

# Informations techniques

## Tables de conversion d'unités

m/s  
Kg  
mbar  
Pa  
Nm  
cwt  
oz  
hp  
Torr  
kcal

### Mesures

|        | Kg                     | lb                   | slug                   | oz                 | cwt                    | sh cwt                 |
|--------|------------------------|----------------------|------------------------|--------------------|------------------------|------------------------|
| Kg     | 1                      | 2.205                | $68.522 \cdot 10^{-3}$ | 35.274             | $19.684 \cdot 10^{-3}$ | $22.046 \cdot 10^{-3}$ |
| lb     | 0.454                  | 1                    | $31.081 \cdot 10^{-3}$ | 16                 | $8.929 \cdot 10^{-3}$  | $10 \cdot 10^{-3}$     |
| slug   | 14.594                 | 32.174               | 1                      | 514.785            | 0.287                  | 0.322                  |
| oz     | $28.349 \cdot 10^{-3}$ | $62.5 \cdot 10^{-3}$ | $1.943 \cdot 10^{-3}$  | 1                  | $0.558 \cdot 10^{-3}$  | $0.625 \cdot 10^{-3}$  |
| cwt    | 50.802                 | 112                  | 3.481                  | $1.792 \cdot 10^3$ | 1                      | 1.12                   |
| sh cwt | 45.359                 | 100                  | 3.108                  | $1.6 \cdot 10^3$   | 0.893                  | 1                      |

### Pression

|                           | N/m <sup>2</sup> , Pa | bar                    | mbar               | Torr                    | at                     | lbf/in <sup>2</sup> , psi |
|---------------------------|-----------------------|------------------------|--------------------|-------------------------|------------------------|---------------------------|
| N/m <sup>2</sup> , Pa     | 1                     | $10 \cdot 10^{-6}$     | $10 \cdot 10^{-3}$ | $7.5 \cdot 10^{-3}$     | $9.869 \cdot 10^{-6}$  | $0.145 \cdot 10^{-3}$     |
| bar                       | $100 \cdot 10^3$      | 1                      | $1 \cdot 10^3$     | 750.062                 | 0.987                  | 14.504                    |
| mbar                      | 100                   | $1 \cdot 10^{-3}$      | 1                  | $750.062 \cdot 10^{-3}$ | $0.987 \cdot 10^{-3}$  | $14.504 \cdot 10^{-3}$    |
| Torr                      | 133.322               | $1.333 \cdot 10^{-3}$  | 1.333              | 1                       | $1.316 \cdot 10^{-3}$  | $19.337 \cdot 10^{-3}$    |
| at                        | $101.325 \cdot 10^3$  | 1.013                  | $1.013 \cdot 10^3$ | 760                     | 1                      | 14.696                    |
| lbf/in <sup>2</sup> , psi | $6.895 \cdot 10^3$    | $68.948 \cdot 10^{-3}$ | 68.948             | 51.715                  | $68.046 \cdot 10^{-3}$ | 1                         |

### Travail, énergie

|           | Nm, Ws, J           | erg                 | kWh                     | kpm                    | kcal                    | ft lbf                 |
|-----------|---------------------|---------------------|-------------------------|------------------------|-------------------------|------------------------|
| Nm, Ws, J | 1                   | $10 \cdot 10^6$     | $0.278 \cdot 10^6$      | 0.102                  | $0.239 \cdot 10^{-3}$   | 0.738                  |
| erg       | $0.1 \cdot 10^{-6}$ | 1                   | $27.778 \cdot 10^{-15}$ | $10.197 \cdot 10^{-9}$ | $23.885 \cdot 10^{-12}$ | $73.756 \cdot 10^{-9}$ |
| kWh       | $3.6 \cdot 10^6$    | $36 \cdot 10^{12}$  | 1                       | $0.367 \cdot 10^6$     | 859.845                 | $2.655 \cdot 10^6$     |
| kpm       | 9.807               | $98.067 \cdot 10^6$ | $2.724 \cdot 10^6$      | 1                      | $2.342 \cdot 10^{-3}$   | 7.233                  |
| kcal      | $4.187 \cdot 10^3$  | $41.868 \cdot 10^9$ | $1.163 \cdot 10^3$      | 426.935                | 1                       | $3.088 \cdot 10^3$     |
| ft lbf    | 1.356               | $13.558 \cdot 10^6$ | $0.377 \cdot 10^6$      | 0.138                  | $0.324 \cdot 10^{-3}$   | 1                      |

### Puissance

|              | W, Nm/s, J/s       | kpm/s   | kcal/s                | kcal/h           | hp                     | ft lbf/s           |
|--------------|--------------------|---------|-----------------------|------------------|------------------------|--------------------|
| W, Nm/s, J/s | 1                  | 0.102   | $0.239 \cdot 10^{-3}$ | 0.86             | $1.341 \cdot 10^{-3}$  | 0.738              |
| kpm/s        | 9.807              | 1       | $2.343 \cdot 10^{-3}$ | 8.432            | $13.151 \cdot 10^{-3}$ | 7.233              |
| kcal/s       | $4.187 \cdot 10^3$ | 426.935 | 1                     | $3.6 \cdot 10^3$ | 5.615                  | $3.088 \cdot 10^3$ |
| kcal/h       | 1.163              | 0.119   | $0.278 \cdot 10^{-3}$ | 1                | $1.56 \cdot 10^{-3}$   | 0.858              |
| hp           | 745.7              | 76.040  | 0.178                 | 641.186          | 1                      | 550                |
| ft lbf/s     | 1.356              | 0.138   | $0.324 \cdot 10^{-3}$ | 1.166            | $1.818 \cdot 10^{-3}$  | 1                  |

## Unités de pression en technique du vide

|            | mbar                 | Pascal             | Torr                    | mmWs   | psi                    | inch of Hg            |
|------------|----------------------|--------------------|-------------------------|--------|------------------------|-----------------------|
| mbar       | 1                    | 100                | $750.062 \cdot 10^{-3}$ | 10.2   | $14.504 \cdot 10^{-3}$ | $2.95 \cdot 10^{-2}$  |
| Pascal     | $10 \cdot 10^{-3}$   | 1                  | $7.5 \cdot 10^{-3}$     | 0.102  | $0.145 \cdot 10^{-3}$  | $2.95 \cdot 10^{-4}$  |
| Torr       | 1.333                | 133.332            | 1                       | 13.595 | $19.337 \cdot 10^{-3}$ | $3.937 \cdot 10^{-2}$ |
| mmWs       | $9.81 \cdot 10^{-2}$ | 9.81               | $7.356 \cdot 10^{-2}$   | 1      | $1.422 \cdot 10^{-3}$  | $2.896 \cdot 10^{-3}$ |
| psi        | 68.948               | $6.895 \cdot 10^3$ | 51.715                  | 703    | 1                      | 2.036                 |
| inch of Hg | 33.86                | $3.386 \cdot 10^3$ | 25.4                    | 345    | 0.491                  | 1                     |

## Longueur

|      | mm             | m                    | inch                  | ft                    |
|------|----------------|----------------------|-----------------------|-----------------------|
| mm   | 1              | $1 \cdot 10^{-3}$    | $39.37 \cdot 10^{-3}$ | $3.281 \cdot 10^{-3}$ |
| m    | $1 \cdot 10^3$ | 1                    | 39.37                 | 3.281                 |
| inch | 25.4           | $25.4 \cdot 10^{-3}$ | 1                     | $8.333 \cdot 10^{-2}$ |
| ft   | 304.8          | 0.305                | 12                    | 1                     |

## Surface

|                   | mm <sup>2</sup>     | m <sup>2</sup>         | inch <sup>2</sup>    | ft <sup>2</sup>        |
|-------------------|---------------------|------------------------|----------------------|------------------------|
| mm <sup>2</sup>   | 1                   | $1 \cdot 10^{-6}$      | $1.55 \cdot 10^{-3}$ | $10.764 \cdot 10^{-6}$ |
| m <sup>2</sup>    | $1 \cdot 10^6$      | 1                      | $1.55 \cdot 10^3$    | 10.764                 |
| inch <sup>2</sup> | $0.645 \cdot 10^3$  | $0.645 \cdot 10^{-3}$  | 1                    | $6.944 \cdot 10^{-3}$  |
| ft <sup>2</sup>   | $92.903 \cdot 10^3$ | $92.903 \cdot 10^{-3}$ | 144                  | 1                      |

## Volume

|                   | mm <sup>3</sup>     | m <sup>3</sup>         | inch <sup>3</sup>      | ft <sup>3</sup>        |
|-------------------|---------------------|------------------------|------------------------|------------------------|
| mm <sup>3</sup>   | 1                   | $1 \cdot 10^{-9}$      | $61.024 \cdot 10^{-6}$ | $35.315 \cdot 10^{-9}$ |
| m <sup>3</sup>    | $1 \cdot 10^9$      | 1                      | $61.024 \cdot 10^3$    | 35.315                 |
| inch <sup>3</sup> | $16.387 \cdot 10^3$ | $16.387 \cdot 10^{-6}$ | 1                      | $0.579 \cdot 10^{-3}$  |
| ft <sup>3</sup>   | $28.317 \cdot 10^6$ | $28.317 \cdot 10^{-3}$ | $1.728 \cdot 10^3$     | 1                      |

## Vitesse

|        | m/s   | km/h  | ft/s  | mile/h |
|--------|-------|-------|-------|--------|
| m/s    | 1     | 3.6   | 3.281 | 2.237  |
| km/h   | 0.278 | 1     | 0.911 | 0.621  |
| ft/s   | 0.305 | 1.097 | 1     | 0.682  |
| mile/h | 0.447 | 1.609 | 1.467 | 1      |

## Etanchéité

|                      | kg/m <sup>3</sup>  | g/cm <sup>3</sup>      | lb/inch <sup>3</sup>   | lb/ft <sup>3</sup>     |
|----------------------|--------------------|------------------------|------------------------|------------------------|
| kg/m <sup>3</sup>    | 1                  | $1 \cdot 10^{-3}$      | $36.127 \cdot 10^{-6}$ | $62.428 \cdot 10^{-3}$ |
| g/cm <sup>3</sup>    | $1 \cdot 10^3$     | 1                      | $36.127 \cdot 10^{-3}$ | 62.428                 |
| lb/inch <sup>3</sup> | $27.68 \cdot 10^3$ | 27.68                  | 1                      | $1.728 \cdot 10^3$     |
| lb/ft <sup>3</sup>   | 16.018             | $16.018 \cdot 10^{-3}$ | $0.579 \cdot 10^{-3}$  | 1                      |

## Force

|            | <b>N</b>        | <b>dyn</b>         | <b>kp</b>         | <b>lbf</b>         |
|------------|-----------------|--------------------|-------------------|--------------------|
| <b>N</b>   | 1               | $0.1 \cdot 10^6$   | 0.102             | 0.225              |
| <b>dyn</b> | $10 \cdot 10^6$ | 1                  | $1.02 \cdot 10^6$ | $2.248 \cdot 10^6$ |
| <b>kp</b>  | 9.807           | $0.981 \cdot 10^6$ | 1                 | 2.205              |
| <b>lbf</b> | 4.448           | $0.445 \cdot 10^6$ | 0.454             | 1                  |

## Nombre de tours

|                 | <b>Nm</b> | <b>kpm</b>             | <b>lbf inch</b>       | <b>lbf ft</b>          |
|-----------------|-----------|------------------------|-----------------------|------------------------|
| <b>Nm</b>       | 1         | 0.102                  | 8.851                 | 0.738                  |
| <b>kpm</b>      | 9.807     | 1                      | 86.796                | 7.233                  |
| <b>lbf inch</b> | 0.113     | $11.521 \cdot 10^{-3}$ | 1                     | $83.333 \cdot 10^{-3}$ |
| <b>lbf ft</b>   | 1.355     | $1.38 \cdot 10^{-1}$   | $1.209 \cdot 10^{-1}$ | 1                      |

## Température

|                   | <b>Kelvin</b>                   | <b>Celsius</b>                          | <b>Rankine</b>                          | <b>Fahrenheit</b>                       |
|-------------------|---------------------------------|---|---|---|
| <b>Kelvin</b>     | 1                               | $^{\circ}\text{C} + 273.15$             | $^{\circ}\text{R} \cdot 5/9$            | $(^{\circ}\text{F} + 459.67) \cdot 5/9$ |
| <b>Celsius</b>    | $^{\circ}\text{K} - 273.15$     | 1                                       | $(^{\circ}\text{R} - 491.69) \cdot 5/9$ | $5/9 ^{\circ}\text{F} - 17.778$         |
| <b>Rankine</b>    | $\text{K} \cdot 9/5$            | $(^{\circ}\text{C} \cdot 9/5) + 491.69$ | 1                                       | $^{\circ}\text{F} + 459.67$             |
| <b>Fahrenheit</b> | $9/5 ^{\circ}\text{K} - 459.67$ | $9/5 (^{\circ}\text{C} + 17.778)$       | $^{\circ}\text{R} - 459.67$             | 1                                       |

## Couple

|                 | <b>lbf.inch</b>     | <b>lbf.ft</b>      | <b>kgf.cm</b>       | <b>kgf.m</b>         | <b>cN.m</b> | <b>N.m</b>          |
|-----------------|---------------------|--------------------|---------------------|----------------------|-------------|---------------------|
| <b>lbf.inch</b> | 1                   | $83 \cdot 10^{-3}$ | 1.152               | $11.5 \cdot 10^{-3}$ | 11.3        | $113 \cdot 10^{-3}$ |
| <b>lbf.ft</b>   | 12                  | 1                  | 13.83               | $138 \cdot 10^{-3}$  | 135.6       | 1.356               |
| <b>kgf.cm</b>   | $868 \cdot 10^{-3}$ | $72 \cdot 10^{-3}$ | 1                   | $10 \cdot 10^{-3}$   | 9.807       | $98 \cdot 10^{-3}$  |
| <b>kgf.m</b>    | 86.8                | 7.233              | 100                 | 1                    | 980.7       | 9.807               |
| <b>cN.m</b>     | $88 \cdot 10^{-3}$  | $7 \cdot 10^{-3}$  | $102 \cdot 10^{-3}$ | $1 \cdot 10^{-3}$    | 1           | $10 \cdot 10^{-3}$  |
| <b>N.m</b>      | 8.851               | 0.738              | 10.2                | $102 \cdot 10^{-3}$  | 100         | 1                   |