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Lawrence Radiation Laboratory
Berkeley, California

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STANDARD ABBREVIATIONS

February 1966

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STANDARD ABBREVIATIONS*

Lawrence Radiation Laboratory
University of California
Berkeley, California

February 1966

The following abbreviations should be used in UCRL reports and illustrations. Abbreviations not appearing in this list may be used providing they conform to an accepted standard as set forth in one of the references appearing at the end of this list. If there is a conflict between an abbreviation as given by one of the references and as given here, the form given here should be followed for UCRL reports, for this list represents the majority practice among professional scientific societies.

All but the most common abbreviations should be defined where they first appear in an article. An accepted way of doing this is to spell out the term, and follow it with the abbreviation in parentheses. Thereafter the abbreviation alone may be used. Where the first appearance is in an illustration, the abbreviation should be defined below in the legend.

Although some letter symbols are included for convenience, this list is not intended to cover that field. For an authority on letter symbols, consult the appropriate reference at the end of this list.

about (circa—dates only)	ca	approximate(ly)	approx
absolute	abs	approximately equal to	≈
absolute ampere(s)	abamp	asymptotically equal to	~
acceleration due to gravity	g	atmosphere(s) (unit)	atm
alternating current (n) or alternating-current (adj)	ac	atomic mass unit(s)	amu
ampere(s)	A	atomic number	at. no. [or Z]
ampere-hour(s)	Ah	atomic percent	at. %
ampere-turn(s)	A-turn	atomic weight	at. wt. [or A]
and others	et al.	atomic weight unit(s)	awu
angstrom unit(s)	Å	audio frequency (n) or audio-frequency (adj)	af
aperture ratio 16	<u>f</u> /16		

*Supersedes all earlier abbreviation lists.

average	av	cubic foot (feet)	ft ³
barn	b	cubic feet per minute	cfm
billion electron volts	GeV [or BeV]	cubic feet per second	cfs
boiling point	bp	cubic inch(es)	in. ³
British thermal unit(s)	Btu	cubic meter(s)	m ³
calculated	calc	cubic millimeter(s)	mm ³
calorie(s) (gram)	cal	curie(s)	Ci
Calorie(s)	see kcal	cycle(s) per second	cps [or Hz]
capacitance	C	debye	D
center of mass (n) or center-of-mass (adj)	c. m.	decibel(s)	dB
centimeter(s)	cm	degree(s) (angle)	deg
centimeter-gram-second (system)	cgs	degree(s)Celsius(centigrade)	°C
centimeter(s) per second	cm/sec	degree(s)Fahrenheit	°F
Chapter	Chap.	degree(s)Kelvin(absolute)	°K
chemically pure	cp	density	d or ρ
coefficient	coeff	derivative	deriv
compare	cf	deuteron(s)	d
constant	const	diameter	diam
continuous-wave	cw	direct current (n) or direct-current (adj)	dc
coulomb	C	disintegration(s) per sec	dis/sec
counts per minute	counts/min	drawing number	dwg no.
counts per second	counts/sec	edition	ed
cubic	cu [or ³]	editor (editors)	Ed. (Eds.)
cubic centimeter(s)	cm ³ or cc	efficiency	eff

electromagnetic unit(s)	emu	frequency , very low	vlf
electromotive force	emf	, video	vdf
electron volt(s)	eV	frequency modulation	FM
electrostatic unit(s)	esu	functions, hyperbolic:	
entropy unit(s)	eu	cosecant	csch
Equation(s)*	Eq. (Eqs.)	cosine	cosh
equivalent	equiv	cotangent	coth
erg second(s)	erg sec	secant	sech
exponent or exponential	exp	sine	sinh
farad(s)	F	tangent	tanh
feet per minute	fpm	functions, trigonometric:	
feet per second	fps	cosecant	csc
fermi (=10 ⁻¹³ cm)	F	cosine	cos
Figure(Figures)*	Fig. (Figs.)	cotangent	cot
foot (feet)	ft	secant	sec
foot-pound	ft-lb	sine	sin
for example	e. g.	tangent	tan
freezing point	fp	covered sine	covers
frequency	freq	versed sine	vers
frequency , high	hf	gallons per minute	gpm
, low	lf	gauss	G
, medium	mf	Geiger-Mueller	
, super high	shf	[or Müller]	G-M
, ultrahigh	uhf	giga (10 ⁹)	G
, very high	vhf	giga electron volts	GeV
		gram(s)	[or BeV]
		gram calorie(s)	
		gram-molecular volume	gmv
		grams per liter	g/l
		gram(s) per cubic	g/cm ³
		centimeter	or g/cc

* Not abbreviated when it is the first word of a sentence.

gravity, acceleration of	g	kilogauss	kG
henry(s)	H	kilogram(s)	kg
hertz (cycles per second)	Hz	kilogram-meter(s)	kg-m
high explosive	H. E.	kilogram(s) per cubic meter	kg/m ³
high voltage	hv	kilohm	kΩ
horsepower	hp	kilojoule(s)	kJ
hour(s)	h[or hr]	kiloliter(s)	kl
hyperfine structure	hfs	kilomegacycle	kMc
in the place cited	loc. cit.	kilometer(s)	km
in the same place	ibid.	kilometer(s) per second	km/sec
in the work cited	op. cit.	kilo-oersted	kOe
inch(es)	in.	kiloton(s)	kt
inch-pound(s)	in. -lb	kilovolt(s)	kV
inductance	L	kilovolt-ampere(s)	kVA
inductance-capacitance	LC	kilowatt(s)	kW
infrared	ir	kilowatt-hour(s)	kWh
inside diameter	i. d.	kinetic	kin
internal resistance	spell out	kinetic energy	KE
joule(s)	J	laboratory (system)	lab
kilocalorie(s) or kilogramcalorie(s)	kcal	lambert(s)	L
kilocalorie(s) per mole	kcal/mole	lethal dose (subscript denotes percent)	LD ₅₀
kilocycle(s)	kc	liter(s)	spell out
kilocycle(s) per second	kc [or kc/sec]	logarithm, base of natural	e
kilocurie(s)	kCi	logarithm (common)	log
kiloelectron volt(s)	keV		

logarithm (natural)	ln [or log.]	micromho(s)	μmho
mass	spell out	micromicron(s)	$\mu\mu$
maximum	max	micromicrosecond(s) [or picosecond(s),	$\mu\mu\text{sec}$ psec]
maxwell	Mx	micromole(s)	μM
mean free path	mfp	micron	μ
megacurie(s)	MCi	microsecond(s)	μsec
megacycle(s)	Mc	microvolt(s)	μV
megacycle(s) per second	Mc [or Mc/sec]	microwatt(s)	μW
megavolt-ampere(s)	MVA	mil(s)	spell out
megaton(s)	Mt	milliampere(s)	mA
megawatt(s)	MW	milliangstrom(s)	$\text{m}\text{\AA}$
megawatt-hour(s)	MWh	millibarn(s)	mb
megohm(s)	$M\Omega$	millicurie(s)	mCi
melting point	mp	milliequivalents	meq
meter(s)	m	millifarad(s)	mF
meter-kilogram-second (system)	mks	milligram(s)	mg
mho(s)	spell out	milligram percent	mg/100 cc
microampere(s)	μA	millihenry(s)	mH
microangstrom(s)	$\mu\text{\AA}$	millilambert(s)	mL
microcoulomb(s)	μC	milliliter(s)	ml
microcurie(s)	μCi	milli-mass units	mmu
microfarad(s)	μF	millimeter(s)	mm
microgram(s)	μg	millimeter(s) of mercury [1 torr]	mm Hg
microhenry(s)	μH	millimho(s)	mmho
microliter	μl	millimicron(s)	$\text{m}\mu$

millimicrosecond(s) [or nanosecond(s),	mμsec nsec]	nuclear magneton	nm
millimole(s)	mM	nucleon(s)	N
million electron volts	MeV	Number(s)*	No. (Nos.)
million volts	MV	observed	obs
milliradian(s)	mr	oersted	Oe
milliroentgen(s)	mR	ohm(s)	Ω
millisecond(s)	msec	optical density	OD
millivolt(s)	mV	outside diameter	o. d.
milliwatt(s)	mW	page	p.
minimum	min	pages	pp.
minute(s)(angular measure)	'	part(s) per million	ppm
minute(s)(time)	min	percent	%
molar (with number only, e. g. 0.5 <u>M</u>)	<u>M</u>	pico (10 ⁻¹²)	p
mole	spell out	picofarad	pF
mole percent	<u>M</u> % [or mole %]	pound(s) per square inch	psi
molecular weight	mol wt	pound(s) per square inch, absolute	psia
motor generator (n or adj)	m. g.	pound(s) per square inch, gauge	psig
nano (10 ⁻⁹)	n	proportional to (or varies as)	∝
nanosecond(s)	nsec	proton(s)	p
natural logarithm	ln [or log _e]	pulse(s) per second	pps
neutron(s)	n	radian	rad
normal (solutions; with numbers only, e. g. 0.5 <u>N</u>)	<u>N</u>	radiation absorbed dose	rad
		radio frequency (n) or radio-frequency (adj)	rf

*Not abbreviated when it is the first word of a sentence.

rate of flow	Rf	square meter(s)	m ²
relative biological effectiveness (of radiation)	RBE	square micron(s)	μ ²
resistance	R	square millimeter(s)	mm ²
revolutions per minute	rpm	standard	std
revolutions per second	rps	standard cubic feet	scf
roentgen(s)	R	standard temperature and pressure	STP
roentgen equivalent, man	rem	steradian(s)	sr
roentgen equivalent, physical	rep	temperature	temp
root-mean-square	rms	that is	i. e.
second(s) (angular measure)	"	thermocouple	TC
second(s) (time)	sec	thousand electron volts	keV
Section(s)*	Sec. (Secs.)	thousand tons	kt
soluble	sol	ton(s)	spell out
solution	soln	torr [1 mm Hg]	spell out
specific activity	sp act.	triton(s)	t
specific gravity	sp gr	ultrahigh frequency	uhf
specific heat	sp ht	ultraviolet	uv
specific volume	sp vol	velocity	v
speed of light	c	versus	vs
square	sq or ²	volt(s)	V
square centimeter(s)	cm ²	volt-ampere(s)	VA
square foot (feet)	ft ²	volume	vol
square inch(es)	in. ²	volume percent	vol %
square kilometer(s)	km ²	watt(s)	W
		watt-hour	Wh

*Not abbreviated when it is the first word of a sentence.

weight	wt	year(s)	yr
weight percent	wt %		

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(American Society of Mechanical Engineers, New York, 1941).

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about (circa--dates only)	ca	aperture ratio 16	$f/16$
absolute	abs	approximate(ly)	approx
absolute ampere(s)	abamp	approximately equal to	\approx
acceleration due to gravity	g	asymptotically equal to	\sim
alternating current (n) or alternating-current (adj)	ac	atmosphere(s) (unit)	atm
ampere(s)	A	atomic mass unit(s)	amu
ampere-hour(s)	Ah	atomic number	at. no. [or Z]
ampere-turn(s)	A-turn	atomic weight	at. wt [or A]
and others	et al.	atomic weight unit(s)	awu
angstrom unit(s)	Å	audio frequency (n) or audio-frequency (adj)	af
antilogarithm	antilog	average	av

*Supersedes all earlier abbreviation lists.

barn	b	cubic inch(es)	in. ³
billion electron volts	BeV [or GeV]	cubic meter(s)	m ³
boiling point	bp	cubic micron(s)	μ^3
British thermal unit(s)	Btu	cubic millimeter(s)	mm ³
calculated	calc	curie(s)	Ci
calorie(s) (gram)	cal	cycle(s) per second	cps [or Hz]
Calorie(s)	see kcal	decibel(s)	dB
capacitance	C	degree(s) (angle)	deg
center of mass (n) or center-of-mass (adj)	c. m.	degree(s) Celsius (centigrade)	°C
centimeter(s)	cm	degree(s) Fahrenheit	°F
centimeter-gram-second (system)	cgs	degree(s) Kelvin (absolute)	°K
centimeter(s) per second	cm/sec	density	d or ρ
Chapter	Chap.	derivative	deriv
chemically pure	cp	deuteron(s)	d
coefficient	coeff	diameter	diam
compare	cf	direct current (n) or direct-current (adj)	dc
constant	const	drawing number	dwg no.
continuous-wave	cw	disintegration(s) per sec	dis/sec
coulomb	C	edition	ed
counts per minute	counts/min	editor (editors)	Ed. (Eds.)
counts per second	counts/sec	efficiency	eff
cubic	cu[or ³]	electromagnetic unit(s)	emu
cubic centimeter(s)	cm ³ or cc	electromotive force	emf
cubic foot (feet)	ft ³	electron volt(s)	eV
cubic feet per minute	cfm	electrostatic unit(s)	esu
cubic feet per second	cfs	entropy unit(s)	eu

Equation(s)*	Eq. (Eqs.)	functions, trigonometric:	
equivalent	equiv	cosecant	csc
		cosine	cos
		cotangent	cot
erg second(s)	erg sec	secant	sec
		sine	sin
exponent or exponential	exp	tangent	tan
		covered sine	covers
farad(s)	F	versed sine	vers
feet per minute	fpm	gauss	G
feet per second	fps	Geiger-Mueller	G-M
fermi ($=10^{-13}$ cm)	F	giga electron volts	GeV[or BeV]
Figure (Figures)*	Fig. (Figs.)	gram(s)	g
foot (feet)	ft	gram calorie(s)	cal
foot-pound	ft-lb	gram-molecular volume	gmv
for example	e. g.	grams per liter	g/l
freezing point	fp	gram(s) per cubic centimeter	g/cm^3 or g/cc
frequency	freq	gravity, acceleration of	g
frequency, high	hf	henry(s)	H
, low	lf	hertz (cycles per second)	Hz
, medium	mf	high explosive	H. E.
, super high	shf	high voltage	hv
, ultrahigh	uhf	horsepower	hp
, very high	vhf	hour(s)	h[or hr]
, very low	vlf	hyperfine structure	hfs
, video	vdf	in the place cited	loc. cit.
frequency modulation	FM	in the same place	ibid.
functions, hyperbolic:		in the work cited	op. cit.
cosecant	csch	inch(es)	in.
cosine	cosh	inch-pound(s)	in. -lb
cotangent	coth		
secant	sech		
sine	sinh		
tangent	tanh		

*Not abbreviated when it is the first word of a sentence.

inductance	L	kilowatt(s)	kW
inductance-capacitance	LC	kilowatt-hour(s)	kWh
infrared	ir	kinetic	kin
inside diameter	i. d.	kinetic energy	KE
internal resistance	spell out	laboratory (system)	lab
joule(s)	J	lambert(s)	L
kilocalorie(s) or kilogramcalorie(s)	kcal	lethal dose (subscript denotes percent)	LD ₅₀
kilocalorie(s) per mole	kcal/mole	liter(s)	spell out
kilocycle(s)	kc	logarithm, base of natural	e
kilocycle(s) per second	kc[or kc/sec]	logarithm (common)	log
kilocurie(s)	kCi	logarithm (natural)	ln or log _e
kiloelectron volt(s)	keV	mass	spell out
kilogauss	kG	maximum	max
kilogram(s)	kg	maxwell	Mx
kilogram-meter(s)	kg-m	mean free path	mfp
kilogram(s) per cubic meter	kg/m ³	megacurie(s)	MCi
kilohm	kΩ	megacycle(s)	Mc
kilojoule(s)	kJ	megacycle(s) per second	Mc [or Mc/sec]
kiloliter(s)	kl	megavolt-ampere(s)	MVA
kilomegacycle	kMc	megaton(s)	Mt
kilometer(s)	km	megawatt(s)	MW
kilometer(s) per second	km/sec	megawatt-hour(s)	MWh
kilo-oersted	kOe	megohm(s)	MΩ
kiloton(s)	kt	melting point	mp
kilovolt(s)	kV	meter(s)	m
kilovolt-ampere(s)	kVA		

meter-kilogram- second (system)	mks	milligram(s)	mg
mho(s)	spell out	milligram percent	mg/100 cc
microampere(s)	μA	millihenry(s)	mH
microangstrom(s)	$\mu\text{\AA}$	millilambert(s)	mL
microcoulomb(s)	μC	milliliter(s)	ml
microcurie(s)	μCi	milli-mass units	mmu
microfarad(s)	μF	millimeter(s)	mm
microgram(s)	μg	millimeter(s) of mercury	mm Hg
microhenry(s)	μH	millimho(s)	mhmho
microliter	μl	millimicron(s)	m μ
micromho(s)	μmho	millimicrosecond(s) [or nanosecond(s), nsec]	m μsec nsec
micromicrofarad(s)	$\mu\mu\text{F}$	millimole(s)	mM
micromicron(s)	$\mu\mu$	million electron volts	MeV
micromicrosecond(s) [or picosecond(s), psec]	$\mu\mu\text{sec}$ psec	million volts	MV
micromole(s)	μM	milliradian(s)	mr
micron	μ	milliroentgen(s)	mR
microsecond(s)	μsec	millisecond(s)	msec
microvolt(s)	μV	millivolt(s)	mV
microwatt(s)	μW	milliwatt(s)	mW
mil(s)	spell out	minimum	min
milliampere(s)	mA	minute(s)(angular measure)	'
milliangstrom(s)	$\text{m}\text{\AA}$	minute(s)(time)	min
millibarn(s)	mb	molar (with number only, e. g. 0.5 <u>M</u>)	<u>M</u>
millicurie(s)	mCi	mole	M
millifarad(s)	mF		

mole percent	M% [or mole %]	proportional to (or varies as)	\propto
molecular weight	mol wt	proton(s)	p
motor generator (n or adj)	m. g.	pulse(s) per second	pps
nanosecond(s)	nsec	radian	rad
natural logarithm	ln	radio frequency (n) or radio-frequency (adj)	rf
neutron(s)	n	rate of flow	Rf
normal (solutions; with numbers only, e. g. 0.5 <u>N</u>)	<u>N</u>	relative biological effec- tiveness (of radiation)	RBE
nuclear magneton	nm	resistance	R
nucleon(s)	N	revolutions per minute	rpm
Number(s)*	No. (Nos.)	revolutions per second	rps
observed	obs	roentgen(s)	R
oersted	Oe	roentgen equivalent, man	rem
ohm(s)	Ω	roentgen equivalent, physical	rep
optical density	OD	root-mean-square	rms
outside diameter	o. d.	second(s) (angular measure)	"
page	p.	second(s) (time)	sec
pages	pp.	Section(s)*	Sec. (Secs.)
part(s) per million	ppm	soluble	sol
percent	%	solution	soln
picofarad	pF	specific activity	sp act.
pound(s) per square inch	psi	specific gravity	sp gr
pound(s) per square inch, absolute	psia	specific heat	sp ht
pound(s) per square inch, gauge	psig	specific volume	sp vol

*Not abbreviated when it is the first word of a sentence.

speed of light	c	volume	vol
square	sq	volume percent	vol %
square centimeter(s)	cm ²	watt(s)	W
square foot (feet)	ft ²	watt-hour	Wh
square inch(es)	in. ²	weber	Wb
square kilometer(s)	km ²	weight	wt
square meter(s)	m ²	weight percent	wt %
square micron(s)	μ ²	year(s)	yr
square millimeter(s)	mm ²		
standard	std		
standard temperature and pressure	STP		
steradian(s)	sr		
temperature	temp		
that is	i. e.		
thousand electron volts	keV		
thousand tons	kt		
ton(s)	spell out		
torr	spell out		
triton(s)	t		
ultrahigh frequency	uhf		
ultraviolet	uv		
velocity	v		
versus	vs		
volt(s)	V		
volt-ampere(s)	VA		

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