S.I. UNITS 1413

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revision of 1-1995

THE LEGAL MEASURING UNITS = S.I. UNITS

Science and industry will be required to supply all information on their products in units, defined in the international agreement named S.I. (Système International d'Unités). The S.I. is an expansion and rationalization of the metric system.

Since these data are used exclusively in education and science, in due course data given in older conventional units will become increasingly unintelligible to new generations of scientists and technologists who enter industry from school and universities.

The new units required by law will be stated in our data sheets as they are revised and reprinted but for an interim period the customary units will also be given in brackets.

The following is a brief review of S.I. units likely to be used in surface coating technology.

BASIS UNITS (have to be used)

Physical	Unit	Symbol
length	metre	m
mass	kilogram	kg
time	second	s
electric current	ampère	A
(thermodynamical) temperature	kelvin	K
quantity of matter	mol	mol

PREFIXES

Factor	Name	Symbol	Factor	Name	Symbol
10^9	giga	G	$10^{-1} = 0{,}1$	deci	d
$10^6 = 1.000.000$	mega	M	$10^{-2} = 0{,}01$	centi	c
$10^3 = 1.000$	kilo	k	$10^{-3} = 0{,}001$	milli	m
$10^2 = 100$	hecto	h	$10^{-6} = 0{,}000001$	micro	µ
$10^1 = 10$	deca	da	10^{-9}	nano	n

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DERIVED S.I. UNITS (have to be used)

Quantity	Name	Symbol
area	square metre	m^2
volume, capacity	cubic metre	m^3
mass density	kilogram per cubic metre	$kg.m^{-3}$ $(= \frac{kg}{m^3})$
molar concentration	mol per cubic metre	$mol.m^{-3}$ $(= \frac{mol}{m^3})$
frequency	hertz	s^{-1} $(= \frac{1}{s})$ = Hz
force	newton	$kg.m.s^{-2}$ $(= \frac{kg.m}{s^2})$ = N
pressure	pascal	$N.m^{-2}$ $(= \frac{N}{m^2})$ = Pa
energy, work, quantity of heat	joule	N.m = J
power	watt	$J.s^{-1}$ $(= \frac{J}{s})$ = W
electrical potential	volt	$W.A^{-1}$ $(= \frac{W}{A})$ = V
electrical resistance	ohm	$V.A^{-1}$ $(= \frac{V}{A})$ = Ω
surface tension	newton per metre	$N.m^{-1}$ $(= \frac{N}{m})$
specific heat	joule per kilogram kelvin	$J.kg^{-1}.K^{-1}$ $(= \frac{J}{kg.K})$
thermal conductivity	watt per metre kelvin	$W.m^{-1}\ K^{-1}$ $(= \frac{W}{m.K.})$
dynamic viscosity	pascal second	Pa.s

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APPROVED NON S.I. UNITS (may be used)

Quantity	Name	Symbol	Value	
volume, capacity	litre	l	1 dm^3	= $10^{-3}m^3$ (= 0,001 m^3)
time	minute	min	1 min	= 60 s
	hour	h	1 h	= 3600 s
	day	d	1 d	= 86400 s
temperature	degree centigrade	°C	1°C	= 1 K (but K = °C + 273)

CANCELLED UNITS (may not be used anymore)

Conversion in S.I. units of the units used up till now in the paint technology and cancelled per 1st October 1991.

Quantity	Name	to multiply → / to divide ←	S.I. Units
length	micron, mu, µ	1	micrometre, µm
	inch, in, ″	25,4	millimetre, mm
		2,54	centimetre, cm
	foot, ft, ′	30,48	centimetre, cm
	yard, yd	0,9144	metre, m
volume	cc	1	cubic centimetre, cm^3
	fluid ounce, fl oz	28,41	cubic centimetre, cm^3
	pint, pt	0,5683	litre, l
	gallon, UK gal	4,546	litre, l
	gallon, US gal	3,785	litre, l
Note: litre is not a S.I. unit, but remains approved = $10^{-3}m^3$			
frequency, revolutions	revolutions per second	1	hertz, Hz, S^{-1}
	rpm	0,01667	hertz, Hz, S^{-1}
Note: per minute, or min^{-1} is not a S.I. unit, but remains approved			
mass	ounce, oz	28,35	gram, g
	pound, lb	0,4536	kilogram, kg
force	kilogramforce, kgf	9,80665	newton, N
	poundforce, lbf	4,44822	newton, N

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Quantity	Name	to multiply → / to divide ←	S.I. Units
pressure	kgf/cm², at	98,0665	kilopascal, kPa
	mm Hg, (Torr)	0,133332	kilopascal, kPa
	mH_2O (mWK, MWS)	9,80665	kilopascal, kPa
	lbf/in² (psi, pound)	6,89476	kilopascal, kPa
	bar	100	kilopascal, kPa
quantity of heat	calorie, cal	4,1868	joule, J
	kilocalorie, kcal, Cal	4,1868	kilojoule, kJ
power	cal/s	4,1868	watt, W
	kcal/h	0,001163	kilowatt, kW
	m.kgf/s	9,80665	watt, W
	HP (PK, CV, PS)	0,735498	kilowatt, kW
	horsepower, hp	0,7457	kilowatt, kW
temperature	degree Fahrenheit, °F	5/9	degree centigrade, °C
dynamic viscosity	poise	0,1	pascalsecond, Pa.s
kinematic viscosity	stokes	0,0001	$m^2.s^{-1}$