

SI ()

8. SI

1)

SI

5

SI

5. SI

양	단위의 명칭	단위기호	정의
시간	분	min	1 min = 60 s
	시	h	1 h = 60 min
	일	d	1 d = 24 h
평면각	도	°	1° = (π/180) rad
	분	'	1' = (1/60)°
	초	"	1" = (1/60)'
부피	리터	ℓ	1 ℓ = 1 dm³
질량	톤	t	1 t = 10³ kg

2)

SI

6

SI

6.

SI

양	단위	기호	정의
선밀도	tex	tex	1 tex = 10 ⁻⁶ kg/m
에너지	kilowatthour	KWh	1 KWh = 3.6 MJ
	electronvolt	eV	1 eV = 1.602 × 10 ⁻¹⁹ J
면적	barn	b	1 b = 10 ⁻²⁸ m²
	hectare	ha	1 ha = 10 ⁴ m²
길이		AuU	1 AuU = 1.496 × 10 ¹¹ m
	parsec	pc	1 pc = 3.086 × 10 ¹⁶ m
압력	bar	bar	1 bar = 10 ⁵ Pa
원자질량		u	1 u = 1.660 × 10 ⁻²⁷ kg
방사능	curie	Ci	1 Ci = 3.7 × 10 ¹⁰ Bq
조사선량	roentgen	r	1 r = 2.58 × 10 ⁻⁴ C/kg
흡수선량	rad	rd	1 rd = 0.01 Gy

3) 10

4 5 6

. ml, 가 MeV .

4)

5 6 SI 10

가 . kg/h, km/h .

9. SI

1) SI .

m *m*

2)

.()

watt(from James Watt)

3)

.(가 .)

W(Watt) Hz(Hertz)

4)

s() kg()

5) 가

(가) MW

6) 가 .

second() SI 가 s .

10m (10metres)

10ms (10milliseconds)

7) 가 .

가 .

8) 10 가 .

1000 cubic centimeters = 1 litre

millilitre(ml)

9) 가 “litre” “tonne”

l 1 l

tonne(, 1000kg) t

imperial ton(, 2240 lb=1016.047kg)

ton tonne

가 tonne metrictonne(

)

10)

1 .

newton metre

(: meter)

1 .

가 .

. ,

.

ms (metre second)

ms (millisecond)

N'm or N · m (Newton metre)

11) 가

3가 가 . 가 metre per second m/s or $\frac{m}{s}$ or ms^{-1}

.

: (/)

가 . 가 2

가 .

metres per second ms^{-1} m/s .

가

.

volt(V)

.

$V=kg\ m^2\ s^{-3}\ A^{-1}$ or

$V=kg\ m^2 / (s^3\ A)$

$V=kg\ m^2 / s^3 / A$

.

가

가

. 가

가

가

12)

kg (kilogram)

kHz (kilohertz)

MHz(megahertz)

13)

14)

가

가

15)

(-, hyphen)

,

16)

(metre)

100 1

,

micrometer

SI 10

(gram)

milligram, micro kilogram(×)

17)

45,000m 45.000km가

18)

가 0.1 1000

. 0.00005 50 μ m가

19) 가

mm

20)

가 가

megohm, not megaohm

21) , m, kg, s SI 10

가

6.2mms⁻¹ 6.2 $\times$ 10⁻³ms⁻¹

22)

(,)

(,)

4.25m 4,25m

가

L 4.25 L 4.25

1 0

(copy)

0.25, not.25m

3

30 000

30 000 000

1000

. 4 가

.

3000

5

3

1

.

3 000 000

.

4321. 1234

54 321. 123 45

.

2 000

19 000

425 321

23) 가

가

.

‘pH’

.

SI

moles per cubic metre(mol m^{-3})

moles

per cubic decimeter(mol dm^{-3}), moles per litre(mol l^{-1})

. mole

.

, ,

mole

.

gram-ion,

gram-molecule

.

(Na_2CO_3) 1mole 106grams
 (sodium earbonate) 106grams (sodium ions) 2moles
 (sulphate ions) 1mole 96grams
 (equivalent weight) (normality)
 mol 1litre 1mole(mol l^{-1})
 “ ” “ (mole) ”
 “ ” 1 (molal)
 1kilogram 1mole
 () SI mol kg^{-1} ,

m

SI

7.

양	—로부터	S I 단위
density of water	62.5 lb/ft ³ or 1 g/cm ³	$1 \times 10^3 \text{ kg m}^{-3}$
heat capacity of water	1 Btu/(lb degF)	$4.187 \times 10^3 \text{ J kg}^{-1} \text{ K}^{-1}$
thermal conductivity of water	0.34 Btu/(ft h degF)	$5886 \times 10^{-3} \text{ W m}^{-1} \text{ K}^{-1}$
latent heat of water	970.3 Btu/lb	$2.257 \times 10^6 \text{ J kg}^{-1}$
viscosity of water	1 centipoise	$1 \times 10^{-3} \text{ Pa s}$
atmospheric pressure	14.7 lb/in ² or 760 mm Hg	$101.3 \times 10^3 \text{ Pa}$
specific volume of air at S.T.P.	13.1 ft ³ /lb	$0.8177 \text{ m}^3 \text{ kg}^{-1}$
universal gas constant R	1.986 Btu/(lb mol degR) or $8.314 \times 10^7 \text{ erg/(mol K)}$	$8.314 \text{ J mol}^{-1} \text{ K}^{-1}$
standard temperature	0 °C	273.1 K
standard pressure	1 atm or 760 mm Hg or 14.7 lb/in ²	$101.3 \times 10^3 \text{ Pa}$ or 1.013 bar
volume of 1 mole of gas at S.T.P. (N.T.P.)	359 ft ³ /(lb mol)	$22.41 \times 10^{-3} \text{ m}^3 \text{ mol}^{-1}$
gravitational acceleration	32.2 ft/s ² or $4.18 \times 10^8 \text{ ft/h}^2$	9.807 m s^{-2}
Avogadro constant		$602.5 \times 10^{21} \text{ mol}^{-1}$
Boltzmann constant	$138.1 \times 10^{-16} \text{ erg } ^\circ\text{C}^{-1}$	$13.81 \times 10^{-24} \text{ J K}^{-1}$
Stefan-Boltzmann constant	$56.69 \times 10^{-8} \text{ erg cm}^{-2} \text{ s}^{-1} \text{ } ^\circ\text{C}^{-1}$	$56.69 \times 10^{-9} \text{ W m}^{-2} \text{ K}^{-4}$
Planck constant	$66.25 \times 10^{-27} \text{ erg s}$	$662.5 \times 10^{-36} \text{ J s}$

pH

(hydrogen ion)

pH

mol dm⁻³

10.

7 8

가

() ASTM

9

가

가

1.

oz/yd² → kg/m²

1 oz = 0.02835kg

1 yd² = 0.83610m²

$$\frac{0.02835\text{kg}}{0.83610\text{m}^2} = 0.03391\text{kg/m}^2$$

0.03391

3.391 × 10⁻²

2.

oz/(min · in) → kg/(s · m)

1oz = 0.02835kg

1min = 60s

1in = 0.02540m

$$\frac{0.02835\text{kg}}{60\text{s} \cdot 0.02540\text{m}} = 0.01860\text{kg}/(\text{s} \cdot \text{m})$$

0.01860

1.860 × 10⁻²

양	~로부터	S I 단위
mass	1 ounce	$28.35 \times 10^{-3} \text{ kg}$
	1 pound	$453.6 \times 10^{-3} \text{ kg}$
	1 ton	$1.016 \times 10^3 \text{ kg}$
length	1 inch	$25.40 \times 10^{-3} \text{ m}$
	1 foot	0.3048 m
	1 mile	$1.609 \times 10^3 \text{ m}$
	1 ångström	$0.1 \times 10^{-9} \text{ m}$
time	1 minute	60 s
	1 hour	$3.6 \times 10^3 \text{ s}$
	1 day	$86.40 \times 10^3 \text{ s}$
	1 year	$31.54 \times 10^6 \text{ s}$
area	1 in ²	$645.2 \times 10^{-6} \text{ m}^2$
	1 ft ²	$92.90 \times 10^{-3} \text{ m}^2$
	1 mile ²	$2.590 \times 10^6 \text{ m}^2$
volume	1 in ³	$16.39 \times 10^{-6} \text{ m}^3$
	1 ft ³	$28.32 \times 10^{-3} \text{ m}^3$
	1 gallon (Imperial)	$4.546 \times 10^{-3} \text{ m}^3$
	1 gallon (U.S.)	$3.785 \times 10^{-3} \text{ m}^3$
velocity	1 ft/s	$304.8 \times 10^{-3} \text{ m s}^{-1}$
	1 mile/h	$446.9 \times 10^{-3} \text{ m s}^{-1}$
acceleration	1 ft/s ²	$304.8 \times 10^{-3} \text{ m s}^{-2}$
density	1 lb/ft ³	16.02 kg m^{-3}
mass flow	1 lb/h	$126.0 \times 10^{-6} \text{ kg s}^{-1}$
	1 ton/h	$282.2 \times 10^{-3} \text{ kg s}^{-1}$
volumetric flow	1 ft ³ /s	$28.30 \times 10^{-3} \text{ m}^3 \text{ s}^{-1}$
	1 ft ³ /h	$7.886 \times 10^{-6} \text{ m}^3 \text{ s}^{-1}$
	1 U.K. gal/h	$1.263 \times 10^{-6} \text{ m}^3 \text{ s}^{-1}$
force (weight)	1 kg force	(1 kg force (1 kgf))
	1 lb force (1 lbf)	4.448 N
	1 ton force (1 tonf)	$9.964 \times 10^3 \text{ N}$
energy (work and heat)	1 ft lb	1.356 J
	1 Btu	$1.055 \times 10^3 \text{ J}$
	1 kWh	$3.6 \times 10^6 \text{ J}$
	1 calorie	4.187 J
	1 erg	$0.1 \times 10^{-6} \text{ J}$
	1 therm	$105.5 \times 10^6 \text{ J}$
	1 kcal/mole	$4.187 \times 10^3 \text{ J mol}^{-1}$
power	1 h.p.	745.7 W
	1 erg/s	$0.1 \times 10^{-6} \text{ W}$
	1 ft lb/s	1.356 W
pressure	1 lbf/in ²	$6.895 \times 10^3 \text{ Pa}$
	1 lbf/ft ²	47.88 Pa
	1 tonf/in ²	$15.44 \times 10^6 \text{ Pa}$
	1 atm (standard)	$101.32 \times 10^3 \text{ Pa}$
	1 atm (1 kg/cm ²)	$98.07 \times 10^3 \text{ Pa}$
	1 ft water	$2.989 \times 10^3 \text{ Pa}$
	1 in Hg	$3.386 \times 10^3 \text{ Pa}$
	1 ton (1 mm Hg)	133.3 Pa
dynamic viscosity	1 poise (1 g/(cm s))	0.1 Pa s
	1 lb/ft h	$413.4 \times 10^{-6} \text{ Pa s}$
	1 lb/ft s	1.488 Pa s
kinematic viscosity	1 stroke (1 cm ² /s)	$0.1 \times 10^{-3} \text{ m}^2 \text{ s}^{-1}$
	1 ft ² /h	$25.81 \times 10^{-6} \text{ m}^2 \text{ s}^{-1}$
	1 ft ² /s	$92.90 \times 10^{-3} \text{ m}^2 \text{ s}^{-1}$
surface tension	1 dyne/cm ²	
heat flow	1 Btu/h	$293.1 \times 10^{-3} \text{ W}$
enthalpy (calorific value)	1 Btu/lb	$2.326 \times 10^3 \text{ J kg}^{-1}$
	1 Btu/ft ³	$37.26 \times 10^3 \text{ J m}^{-3}$
heat capacity	1 Btu/(lb degF)	$4.187 \times 10^3 \text{ J mol}^{-1}$
specific volume	1 ft ³ /lb	$62.42 \times 10^{-3} \text{ m}^3 \text{ kg}^{-1}$
entropy	1 Btu/(lb degR)	$4.187 \times 10^3 \text{ J kg}^{-1} \text{ K}^{-1}$
rate of heat transfer	1 Btu/(ft ² h)	3.155 W m^{-2}
	1 kcal/(m ² h)	1.163 W m^{-2}
heat transfer coefficient	1 Btu/(ft ² h degF)	$5.678 \text{ W m}^{-2} \text{ K}^{-1}$
	1 kcal/(m ² h °C)	$1.163 \text{ W m}^{-2} \text{ K}^{-1}$
thermal conductivity	1 Btu/(ft h degF)	$1.731 \text{ W m}^{-1} \text{ K}^{-1}$
	1 kcal/(m h °C)	$1.163 \text{ W m}^{-1} \text{ K}^{-1}$

diffusivity	1 ft ² /s	92.90 × 10 ⁻³ m ² s ⁻²
	1 cm ² /s	0.1 × 10 ⁻³ m ² s ⁻²
rate of diffusion	1 lb mol/(ft ² h)	1.356 × 10 ⁻³ mol m ⁻² s ⁻¹
mass transfer coefficient	1 lb mol/ft ² h Δc)	1.356 × 10 ⁻³ mol m ⁻² s ⁻¹ Δc ⁻¹
concentration	1 lb mol/ft ³	16.03 × 10 mol m ⁻³
superficial mass velocity	1 lb/ft ² h	1.356 × 10 ⁻³ kg m ⁻² s ⁻¹
humid heat	1 Btu/(lb dry gas degF)	4.187 × 10 ⁻³ J kg ⁻¹ K ⁻¹
yarn count	1 tex	1 × 10 ⁻³ g m ⁻¹
	1 denier	0.1111 g m ⁻¹
tensile strength	1 kgf/mm ²	9.807 × 10 ⁶ Pa

9.

		SI 단위	곱하는 값
Air Permeability	(cubic foot of air per minute) per square foot of fabric; pressure drop of 0.5 inch of water	(m ³ of air/s)/m ² of fabric; pressure drop of 124 pascals	0.005 088
Beading Rigidity	gram-force square millimeter, gf-mm ²	millinewton square millimeter, mN-mm ²	9.807
Breaking Load, Tearing Strength	gram-force, gf kilogram-force, kgf pound-force, lbf	millinewton, mN newton, N newton, N	9.807 9.807 4.448
Breaking Tenacity	gram-force per denier, gf/den gram-force per tex, gf/tex	kilometre, km, of breaking length kilometre, km, of breaking length	9.000* 1.000*
Bursting Pressure	pound-force per square inch, psi, lbf/in. ²	kilopascal, kPa	6.895
Density, Bale Density	gram per cubic centimeter, g/cm ³ pound per cubic foot, lb/ft ³	kilogram per cubic metre, kg/m ³ kilogram per cubic metre, kg/m ³	1000.* 16.02
Fabric Areal Density	thousandth of an ounce per square inch, 0.001 oz/in. ²	gram per square metre, g/m ²	43.94
Fabric Mass Per Unit Area, Fabric Weight	ounce per square yard, oz/yd ²	gram per square metre, g/m ²	33.91
Fabric Yield (Areal)	square yard per pound, yd ² /lb	square metre per kilogram, m ² /kg	1.843
Fabric Yield (Linear)	yard per pound, yd/lb	metre per kilogram, m/kg	2.016
Flame Propagation Rate	inch per minute, in./min	millimetre per second, mm/s	0.4233
Mass Burning Rate	gram per second centimeter, g/(s·cm)	gram per second metre, g/(s·m)	100.0*
Mass Transformation Rate	ounce per minute inch, oz/(min·in.)	gram per second metre, g/(s·m)	18.60
Irradiance, Radiant Heat Flux Density	Btu (thermochemical)/(ft ² ·h) cal (thermochemical)/(cm ² ·min) cal (thermochemical)/(cm ² ·s) erg per square centimeter second, erg/(cm ² ·s) watt per square inch, W/in. ²	watt per square metre, W/m ² watt per square metre, W/m ² kilowatt per square metre, kW/m ² milliwatt per square metre, mW/m ² kilowatt per square metre, kW/m ²	3.152 697.3 41.84* 1.000* 1.550
Length, Thickness, Width, Distance, Diameter	angstrom, Å inch, in. micron, μ mil, 0.001 inch yard, yd	nanometre, nm millimetre, mm micrometre, μm micrometre, μm metre, m	0.1000* 25.40* 1.000* 25.40* 0.9144*
Linear Density, Direct Yarn Number	denier, den tex	milligram per metre, mg/m milligram per metre, mg/m	0.1111 1.000*
Surface Tension	dyne per centimeter, dyn/cm erg per square centimeter, erg/cm ²	millinewton per metre, mN/m millinewton per metre, mN/m	1.000* 1.000*
Tensile Strength	kilogram-force per square millimeter, kgf/mm ² pound-force per square inch, lbf/in. ² , psi	megapascal, MPa kilopascal, kPa	9.807 6.895
Twist	turns per inch, turn/in	turn per metre, turn/m	39.37

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