0,6721                         | $2,0885.10^{-2}$                  |
| Kg/m.h                              | $2,778.10^{-3}$ | $2,778.10^{-4}$                | 1                              | $2,833.10^{-5}$                   | $78,68.10^{-10}$                  | $18,67.10^{-5}$                | $5,801.10^{-6}$                   |
| Kgf.s/m <sup>2</sup>                | 98,07           | 9,807                          | $353,04.10^{-2}$               | 1                                 | $2,778.10^{-4}$                   | 6,5919                         | 0,20482                           |
| Kgf.h/m <sup>2</sup>                | $353,04.10^3$   | $353,04.10^2$                  | $127,09.10^6$                  | 3600                              | 1                                 | 23730                          | 737,28                            |
| lb/ft.s                             | 14,882          | 1,488                          | 5357                           | 0,15175                           | $4,214.10^{-5}$                   | 1                              | 0,03108                           |
| lbf.s/ft <sup>2</sup>               | 478,8           | 47,88                          | $172,4.10^3$                   | 4,882                             | $1,3558.10^{-3}$                  | 32,174                         | 1                                 |

$$*P = \frac{\text{dina.s}}{\text{cm}^2} = \frac{\text{g}}{\text{cm.s}}$$



| Condutividade Térmica [K]   |                          |                              |                              |                                   |                              |                              |
|---|--------------------------|------------------------------|------------------------------|-----------------------------------|------------------------------|------------------------------|
| $\begin{matrix} \uparrow \\ \rightarrow \end{matrix}$                   | $\frac{W}{cm.^{\circ}C}$ | $\frac{Kcal}{m.h.^{\circ}C}$ | $\frac{cal}{cm.s.^{\circ}C}$ | $\frac{Btu.in}{ft^2.h.^{\circ}F}$ | $\frac{Btu}{ft.h.^{\circ}F}$ | $\frac{Btu}{in.h.^{\circ}F}$ |
| $\frac{1 \text{ W}}{cm.^{\circ}C} = \frac{10^2 \text{ W}}{m.^{\circ}C}$ | 1                        | 85,985                       | 0,23885                      | 693,5                             | 57,79                        | 4,815                        |
| $\frac{1 \text{ Kcal}}{m.h.^{\circ}C}$                                  | 0,01163                  | 1                            | $2,778 \cdot 10^{-3}$        | 8,064                             | 0,6719                       | 0,05599                      |
| $\frac{1 \text{ cal}}{cm.s.^{\circ}C}$                                  | 4,1868                   | 360                          | 1                            | 2903                              | 241,9                        | 20,16                        |
| $\frac{1 \text{ Btu.in}}{ft^2.h.^{\circ}F}$                             | $1,422 \cdot 10^{-3}$    | 0,124                        | $3,445 \cdot 10^{-4}$        | 1                                 | 0,08333                      | $6,944 \cdot 10^{-3}$        |
| $\frac{1 \text{ Btu.in}}{ft.h.^{\circ}F}$                               | $1,731 \cdot 10^{-2}$    | 1,488                        | $4,134 \cdot 10^{-3}$        | 12                                | 1                            | 0,08333                      |
| $\frac{1 \text{ Btu}}{in.h.^{\circ}F}$                                  | 0,2077                   | 17,858                       | $4,964 \cdot 10^{-2}$        | 144                               | 12                           | 1                            |

| Coeficientes de Transmissão de Calor [h]             |                                 |                                |   |   |   |
|--|---------------------------------|--------------------------------|---|---|---|
| ↑<br>→   | $\frac{W}{cm^2 \cdot ^\circ C}$ | $\frac{W}{m^2 \cdot ^\circ C}$ | $\frac{Kcal}{m^2 \cdot h \cdot ^\circ C}$ | $\frac{cal}{cm^2 \cdot s \cdot ^\circ C}$ | $\frac{Btu}{ft^2 \cdot h \cdot ^\circ F}$ |
| $\frac{1}{cm^2 \cdot ^\circ C} \frac{W}{}$           | 1                               | $10^4$                         | 8598,5                                    | 0,23885                                   | 1761                                      |
| $\frac{1}{m^2 \cdot ^\circ C} \frac{W}{}$            | $10^{-4}$                       | 1                              | 0,85985                                   | $2,3885 \cdot 10^{-5}$                    | 0,2048                                    |
| $\frac{1}{m^2 \cdot h \cdot ^\circ C} \frac{Kcal}{}$ | $1,163 \cdot 10^{-4}$           | 4,163                          | 1   | $2,77778 \cdot 10^{-5}$                   | 0,2048                                    |
| $\frac{1}{cm^2 \cdot s \cdot ^\circ C} \frac{cal}{}$ | 4,1868                          | $4,1868 \cdot 10^4$            | $3,6 \cdot 10^4$                          | 1   | 7373                                      |
| $\frac{1}{ft^2 \cdot h \cdot ^\circ F} \frac{Btu}{}$ | $5,681 \cdot 10^{-4}$           | 5,681                          | 4,886                                     | $1,356 \cdot 10^{-4}$                     | 1   |