

ENGINEERING SYMBOLS AND ABBREVIATIONS

The attention of most readers will have already been drawn by A.F.O. 1559/48 to the British Standard 560 : 1934—*Engineering Symbols and Abbreviations*. This Standard is widely used in the three Services and by industry and it is being adopted for all Admiralty purposes.

Examples of Misuse and Inconsistency

By the casual use of abbreviations confusion of meaning can occur, while inconsistency in the use of recognised forms destroys neatness of presentation.

A large number of writers, for example, use the abbreviation "B.T.U." for "British Thermal Unit", whereas it is a standard abbreviation for an electrical unit, namely the "Board of Trade Unit"; the standard British abbreviation of "British Thermal Unit" is "B.Th.U." Americans generally favour "btu" and it is to be regretted that there is, as yet, no common standard between the two countries.

Also, most engineers write "lbs./sq. in." (and most typists commit the same error), yet "lb" being the abbreviation of *libra* is the same in the plural (*librae*) as in the singular, while others write "lb./in²" or "p.s.i." or "lb. per sq. in." "Revolutions per minute" provides another example which can have four or five abbreviated forms. Some will write "revs. per min.", others "R.P.M." (capitals), "r.p.m." (small letters), "revs./min.", or a possible fifth—an alternative preferred by the British Standards Institution—"r/min".

Editorial Work and Printing

From an editorial point of view it is essential that a particular publication or book shall, at least, be consistent throughout and it considerably simplifies the work of the editorial staff and the printer if a standard abbreviation is used by all concerned. Even with the acceptance of this British Standard 560:1934 and its 1945 amendment, there is still likely to be some confusion for, whereas, for example, the Standard states that *all* abbreviations are the same in the singular and plural, the *Rules for Compositors and Readers* (the 33rd edition of which was published in February, 1946) mentions that "the plural-s should be inserted in hrs., qrs., tons, and yds."

Full Stops

The 1945 amendment to B.S. 560:1934 states that full stops (or full points, as a printer knows them) "shall be omitted in all cases of *single* word abbreviations relating to *units* and *quantities*, except where doubt may exist whether the letters given represent a complete word or abbreviation.

Examples : cm, ft, lb, cm², cu.ft.

The Standard also recommends that the solidus (/) be used to indicate "per," but in such well-established abbreviations as "r.p.m.", "m.p.h.", "g.p.m."

etc., these alternatives shall be allowed. The full stop is to be omitted before a solidus.

Examples : Feet per second ft/sec.
Pounds per square inch lb/sq. in.

Textbooks and Technical Papers

In the preface to this Standard it is stated that " the abbreviations are intended mainly for use in text books and technical papers and that it is hoped that all authors of technical books and papers will adopt the standard symbols and abbreviations, and that the list will also be used by teachers and students in the engineering departments of the universities, technical colleges, and schools." Up to date, the *Journal of Naval Engineering* has attempted to be consistent in its use of abbreviations but these have not always conformed to this British Standard. In order to give engineer officers and others an opportunity of noting some of the abbreviations in this Standard, those likely to be found in the *Journal* are given on pages 216 and 217.

Upper and Lower Case Letters

The use of capital (upper case) letters for abbreviations is, in general, discouraged. Capitals have, however, been adopted in the abbreviation of proper names and where it is the general practice to use them.

Where small (lower case) letters are recommended for abbreviations, capital letters may be used on maps, drawings, plans, etc. We would add that capital letters are generally preferred on illustrations ; on the whole they give a neater presentation, the letter " e " (lower case), for example, is notorious for forming an ugly blot, whereas " E " (upper case) can be drawn by a series of straight lines.

Symbols and Conventional Signs

Most of the abbreviations mentioned in this *Journal* have no symbol or conventional sign, but the few that do are sufficiently well-established and do not justify a repetition here.

There is a separate Standard for the conventional signs used in engineering drawings—B.S. 308—*Engineering Drawing Office Practice*.

ABBREVIATIONS

PRIMARY UNITS

Length

Inch	...	...	...	in
Foot	...	...	...	ft
Yard	...	...	...	yd
Millimetre	...	...	...	mm
Centimetre	...	...	...	cm

Surface

Square inch	...	...	...	sq. in. or in. ²
Square foot	...	...	...	sq. ft. or ft. ²
Square millimetre	...	...	...	mm. ²
Square centimetre	...	...	...	cm. ²

Weight and Mass

Weight	...	...	...	wt
Grain	...	...	...	gr
Ounce	...	...	...	oz
Pound	...	...	...	lb
Ton	...	...	...	t
Kilogramme	...	...	...	kg
Gramme	...	...	...	g

Volume

Cubic inch	...	...	...	cu. in. or in. ³
Cubic foot	...	...	...	cu. ft. or ft. ³
Cubic yard	...	...	...	cu. yd.
Cubic millimetre	...	...	...	mm. ³
Cubic centimetre	...	...	...	cm. ³
Pint	...	...	...	pt
Quart	...	...	...	qt
Gallon	...	...	...	gal
Millilitre	...	...	...	ml

Time

Second	...	...	...	sec
Minute	...	...	...	min
Hour	...	...	...	hr

Angular Measurement

Degree	...	...	...	deg
Right angle	...	...	...	rt. angle

Miscellaneous

Dozen	...	...	...	doz.
Micro-	...	...	...	μ

APPLIED MECHANICS

Acceleration and Velocity

Feet per minute	...	...	ft/min.
Feet per second	...	...	ft/sec.
Knot	...	...	kt.
Miles per hour	...	...	m.p.h.
Revolutions per minute	...	...	r.p.m. or r/min.

Force, Stress, and Strain

Force, centrifugal	...	...	c.f.
Moment of Inertia	...	...	m. of i.
Tensile strength, Ultimate	...	...	T.S.
Yield Point	...	...	Y.P.

PHYSICS

Atmosphere	...	...	atm.	Specific	...	...	sp.
Atomic weight	...	...	at. wt.	Specific gravity	...	...	sp. gr.
Boiling point	...	...	b.p.	Temperature	...	...	temp.
Coefficient	...	...	coeff.	Vacuum	...	...	vac.
Degree	...	...	deg	Volume	...	...	vol.

HEAT, ENERGY AND APPLIED THERMODYNAMICS

Absolute	...	...	abs.	Horse power, indicated	...	...	i.h.p.
British Thermal Unit	...	...	B.Th.U.	Horse power, shaft	...	...	s.h.p.
Compression ratio	...	...	comp. r.	Kilowatt-hour	...	...	kWh.
Efficiency, mechanical	...	...	mech. eff.	Mean effective pressure	...	...	m.e.p.
Horse power	...	...	h.p.	Specific heat	...	...	sp. ht.
Horse power, brake	...	...	b.h.p.				

GENERAL ENGINEERING TERMS

Centrifugal	...	...	centf.	Maximum	...	...	max.
Diameter	...	...	dia.	Minimum	...	...	min.
Efficiency	...	...	eff.	Number	...	...	No.
Electric	...	...	elec.	Pattern number	...	...	Patt. No.
External	...	...	ext.	Per cent	...	...	p.c.
Figure	...	...	Fig.	Sluice or Stop Valve	...	...	s.v.
Height	...	...	ht.	Specification	...	...	Spec.
Hydraulic	...	...	hyd.	Threads per inch	...	...	t.p.i.
Internal	...	...	int.	Vertical	...	...	vert.

MATERIALS

Metals (ferrous)

Cast steel	...	...	C.S.
Forged steel	...	...	F.S.
High tensile steel	...	...	H.T.S.
Mild steel	...	...	M.S.
Nickel steel	...	...	Ni. S.

Metals (Non-ferrous)

Aluminium	...	...	Al.
Brass	...	...	Br.
Copper	...	...	Cpr.
Naval brass	...	...	N. Br.
White metal	...	...	W.M.

ENGINES AND BOILERS

Compression pressure	...	...	comp. p.	High pressure	...	...	H.P.
Constant pressure cycle	...	...	c.p. cycle	Intermediate pressure	...	...	I.P.
Constant volume cycle	...	...	c.v. cycle	Internal combustion	...	...	I.C.
Flash point	...	...	fl. pt.	Low pressure	...	...	L.P.
Forced draught	...	...	F.D.	Lubricating oil	...	...	lub. oil
Heating surface	...	...	H.S.				

NAVAL ARCHITECTURE

Boiler room	...	...	B.R.	Reserve feed water	...	...	R.F.W.
Centre of buoyancy	...	...	C.B.	Steamship	...	...	S.S.
Centre of gravity	...	...	C.G.	Tons per inch (immersion)	...	...	t.p.i.
Engine room	...	...	E.R.	Twin-screw ship	...	...	T.S.S. or 2 s.s.
Motor vessel	...	...	M.V.	Water ballast	...	...	W.B.
Pitch ratio	...	...	p.r.	Water-tight	...	...	W.T.
Quadruple-screw ship	...	...	Q.S.S. or 4 s.s.	Wireless	...	...	W/T.

ELECTRICAL ENGINEERING

Ampere	...	...	A or amp	Watt hour	...	...	Wh.
Volt	...	...	V	Alternating current	...	...	A.C.
Watt	...	...	W	Direct current	...	...	D.C.
Ampere-hour	...	...	Ah.	Volt-ampere	...	...	VA.