

Glossary of

Electrotechnical, power, telecommunication, electronics, lighting and colour terms —

Part 1: Terms common to power,
telecommunications and electronics —

Group 06: Electronic tube terminology

UDC 001.4:[621.3 + 628.9 + 535] + 001.4:[621.383 + 621.385 + 621.387]

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Electronic Engineering Association*	Manufacturing Association*

The Government departments and scientific and industrial organizations marked with an asterisk in the above list, together with the following, were directly represented on the committee entrusted with the preparation of this British Standard.

Institute of Physics and the Physical Society Radio and Electronics Technical Press

This British Standard, having been approved by the Electrical Industry Standards Committee, was published under the authority of the Executive Board on 12 June 1973

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The following BSI references relate to the work on this standard:
Committee reference ELE/TLE/1,
ELE/TLE/1/29
Draft for comment 71/20191

ISBN 0 580 07523 0

Amendments issued since publication

Amd. No.	Date of issue	Comments

Contents

	Page
Co-operating organizations	Inside front cover
Foreword	ii
Guide to the glossary	iv
106 1 General	1
106 11 General tube classification	1
106 12 Emission and space charge	1
106 13 Discharge in a gas	2
106 14 Beam focusing and deflection	3
106 15 Tube noise	4
106 16 Current, voltage and power	5
106 17 General properties other than current, voltage and power	6
106 18 Characteristics and conditions of operation	7
106 2 Construction	9
106 21 Electrodes (general), elements and emitting electrodes	9
106 22 Controlling and collecting electrodes	10
106 23 Structure (envelope etc.)	11
106 3 Types of tube	12
106 31 Space-charge-controlled tubes and diodes	12
106 32 Cathode-ray and storage tubes	13
106 33 Photo sensitive tubes	14
106 34 Gas-filled tubes	14
106 4 Properties and quantities	15
106 41 Space-charge-wave tubes	15
106 42 Cathode ray tubes	15
106 43 Storage tubes	16
106 44 General properties of photosensitive tubes	16
106 45 Gas-filled tubes other than radiation-counter tubes	16
106 46 Radiation counter tubes	18
Alphabetical index	19
Publications referred to	Inside back cover

Foreword

This Group of Part 1 of this British Standard Glossary, prepared under the authority of the Electrical Industry Standards Committee and the Telecommunication Industry Standards Committee, contains terms and definitions relating to electronic tubes other than microwave tubes, and supersedes Sub-section 21 of BS 204:1960. The terms and definitions are in close agreement with those of the Third Edition of the International Electrotechnical Vocabulary.

In this new glossary a number of significant changes have been introduced. It has been decided to combine into one glossary the subjects previously covered by BS 204, BS 205, BS 233 and BS 1611 glossaries. The glossary is divided into four main parts, each of which is further subdivided into groups. Each group will comprise the terms and definitions used in a particular branch of electrical engineering, and will be issued individually as soon as it is completed. This arrangement makes it possible to add new groups, or revise existing groups, at any time without affecting the remainder of the glossary.

The four main Parts of the glossary are as follows:

- *Part 1: Terms common to power, telecommunications and electronics;*
- *Part 2: Terms particular to power engineering;*
- *Part 3: Terms particular to telecommunications and electronics;*
- *Part 4: Terms used in lighting.*

As groups of terms within the new framework are published, the corresponding parts of the relevant British Standards will be withdrawn so that ultimately the new glossary will replace them completely.

General and fundamental terms common to power, telecommunications and electronics form the first two Groups of Part 1. General terms particular to Part 2 and Part 3 similarly form the first group to these Parts. The specialist groups contain only the terms and definitions relating to their subject.

As far as possible all terms and definitions established in current usage and within the scope of this glossary have been included. Experience has shown that it is rarely possible to replace or even modify a well established term no matter what the logical or aesthetic shortcomings of that term may be. Current usage has therefore been accepted as the authority for terms and their meanings. In use terms have only been altered when they were considered fundamentally wrong, ambiguous, superfluous or in need of standardization.

Where two or more synonymous terms are in use, deprecated synonyms are omitted from the body of the text but are placed in the index with a cross-reference to the standard term. Where it was felt that the time was not yet ripe to deprecate a synonym, the preferred term is given first and the other term(s) printed in less prominent type to indicate the intention to deprecate it (them) in the course of time. Where synonyms are considered of equal value they are shown in the same type.

Where terms are used with somewhat different meanings in different branches of electrical engineering, appropriate definitions are given in the groups of the glossary corresponding to these branches. Such a definition when taken out of context of its group should always be quoted with a preamble indicating its proper context.

It is to be noted that the given definition of a term represents the generally accepted meaning of that term. Under no circumstances should it be regarded as taking the place of a specification.

An effort has been made to arrange the terms in a logical order proceeding from the general to the specific and from the whole to the part and placing allied terms in proximity within a subsection or section of the group. Each term has assigned to it a Part number (one digit) and a Group number of two digits followed by a space and four digits, the first digit of which represents the section, the second digit the subsection and the last two digits the place within the subsection.

A general view of the arrangement of the group in the glossary is obtained from the Guide to the Glossary. An alphabetical index of the terms of the group is provided at the end to assist reference to particular terms. For simplicity, only the last four digits of a term's number are quoted in the index. It is recommended that the user of any group of the glossary should consider the group in association with the groups covering general or fundamental terms within the part for Parts 2 and 3, and also together with Groups 01 and 02 of Part 1.

In this glossary, round brackets () enclose words or phrases which are not part of the term or definition and can be omitted without affecting the meaning. Square brackets [] enclose words which may replace a preceding part of an expression.

NOTE The titles of the British Standards referred to in this standard are listed on the inside back cover.

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, pages i to iv, pages 1 to 22, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

Guide to the glossary

Part 1: Terms common to power, telecommunications and electronics

- Group 01 . Fundamental concepts
- Group 02 . General technological terminology
- Group 03 . Relay terminology
- Group 04 . Measurement terminology
- Group 05 . Semiconductor terminology
- Group 06. Electronic tube terminology**
- Group 07 . Magnetism terminology
- Group . Radiological terminology^a
- Group . Radio interference terminology^a
- Group . Integrated electronic circuit terminology^a

Titles to any further groups will be added in due course.

Part 2: Terms particular to power engineering

- Group 01. General power terminology
- Group 02. Static convertor terminology
- Group 03. Rotating machinery terminology
- Group 04. Transformer terminology^a
- Group 05. Voltage fluctuation terminology^a
- Group 06. Switchgear and controlgear terminology (including fuse terminology)
- Group 07. Tariffs terminology^a
- Group . Power systems terminology^a
- Group . Systems operation terminology^a
- Group . Traction terminology^a

Titles to any further groups will be added in due course.

Part 3: Terms particular to telecommunications and electronics

- Group 01. General telecommunication and electronics terminology
- Group 02. Telephony terminology
- Group 03. Telegraphy, including facsimile, terminology
- Group 04. Broadcasting, radio and television terminology
- Group 05. Propagation and media terminology
- Group 06. Radio location and navigation terminology
- Group 07. Radiocommunication terminology
- Group 08. Electro-acoustics terminology^a

Titles to any further groups will be added in due course.

Part 4: Terms particular to lighting and colour

- Group 01. Radiation and photometry terminology
- Group 02. Vision and colour terminology
- Group 03. Lighting technology terminology

^a Not yet published, as at May 1973.

No.	Term	Definition
106 1 General		
106 11 General tube classification		
106 1101	electronic tube	A device in which conduction takes place by the movement of electrons or ions between electrodes through a vacuum or gaseous medium within a gas-tight envelope. NOTE A device which conforms with the above definition but is used only for fighting is called a lamp.
106 1102	vacuum tube	A tube evacuated to such a degree that any residual gas or vapour has negligible effect on its electrical characteristics.
106 1103	electron beam tube	A tube in which the performance depends on the formation and control of one or more electron beams.
106 1104	gas-filled tube	A tube in which the electrical characteristics are substantially established by the ionization of deliberately introduced gas or vapour.
106 1105	voltage reference tube	A voltage stabilizing tube designed to have a constant maintaining voltage with time at fixed values of current and temperature.
106 12 Emission and space charge		
106 1201	electron emission	The liberation of electrons from a surface into the surrounding space.
106 1202	work function	<i>Of an electrode material.</i> The energy required for the removal, to infinity, of an electron initially at the Fermi level.
106 1203	contact potential difference	The difference between the work functions of two materials, divided by the elementary charge of the electron.
106 1204	thermionic emission	Electron emission caused solely by the temperature of the electrode.
106 1205	photo-electric emission	Electron emission caused directly by incident radiant energy.
106 1206	field emission	Electron emission caused solely by the presence of an electric field.
106 1207	primary electron emission	Thermionic, photo-electric or field emission of electrons.
106 1208	secondary emission	Electron emission caused solely by bombardment by electron or ions.
106 1209	secondary emission factor; SECONDARY EMISSION RATIO	The ratio of the number of secondary electrons to the number of incident electrons or ions.
106 1210	thermionic emission efficiency	The quotient of the saturation thermionic emission current by the heating power absorbed by the cathode.
106 1211	Schottky effect	The increase in output current from a cathode caused by the lowering of the work function with increase of applied field.
106 1212	space charge	The net electric charge due to electrons and ions in a region of space.
106 1213	saturation state	The state of operation of a tube in which the cathode current exceeds the maximum space-charge-limited current at a stated cathode temperature.
106 1214	equivalent diode	An imaginary diode consisting of an identical cathode to that of the tube and a virtual anode to which is applied such a voltage that the cathode current in the imaginary diode is the same as in the tube under consideration.
106 1215	cathode fall; CATHODE DROP	The difference of potential across the space charge near the cathode in a gas-filled tube.

No.	Term	Definition
106 1216	field-free emission	The electron current emitted from an electrode, usually a cathode, when the electric field in the vicinity is zero.
106 1217	modulation electrode	An electrode, in an electron gun, used to control the magnitude of the electron beam current.
106 1218	cathode loading (mean)	The average current density over the effective area of the cathode, usually expressed in amperes per square centimetre.
106 1219	virtual cathode	A region between electrodes which can be considered to behave as a source of electrons because of the accumulation of space charge.
106 13 Discharge in a gas		
106 1301	avalanche	A cumulative process in which a charged particle in a gas gives rise, by collision, to a large number of charged particles.
106 1302	glow discharge	A gas discharge in a tube with a cold cathode; the electrons are released from the cathode mainly by bombardment by positive ions or photons. It is characterized by a luminous glow.
106 1303	arc discharge	A gas discharge with a cathode drop which is small compared with that of a glow discharge. Electrons are released from the cathode mainly by thermionic emission and/or high field emission. Emission of electrons released by ion bombardment plays only a small part.
106 1304	corona discharge	A slightly luminous discharge produced in the neighbourhood of a conductor, without greatly heating it, and limited to the region surrounding the conductor where the electric field exceeds a certain value. NOTE In a corona stabilizer tube this usually occurs in a high-voltage, low-current (of the order of microamperes) region, between two unheated electrodes immersed in a gas at a pressure above a few millibars.
106 1305	gap	The conduction path between two electrodes.
106 1306	main gap	A gap that carries the principal current.
106 1307	gas multiplication	<i>Of a Geiger-Müller counter tube.</i> The process whereby, in a strong electric field, the ions produced in a gas by ionizing radiation produce additional ions.
106 1308	plasma	An ionized gas in which the electron and ion populations are approximately equal.
106 1309	arc-back	A failure of the rectifying action which results in a substantial current flow in the reverse direction.
106 1310	arc-through	A loss of control that results in conduction in the forward direction during an intended non-conduction period.
106 1311	cathode glow	The luminous area covering part or all of the cathode in a glow discharge tube.
106 1312	cathode sheath	The region in a gas discharge between a plasma and the cathode in which the electron and ion populations are substantially unequal.
106 1313	anode sheath	The region in a gas discharge between a plasma and the anode in which the electron and ion populations are substantially unequal.
106 1314	cathode spot	<i>Of an arc discharge tube.</i> A luminous area on the cathode from which an electron emission occurs.
106 1315	current to cover	The minimum cathode current at which the cathode is completely covered by glow.

No.	Term	Definition
106 1316	de-ionization time	<i>Of a given gap in a gas-filled tube.</i> The time required for a gap to regain the pre-conduction condition after interruption of the discharge across the gap.
106 1317	first Townsend discharge	<i>In a gas-filled tube.</i> A very weak flow of current which precedes the ignition of a gas-filled tube, primary ionization being produced by an external ionizing agent, and the additional ions which appear being due solely to the ionization of the gas by electron collision.
106 1318	formative time	The time interval elapsing between the appearance of the first Townsend discharge in a given gap and the formation in it of a self-maintaining glow discharge.
106 1319	guide gap; TRANSFER GAP	A gap across which a voltage is applied to effect the transfer of the discharge from one main gap to the next.
106 1320	ionization	Formation of ions by the dissociation of molecules or by adding or removing electrons to or from atoms, molecules, or groups of molecules.
106 1321	misfire	A failure to establish an arc between a main anode and the cathode during an intended conduction period.
106 1322	second Townsend discharge	<i>In a cold cathode gas-filled tube.</i> A weak flow of current which precedes the ignition of a gas-filled tube, primary ionization being produced by an external ionizing agent, and the additional ionization results from the secondary electrons emitted by the cathode under the action of the bombardment by the positive ions present in the gas.
106 1323	voltage drop	<i>Of a hot-cathode or pool-cathode gas-filled tube.</i> The anode voltage during normal anode current flow.

106 14 Beam focusing and deflection

106 1401	collimating	The process of confining the electron beam within a desired cross-section along a stated length.
106 1402	focusing	The process of controlling the convergence of an electron beam.
106 1403	cross over point	The first point of convergence of an electron beam.
106 1404	electron gun convergence ratio	The ratio of the average beam density over a stated cross-section to the average beam density over a reference cross-section, usually at the cathode surface.
106 1405	beam angle	The solid angle of the cone-shaped beam of electrons emerging from the cross over point.
106 1406	electrostatic focusing	Focusing of an electron beam by means of an electrostatic lens.
106 1407	magnetic focusing	Focusing of an electron beam by means of an electromagnetic lens.
106 1408	deflection	Displacement of a beam by a deflecting field.
106 1409	electrostatic deflection	Deflection by an electric field.
106 1410	magnetic deflection	Deflection by a magnetic field.
106 1411	deflection current	The current in a deflector coil.
106 1412	symmetrical deflection	Deflection caused by the application of a voltage to a pair of deflection plates such that at every instant the mean value of the voltage between the plates is equal to that of a stated electrode (usually the final beam forming electrode).