

BRITISH STANDARD 4727 : Part 4 : Group 03 : 1972

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**GLOSSARY OF
ELECTROTECHNICAL, POWER,
TELECOMMUNICATION,
ELECTRONICS, LIGHTING AND
COLOUR TERMS**

**PART 4. TERMS PARTICULAR TO
LIGHTING AND COLOUR**

Group 03. Lighting technology terminology

BRITISH STANDARDS INSTITUTION

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The following BSI references relate to the work on this standard:
Committee reference LGE/2 Draft for comment 70/18410

CO-OPERATING ORGANIZATIONS

The Illumination Industry Standards Committee, under whose supervision this British Standard was prepared, consists of representatives from the following Government departments and scientific and industrial organizations:

Association of Public Lighting Engineers	Engineering Equipment Users' Association
British Glass Industry Research Association	Glass Manufacturers' Federation
British Railways Board	*Illuminating Engineering Society
Council of British Manufacturers of Petroleum Equipment	Institution of Electrical Engineers
Department of Employment and Productivity	Institution of Municipal Engineers
*Department of the Environment	*Lighting Industry Federation Ltd.
Department of the Environment, Building Research Station	London Transport Executive
Department of Trade and Industry	Ministry of Defence, Navy Department
Electricity Council, the Central Electricity Generating Board and the Area Boards in England and Wales	*National Physical Laboratory—Department of Trade and Industry
	Royal Institute of British Architects
	Society of British Gas Industries
	Society of Glass Technology

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:

British Colour Council	P.I.R.A.
Colour Group of Great Britain	Society of Dyers and Colourists
Institute of Physics and the Physical Society	The British Optical Association
National Illumination Committee of Great Britain	Trinity House Lighthouse Service

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 . Semiconductor terminology*
- Group . Electronic tube terminology*
- Group . Magnetism terminology*
- Group . Radiological terminology*
- Group . Radio interference terminology*
- Group . Integrated electronic circuit terminology*

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
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- Group 05. Voltage fluctuation terminology
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- Group . Power systems terminology*
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- Group . Traction terminology*
- Group . Tariffs terminology*

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

*Not yet published, as at 30th March, 1972.

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

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
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BRITISH STANDARD GLOSSARY OF
ELECTROTECHNICAL, POWER,
TELECOMMUNICATION, ELECTRONICS,
LIGHTING AND COLOUR TERMS
Part 4. Terms Particular to Lighting and Colour
Group 03. Lighting technology terminology

FOREWORD

This Group of Part 4 of this British Standard Glossary, prepared under the authority of the Illumination Industry Standards Committee, contains terms and definitions relating to lighting technology and supersedes BS 233*, Sections 5 and 6. The terms and definitions are in close agreement with those of Group 45 of the latest edition of the International Electrotechnical Vocabulary, prepared jointly by the Commission Internationale d'Eclairage (CIE) and the International Electrotechnical Commission (IEC).

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 233, BS 204†, BS 205‡ and BS 1611§ glossaries. The glossary is divided into four main Parts, each of which is 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 particular to lighting and colour.

As groups of terms within the new framework are published, the corresponding parts of the British Standard glossaries mentioned above will be withdrawn. Ultimately the new glossary will replace these standards completely and they will then be withdrawn.

Fundamental and general terms common to power, telecommunications and electronics, respectively, form the first two groups of Part 1. General terms particular to Part 2 and Part 3 similarly form the first groups of their respective Parts. The specialist groups contain only the terms and definitions relating to their subject.

As far as has been practicable all terms and definitions established in current usage and falling within the scope of this glossary have been included. Experience has shown that it is rarely possible to replace, or even to 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 except where there has been a very good reason for doing otherwise, as, for example, where terms have been considered to be fundamentally wrong, ambiguous, superfluous or in need of standardization. Where two or more synonymous terms are in use, those which are deprecated are omitted from the body of the text but are in the alphabetical index with a cross reference to the standard term. In cases where it was felt that the time was not yet right to deprecate a synonym, preferred terms are

* BS 233, 'Glossary of terms used in illumination and photometry'.

† BS 204, 'Glossary of terms used in telecommunication (including radio) and electronics'.

‡ BS 205, 'Glossary of terms used in electrical engineering'.

§ BS 1611, 'Glossary of colour terms used in science and industry'.

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given first and other terms are printed in less prominent type to indicate the intention to deprecate 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 the 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 can be obtained from the Guide to the Glossary. An alphabetical index of the terms of the group is provided at the end to facilitate 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 or phrases which may replace a preceding part of an expression. The limiting sign [] indicates, if necessary, how many of the preceding words are replaced.

403 1 ILLUMINATION

No.	Term	Definition
403 11	<i>Illumination, general</i>	
403 1101	lighting	Illumination of objects and their surroundings so that they may be seen. NOTE. The term 'lighting' is also used in other contexts, e.g. signal lighting.
403 1102	lighting technology	Combined techniques of lighting and related scientific principles.
403 1103	visual environment; luminous environment	Physiological and psychological environment created in a space by light (level and distribution of the illuminance, form and colour of the lighting, luminances) and colour (hue, saturation, distribution in the space, colour rendering) in association with the shape of the space and with objects within it.
403 1104	general lighting	Lighting designed to illuminate an area without provision for special local requirements.
403 1105	localized lighting	Lighting designed to increase the illuminance at certain specified positions, for instance those at which work is carried on. NOTE. The term 'local lighting' is often applied to lighting designed to illuminate a particularly small area, e.g. a desk light.
403 1106	permanent supplementary artificial lighting	<i>In interiors.</i> Permanent artificial lighting intended to supplement the natural lighting of premises, when the natural lighting is insufficient or objectionable when used alone. NOTE. This type of lighting is generally denoted in brief by the initial letters PSALI.
403 1107	emergency lighting	Lighting intended to allow the occupants to find the exits from a building with ease and certainty in the case of failure of the normal lighting system.
403 1108	safety lighting	Lighting intended to ensure safety, maintained in full operation in any occupied building or vehicle.

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No.	Term	Definition
403 1109	standby lighting	Lighting which enables activities to continue in the case of failure of the normal lighting system.
403 1110	extra-low voltage lighting	Lighting by means of electric lamps at a voltage not exceeding a specified limit, generally 50 V or less.
403 1111	direct lighting	Lighting by means of luminaires with a light distribution such that 90 % to 100 % of the emitted luminous flux reaches the working plane directly, assuming that this plane is unbounded.
403 1112	semi-direct lighting	Lighting by means of luminaires with a light distribution such that 60 % to 90 % of the emitted luminous flux reaches the working plane directly, assuming that this plane is unbounded.
403 1113	general diffused lighting	Lighting by means of luminaires with a light distribution such that 40 % to 60 % of the emitted luminous flux reaches the working plane directly, assuming that this plane is unbounded.
403 1114	semi-indirect lighting	Lighting by means of luminaires with a light distribution such that only 10 % to 40 % of the emitted luminous flux reaches the working plane directly, assuming that this plane is unbounded.
403 1115	indirect lighting	Lighting by means of luminaires with a light distribution such that not more than 10 % of the emitted luminous flux reaches the working plane directly, assuming that this plane is unbounded.
403 1116	directional lighting	Lighting in which the light on the working plane or on an object is incident predominantly from a particular direction.
403 1117	diffused lighting	Lighting in which the light on the working plane or on an object is not incident predominantly from any particular direction.
403 1118	floodlighting	Lighting, by projection, of a scene or object in order to increase considerably the illuminance relative to the surroundings.
403 1119	(luminous) intensity distribution curve	<i>For a light source.</i> Curve, generally polar, which represents the luminous intensity in a plane passing through the source, or in a cone with its apex at the source, as a function of the angle measured from some given direction. NOTE 1. When the source has a symmetrical luminous intensity distribution a meridian plane is generally chosen. NOTE 2. In the case of a vertical plane, angles are measured from the downward vertical.
403 1120	surface of (luminous) intensity distribution	Surface formed by the extremities of all the radius vectors drawn from a common origin, the length of each radius vector being proportional to the luminous intensity of the source in the corresponding direction.
403 1121	symmetrical (luminous) intensity distribution	Distribution for which the surface of luminous intensity distribution can be generated by rotating a polar intensity distribution curve around an axis in the corresponding meridian plane. NOTE. Usage has established the extension of the term 'symmetrical (luminous) intensity distribution' to the case where the surface, without being a surface of revolution, possesses at least one plane of symmetry.
403 1122	asymmetrical (luminous) intensity distribution	Non-symmetrical distribution of the luminous intensity.
403 1123	upper [lower] hemispherical (luminous) flux	<i>Of a source.</i> The luminous flux emitted above [below] a horizontal plane passing through the source. NOTE. It is essential that the plane be specified in every case.

No.	Term	Definition
403 1124	Russell angles	Series of angles defining the centre of area of coaxial zones of equal area on a sphere in such a way that the determination of total luminous flux from the intensity distribution curve is reduced to the calculation of the arithmetic mean of the intensities at these angles, the intensity at each angle being the average for that angle in the several meridian planes.
403 1125	zone factor	A factor by which the intensity averaged over a zone of angular width θ is multiplied to determine the flux emitted by a source in that zone.
403 1126	zonal multiplier	The averaged proportion of the lower hemispherical flux from a source of uniform intensity in each 10° zone that is directly incident on the working plane in an interior of given proportions.
403 1127	Rousseau diagram	Graphical construction by means of which the luminous flux and the mean spherical luminous intensity of a source may be calculated from a knowledge of the luminous intensity in a certain number of directions in a meridian plane.
403 1128	isocandela curve	Curve traced on an imaginary sphere with the source at its centre and joining all adjacent points corresponding to those directions in which the luminous intensity is the same, or a plane projection of this curve.
403 1129	isocandela diagram	Array of isocandela curves.
403 1130	divergence of a beam	<i>Of a projector.</i> Angular extent of a beam, in a specified plane, which contains all the radius vectors of the polar curve of luminous intensity having lengths greater than a specified fraction of the maximum. NOTE 1. Commonly used values of the specified fraction are $1/10$ and $1/2$; the divergence is then referred to as the one-tenth peak divergence or one-half peak divergence . NOTE 2. Sometimes loosely termed beam angle . NOTE 3. For definition of 'beam' see 403 1152.
403 1131	beam spread	One-tenth peak divergence. (See 403 1130 Note 1.)
403 1132	optical output ratio	<i>Of a luminaire.</i> Ratio of the light output of luminaire, measured under specified practical conditions, to the sum of the individual light outputs of the lamps when inside the luminaire.
403 1133	light output ratio	<i>Of a luminaire.</i> Ratio of the light output of a luminaire, measured under specified practical conditions, to the sum of the individual light outputs of the lamps operating outside the luminaire under specified conditions. NOTE 1. For luminaires using incandescent lamps, the optical output ratio and the light output ratio are the same in practice. NOTE 2. For luminaires using discharge lamps the light output ratio may be less than or greater than the optical output ratio depending upon: (1) The internal temperature of the luminaire. (2) The setting of the lamp ballast in the luminaire. The term 'light output ratio (working)' is used when including the effects of both the above conditions; the term 'light output ratio (luminaire)' is used when including only the effect of the internal temperature of a luminaire.
403 1134	isoluminance curve	Locus of points on a surface at which the luminance is the same, for given positions of the observer and of the source or sources in relation to the surface.
403 1135	isolux curve	Locus of points on a surface where the illuminance has the same value.

No.	Term	Definition
403 1136	mutual exchange coefficient	Between two surfaces S_1 and S_2 when the radiance [luminance] of each is uniform at all points and for all directions; the two radiances [luminances] need not be equal). Quotient of the radiant [luminous] flux that surface S_1 (or S_2) sends to surface S_2 (or S_1), by the radiant [luminous] exitance of surface S_1 (or S_2). symbol: g; $g = \frac{\phi_2}{M_1} = \frac{\phi_1}{M_2}$ (see Note 1) unit: square metre, m^2 NOTE. Since $M = \pi L$, and in the particular case where all points on S_1 are seen from all points on S_2 $g = \frac{1}{\pi} \int_{S_1} \int_{S_2} \frac{\cos \theta_1 \cos \theta_2}{l^2} dA_1 dA_2 = \frac{1}{\pi} G$ where l is the distance between the elements of area dA_1 and dA_2 on the surfaces S_1 and S_2, and G is the geometric extent (see 401 1208, case (3), and 401 2016) of the beam delimited by the boundaries of S_1 and S_2. For two elementary areas dA_1 and dA_2, $dg = \frac{1}{\pi} dA_1 d\Omega_1 \cos \theta_1 = \frac{1}{\pi} dA_2 d\Omega_2 \cos \theta_2$ where $d\Omega_1$ (or $d\Omega_2$) is the solid angle which the area dA_2 (or dA_1) subtends from the centre of dA_1 (or dA_2). The radiance [luminance] of the beam delimited by the boundaries of dA_1 and dA_2 is: $L = \frac{1}{\pi} \frac{d\phi}{dg}$
403 1137	form factor	For two surfaces S_1 and S_2, 1. Ratio of the average radiant [luminous] flux density received over surface S_2 from surface S_1, to the radiant [luminous] exitance of surface S_1. symbol: f; $f_{21} = \frac{E_2}{M_1} = \frac{\Phi_2}{A_2 M_1}$ where E is the average radiant [luminous] flux density and M is the radiant [luminous] exitance. 2. Ratio of the radiant [luminous] flux received on surface S_1 from surface S_2, to the radiant [luminous] flux emitted by surface S_2. $f_{21} = \frac{\Phi_1}{A_2 M_2}$ NOTE. These definitions are equivalent since $\frac{\Phi_2}{M_1} = \frac{\Phi_1}{M_2} \text{ (see 403 1136)}$
403 1138	configuration factor	For two surfaces S_1, S_2. Ratio of the irradiance [illuminance] at a point P_2 on surface S_2 due to the flux received from surface S_1, to the radiant [luminous] exitance of surface S_1. symbol: c; $c_{21} = \frac{E_{p2}}{M_1}$; $c_{12} = \frac{E_{p1}}{M_2}$ NOTE. The relation between configuration factor c and mutual exchange coefficient g is: $\int_{S_2} c_{21} dA_2 = \int_{S_2} \frac{E_{p2} dA_2}{M_1} = \frac{\Phi_2}{M_1} = g = \frac{\Phi_1}{M_2} = \int_{S_2} \frac{E_{p1} dA_1}{M_2} = \int_{S_1} c_{12} dA_1$
403 1139	self-exchange coefficient	Of a surface when its radiance [luminance] is the same at all points and for all directions. Quotient of that part of the radiant [luminous] flux from surface which falls on the surface itself, by the radiant [luminous] exitance of the surface. symbol: g_s unit: square metre, m^2

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No.	Term	Definition
403 1140	inter-reflection	General effect of the reflections of radiation between several reflecting surfaces
403 1141	inter-reflection ratio	Ratio of the radiant or luminous flux Φ_i indirectly reaching a surface in a cavity to the primary flux Φ_o directly received by another surface, the flux Φ resulting from the inter-reflection undergone by the flux Φ_o .
403 1142	reference surface	Surface on which illuminance is measured or specified.
403 1143	working plane	Reference surface defined as the plane at which work is usually done. NOTE. In interior lighting and unless otherwise indicated, it is assumed to be a horizontal plane 0.85 m above the floor and limited by the walls of the room.
403 1144	utilized flux	Luminous flux received on the side of the reference surface under consideration. NOTE. Unless otherwise indicated the reference surface is the working plane.
403 1145	utilization factor	Ratio of the utilized flux to the luminous flux emitted by the lamps. NOTE. The term 'coefficient of utilization' is deprecated.
403 1146	utilance	Ratio of the utilized flux to the luminous flux leaving the luminaires. symbol: U
403 1147	room index	Code number, representative of the geometry of a room, used in calculation of the utilization factor or the utilance. NOTE 1. Unless otherwise indicated, the room index is given by the formula $\frac{l.b}{h(l+b)}$ where l is the length of the room, b is the width and h is the distance of the luminaires above the working plane. NOTE 2. The 'ceiling cavity index' is calculated from the same formula except that h is the distance from ceiling to luminaires.
403 1148	spacing/height ratio	The ratio of the spacing between the geometric centres of adjacent luminaires to their height above the working plane.
403 1149	midpoint ratio	The ratio of the calculated illuminance at the centre of a particular 16-luminaire square array of luminaires to that immediately below one of the inner luminaires. NOTE. For a full description of this concept see Technical Report No. 2: 1971, of The Illuminating Engineering Society (London).
403 1150	uniformity ratio of illuminance	<i>On a given plane.</i> A measure of the variation of illuminance over the plane expressed as either: (1) The ratio of the minimum to the maximum illuminance. (2) The ratio of the minimum to the average illuminance. NOTE. In some other countries the reciprocal of these ratios is used, characterized by values greater than unity.
403 1151	maintenance factor	Ratio of the average illuminance on the working plane after a specified period of use of a lighting installation to the average illuminance obtained under the same conditions for a new installation. NOTE 1. The concept of maintenance factor may also be applied to the illuminance at a given point on a given plane. NOTE 2. For artificial lighting, it is understood that a new installation is one in which the lamps have been aged as prescribed. NOTE 3. The use of the term 'depreciation factor' as the reciprocal of maintenance factor is deprecated. NOTE 4. The term 'maintenance factor—cleaning' is used for the ratio of the average illuminance on the working plane provided by an installation in the average condition of dirtiness expected in service, to the average illuminance provided by that installation when cleaned.