

## جدول A.1.2 ضرایب تبدیل مفید

(ثقل) شتاب جاذبه

$$g = 9.80665 \text{ m/s}^2$$

$$g = 980.665 \text{ cm/s}^2$$

$$g = 32.174 \text{ ft/s}^2$$

$$1 \text{ ft/s}^2 = 0.304799 \text{ m/s}^2$$

سطح

$$1 \text{ acre} = 4.046856 \times 10^3 \text{ m}^2$$

$$1 \text{ ft}^2 = 0.0929 \text{ m}^2$$

$$1 \text{ in}^2 = 6.4516 \times 10^{-4} \text{ m}^2$$

(دانسیته) چگالی

$$1 \text{ lb}_m/\text{ft}^3 = 16.0185 \text{ kg/m}^3$$

$$1 \text{ lb}_m/\text{gal} = 1.198264 \times 10^2 \text{ kg/m}^3$$

$$0^\circ\text{C}, 760 \text{ mm Hg} \text{ چگالی هوای خشک بر } = 1.2929 \text{ g/L}$$

$$0^\circ\text{C}, 760 \text{ mm Hg} \text{ 1 گاز ایده‌آل بر } 1 \text{ kg mol} = 22.414 \text{ m}^3$$

(ضریب انتشار) قابلیت نفوذ

$$1 \text{ ft}^2/\text{h} = 2.581 \times 10^{-5} \text{ m}^2/\text{s}$$

انرژی

$$1 \text{ Btu} = 1055 \text{ J} = 1.055 \text{ kJ}$$

$$1 \text{ Btu} = 252.16 \text{ cal}$$

$$1 \text{ kcal} = 4.184 \text{ kJ}$$

$$1 \text{ J} = 1 \text{ N m} = 1 \text{ kg m}^2/\text{s}^2$$

$$1 \text{ kW h} = 3.6 \times 10^3 \text{ kJ}$$

آنتالپی

$$1 \text{ Btu/lb}_m = 2.3258 \text{ kJ/kg}$$

نیرو

$$1 \text{ lb}_f = 4.4482 \text{ N}$$

$$1 \text{ N} = 1 \text{ kg m/s}^2$$

$$1 \text{ dyne} = 1 \text{ g cm/s}^2 = 10^{-5} \text{ kg m/s}^2$$

(جریان حرارتی) جریان گرمایی

$$1 \text{ Btu/h} = 0.29307 \text{ W}$$

$$1 \text{ Btu/min} = 17.58 \text{ W}$$

$$1 \text{ kJ/h} = 2.778 \times 10^{-4} \text{ kW}$$

$$1 \text{ J/s} = 1 \text{ W}$$

(شار حرارتی) شار گرمایی

$$1 \text{ Btu}/(\text{h ft}^2) = 3.1546 \text{ W/m}^2$$

ضریب انتقال حرارت

$$1 \text{ Btu}/(\text{h ft}^2 ^\circ\text{F}) = 5.6783 \text{ W}/(\text{m}^2 \text{ K})$$

$$1 \text{ Btu}/(\text{h ft}^2 ^\circ\text{F}) = 1.3571 \times 10^{-4} \text{ cal}/(\text{s cm}^2 ^\circ\text{C})$$

طول

$$1 \text{ ft} = 0.3048 \text{ m}$$

$$1 \text{ micron} = 10^{-6} \text{ m} = 1 \mu\text{m}$$

$$1 \text{ Å} = 10^{-10} \text{ m}$$

$$1 \text{ in} = 2.54 \times 10^{-2} \text{ m}$$

$$1 \text{ mile} = 1.609344 \times 10^3 \text{ m}$$

جرم

$$1 \text{ carat} = 2 \times 10^{-4} \text{ kg}$$

$$1 \text{ lb}_m = 0.45359 \text{ kg}$$

$$1 \text{ lb}_m = 16 \text{ oz} = 7000 \text{ grains}$$

$$1 \text{ ton (metric)} = 1000 \text{ kg}$$

ضریب انتقال جرم

$$1 \text{ lb mol}/(\text{h ft}^2 \text{ mol fraction}) = 1.3562 \times 10^{-3} \text{ kg mol}/(\text{s m}^2 \text{ mol fraction})$$

توان

$$1 \text{ hp} = 0.7457 \text{ kW}$$

$$1 \text{ W} = 14.34 \text{ cal/min}$$

$$\begin{aligned} 1 \text{ hp} &= 550 \text{ ft lb}_f/\text{s} \\ 1 \text{ Btu/h} &= 0.29307 \text{ W} \\ 1 \text{ hp} &= 0.7068 \text{ Btu/s} \\ 1 \text{ J/s} &= 1 \text{ W} \end{aligned}$$

فشار

$$\begin{aligned} 1 \text{ psia} &= 6.895 \text{ kPa} \\ 1 \text{ psia} &= 6.895 \times 10^3 \text{ N/m}^2 \\ 1 \text{ bar} &= 1 \times 10^5 \text{ Pa} = 1 \times 10^5 \text{ N/m}^2 \\ 1 \text{ Pa} &= 1 \text{ N/m}^2 \\ 1 \text{ mm Hg (0}^\circ\text{C)} &= 1.333224 \times 10^2 \text{ N/m}^2 \\ 1 \text{ atm} &= 29.921 \text{ in. Hg at } 0^\circ\text{C} \\ 1 \text{ atm} &= 33.90 \text{ ft H}_2\text{O at } 4^\circ\text{C} \\ 1 \text{ atm} &= 14.696 \text{ psia} = 1.01325 \times 10^5 \text{ N/m}^2 \\ 1 \text{ atm} &= 1.01325 \text{ bar} \\ 1 \text{ atm} &= 760 \text{ mm Hg at } 0^\circ\text{C} = 1.01325 \times 10^5 \text{ Pa} \\ 1 \text{ lb}_f/\text{ft}^2 &= 4.788 \times 10^2 \text{ dyne/cm}^2 = 47.88 \text{ N/m}^2 \end{aligned}$$

گرمای ویژه

$$\begin{aligned} 1 \text{ Btu}/(\text{lb}_m \text{ } ^\circ\text{F}) &= 4.1865 \text{ J}/(\text{g K}) \\ 1 \text{ Btu}/(\text{lb}_m \text{ } ^\circ\text{F}) &= 1 \text{ cal}/(\text{g } ^\circ\text{C}) \end{aligned}$$

دما

$$\begin{aligned} T_{^\circ\text{F}} &= T_{^\circ\text{C}} \times 1.8 + 32 \\ T_{^\circ\text{C}} &= (T_{^\circ\text{F}} - 32)/1.8 \end{aligned}$$

ضریب هدایت حرارتی

$$\begin{aligned} 1 \text{ Btu}/(\text{h ft } ^\circ\text{F}) &= 1.731 \text{ W}/(\text{m K}) \\ 1 \text{ Btu in.}/(\text{ft}^2 \text{ h } ^\circ\text{F}) &= 1.442279 \times 10^{-2} \text{ W}/(\text{m K}) \end{aligned}$$

(ویسکوزیته) گرانیوی

$$\begin{aligned} 1 \text{ lb}_m/(\text{ft h}) &= 0.4134 \text{ cp} \\ 1 \text{ lb}_m/(\text{ft s}) &= 1488.16 \text{ cp} \\ 1 \text{ cp} &= 10^{-2} \text{ g}/(\text{cm s}) = 10^{-2} \text{ poise} \\ 1 \text{ cp} &= 10^{-3} \text{ Pa s} = 10^{-3} \text{ kg}/(\text{m s}) = 10^{-3} \text{ N s/m}^2 \\ 1 \text{ lb}_f \text{ s}/\text{ft}^2 &= 4.7879 \times 10^4 \text{ cp} \\ 1 \text{ N s/m}^2 &= 1 \text{ Pa s} \\ 1 \text{ kg}/(\text{m s}) &= 1 \text{ Pa s} \end{aligned}$$

حجم

$$\begin{aligned} 1 \text{ ft}^3 &= 0.02832 \text{ m}^3 \\ 1 \text{ U.S. gal} &= 3.785 \times 10^{-3} \text{ m}^3 \\ 1 \text{ L} &= 1000 \text{ cm}^3 \\ 1 \text{ m}^3 &= 1000 \text{ L} \\ 1 \text{ U.S. gal} &= 4 \text{ qt} \\ 1 \text{ ft}^3 &= 7.481 \text{ U.S. gal} \\ 1 \text{ British gal} &= 1.20094 \text{ U.S. gal} \end{aligned}$$

کار

$$\begin{aligned} 1 \text{ hp h} &= 0.7457 \text{ kW h} \\ 1 \text{ hp h} &= 2544.5 \text{ Btu} \\ 1 \text{ ft lb}_f &= 1.35582 \text{ J} \end{aligned}$$

جدول A.1.3 ضرایب تبدیل فشار

	lb <sub>f</sub> /in. <sup>2</sup>	kPa	kg <sub>f</sub> /cm <sup>2</sup>	in. Hg (at 21°C)	mm Hg (at 21°C)	in. H <sub>2</sub> O (at 21°C)	atm
1 lb <sub>f</sub> /in. <sup>2</sup>	= 1	689.473 × 10 <sup>-2</sup>	0.07031	2.036	51.715	27.71	0.06805
1 kPa	= 0.1450383	1	101.972 × 10 <sup>-4</sup>	0.2952997	7.5003	4.0188	986.923 × 10 <sup>-5</sup>
1 kg <sub>f</sub> /cm <sup>2</sup>	= 14.2234	980.665 × 10 <sup>-1</sup>	1	28.959	735.550	394.0918	967.841 × 10 <sup>-3</sup>
1 in. Hg (21°C)	= 0.4912	338.64 × 10 <sup>-2</sup>	0.03452	1	25.40	13.608	0.03342
1 mm Hg (21°C)	= 0.01934	0.1333273	1.359 × 10 <sup>-3</sup>	0.03937	1	0.5398	1.315 × 10 <sup>-3</sup>
1 in. H <sub>2</sub> O (21°C)	= 0.03609	24.883 × 10 <sup>-2</sup>	2.537 × 10 <sup>-3</sup>	0.0735	1.8665	1	2.458 × 10 <sup>-3</sup>
1 atm	= 14.6959	101.3251	1.03323	29.9212	760	406	1