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PART XVI LIGHTING

Section 3 Lamps and Auxiliary Apparatus

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PART XVI LIGHTING

Section 3 Lamps and Auxiliary Apparatus

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ELECTROTECHNICAL VOCABULARY

PART XVI LIGHTING

Section 3 Lamps and Auxiliary Apparatus

0. FOREWORD

0.1 This Indian Standard (Part XVI/Sec 3) was adopted by the Indian Standards Institution on 5 October 1967, after the draft finalized by the Electrotechnical Standards Sectional Committee, in consultation with the Electric Lamps and Accessories Sectional Committee, had been approved by the Electrotechnical Division Council.

0.2 This standard (Part XVI/Sec 3) which deals with lamps and components of lamps and auxiliary apparatus is based to a large extent, on Publication No. 50 (54) ' International Electrotechnical Vocabulary ' issued by the International Electrotechnical Commission.

0.3 The definitions contained in this standard have been drawn up with the object of striking a correct balance between absolute precision and simplicity. The principal object of the standard is to provide definitions which are sufficiently clear so that each term is understood with the same meaning by all the users and it does not, therefore, constitute a treatise on lighting terminology. Thus, it may sometimes be felt that the definitions are not sufficiently precise, do not include all cases, do not take account of certain exception or are not identical with those which may be found in other publications designed with other objects and for other readers. Such imperfections, which will be eliminated as far as possible in later editions, are inevitable and should be accepted in the interest of simplicity and clarity.

0.4 The electrotechnical vocabulary is being prepared in several parts, each having one or more sections. A complete list in parts is given on page 15.

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1. SCOPE

1.1 This standard (Part XVI/Sec 3) covers terms used for lamps and components of lamps and auxiliary apparatus.

2. LAMPS

2.1 Incandescent Lamps

2.1.1 *Incandescent (Electric) Lamp* — Lamp in which light is produced by means of a body heated to incandescence by the passage of an electric current.

NOTE — Depending on the luminous element is a filament of carbon or metal, the lamp is called a 'carbon filament lamp or metal filament lamp'. The latter may be single-coil lamp (*see* **3.4**), 'coiled coil lamp' (*see* **3.5**) or a 'ribbon filament lamp' (*see* **2.3.18**).

2.1.2 *Pre-focus Lamp* — Incandescent lamp in which the luminous element is accurately adjusted in position with regard to locating device forming part of the cap.

2.1.3 *Tubular Lamp* — Incandescent lamp, with a tubular bulb, having the filament mounted along the axis of the tube.

NOTE — This type of lamp may have one or two caps (doubled capped tubular lamp).

2.1.4 *Festoon Lamp* — Small incandescent or discharge (negative glow) lamp with a tubular bulb having a SV cap at each end.

NOTE — In practice festoon lamps are always incandescent lamps.

2.1.5 *Candle Lamp* — Decorative lamp having a bulb in the shape of a candle flame.

2.1.6 *Reflector Lamp* — Incandescent lamp in which part of the bulb is shaped and metallized or coated so as to control the light.

NOTE — Among the types of lamps in this class are the following:

a) The *pressed glass lamp*, the bulb of which consists of two glass parts fused together, namely a metallized reflecting bowl and a patterned cover forming an optical system; and

b) The *sealed beam lamp*, a type of pressed glass lamp designed to give a closely controlled beam of light.

2.1.7 *Vacuum Lamp* — Incandescent lamp in which the luminous element operates in an evacuated bulb.

2.1.8 *Gas-filled Lamp* — Incandescent lamp in which the luminous elements operate in a bulb filled with an inert gas.

2.1.9 *Tungsten Halogen Lamp* — Gas-filled lamp containing a certain proportion of halogens.

The *tungsten iodine lamp* and *quartz iodine lamp* belong to this category.

2.1.10 *Rough Service Lamp* — Incandescent lamp so constructed as to withstand mechanical shocks and vibrations.

2.1.11 *Series Lamp* — Incandescent lamp designed for use in a group connected in series.

NOTE — The tolerances on series lamps, as regards their electrical characteristics, are smaller than those applied to lamps intended for burning in parallel on normal supply voltages.

2.1.12 *Standard Ratings* — Series of voltages and wattages of lamps preferred for general use (general lighting service lamps).

2.2 Discharge Lamps and Arc Lamps

2.2.1 *Discharge Lamp* — Lamp in which the light is produced by an electric discharge through a gas, metal vapour or a mixture of several gases and vapours.

2.2.2 *Tubular Discharge Lamp* — Discharge lamp of tubular form either straight or curved.

2.2.3 *Gaseous Discharge Lamp* — Discharge lamp in which the discharge takes place in a gas. (For example : *Xenon-, neon-, helium-, nitrogen-, carbon dioxide-lamp*).

NOTE — The term ***neon tube*** is sometimes wrongly used to denote any such tubular discharge lamp.

2.2.4 *Negative-glow Lamp* — Discharge lamp in which the light is produced directly or indirectly (by fluorescence) from the radiation of the negative glow.

2.2.5 *Metal Vapour Lamp* — Discharge lamp in which the light is mainly produced in a metallic vapour, such as the *mercury* (vapour) *lamp* and the *sodium* (vapour) *lamp.*

2.2.6 *Extra High Pressure Mercury (Vapour) Lamp* — Mercury vapour lamp in which, during operation, the partial pressure of the vapour reaches a very high value [of the order of 10^6 newtons/mm^2 (10 atm) or more].

2.2.7 *High Pressure Mercury Vapour Lamp* — A mercury vapour lamp with or without a coating of fluorescent material in which during operation the partial pressure of the vapour is of the order of one atmosphere or more.

NOTE — A *fluorescent mercury discharge lamp* is a high pressure mercury vapour lamp in which the light is produced partly by the mercury vapour and partly by a layer of fluorescent material excited by the ultra-violet radiation of the discharge.

2.2.8 *High (Low) Pressure Sodium (Vapour) Lamp* — Sodium vapour lamp in which the partial pressure of the vapour during operation is of the order 10^4 newtons/mm^2 (0·1 atm) (not above a few newtons per square metre).

2.2.9 *Halide Lamp* — Discharge lamp in which the light is produced by the radiation from a mixture of a metallic vapour (for example, mercury or sodium) and the products of the dissociation of halides (for example, halides of thallium, indium).

2.2.10 *Tubular Fluorescent Lamp* — A low pressure mercury vapour lamp in which light emission is mainly produced by the fluorescence of a translucent coating on the inner surface of the tube.

2.2.11 *Cold Cathode Lamp* — A low pressure discharge lamp in which the cathodes are not externally heated and the cathode losses are relatively high. The lamp starts instantly without a starting device.

2.2.12 *Hot Cathode Lamp* — A discharge lamp in which the cathode losses are relatively small. This lamp generally requires a special starting device.

2.2.13 *Cold-start Lamp* — Discharge lamp designed to start without preheating of the electrodes.

2.2.14 *Preheat (Hot-start) Lamp* — Hot cathode lamp the start of which requires a preheating of the electrodes.

2.2.15 *Series Cathode Heating (Pre-heating)* — Type of heating (pre-heating) in which the cathode is in series with the circuit before the lamp is started.

2.2.16 *Parallel Cathode Heating (Pre-heating)* — Type of heating (pre-heating) provided by a low voltage winding on the ballast directly connected with the cathode terminals.

2.2.17 *Switch-start Fluorescent Lamp* — Fluorescent lamp operating with a circuit requiring a starter for the pre-heating of the electrodes.

2.2.18 *Starterless Fluorescent Lamp* — Fluorescent lamp operating with auxiliary equipment enabling it to start immediately when switched on.

2.2.19 *Low Temperature Fluorescent Lamp* — Fluorescent lamp designed to give satisfactory starting and operation at relatively low ambient temperatures below 5°C (for example, in the open in winter).

2.2.20 *Arc Lamp* — Lamp in which light is emitted by an arc discharge or its electrodes.

2.2.21 *Carbon Arc Lamp* — Low current density arc lamp with carbon electrodes not containing any other material.

2.2.22 *High Density Carbon Arc Lamp* — Carbon arc lamp operating at very high current density, in which the flame makes an appreciable contribution to the light emitted.

2.2.23 *Flame Arc Lamp* — High current density arc lamp with carbon electrodes containing other substances which, volatizing in the flame, contribute to the radiation so that the spectral distribution is altered or the luminous efficacy improved.

2.2.24 *Enclosed Arc Lamp* — Arc lamp operating in an enclosed space so that the air supply is restricted.

2.2.25 *Tungsten Arc Lamp* — Arc lamp with tungsten electrodes, the light being produced principally by the incandescence of the electrodes.

2.2.26 *Short-arc Lamp* — Discharge lamp in which the distance between the electrodes is small (of the order 1 to 10 mm).

NOTE — This type of lamp (for example mercury or xenon) is generally of very high pressure.

2.2.27 *Long-arc Lamp* — Discharge lamp in which the distance between the electrodes is large.

NOTE — This type of lamp (for example xenon) is generally of high pressure. The arc fills the discharge tube and is therefore stabilized.

2.3 Lamps of Special Type or for Special Purposes

2.3.1 *Combustion Lamp* — Lamp in which the chemical energy of the combustible material is transformed into light, either directly in a flame or indirectly by an incandescent body.

2.3.2 *Decorative Lamp* — Incandescent lamp, made in various shapes and colours, used for decorative effects.

2.3.3 *Projector Lamp* — Lamp in which the luminous element is so mounted that the lamp may be used with an optical system projecting the light in chosen directions.

2.3.4 *Miniature Lamp* — Small lamp generally with a lengh of less than 30 mm and a bulb diameter of less than 18 mm.

2.3.5 *Signal Lamp* — Lamp designed for optical signalling or for acting as a signal on equipment.

2.3.6 *Panel Lamp* — Small lamp used to give local lighting on an instrument board.

Small lamp used for local lighting and as an indicator on motor vehicles.

Incandescent or glow discharge lamp for low level lighting, as used for instance in bedrooms or sick rooms.

2.3.7 *Photoflood Lamp* — Incandescent lamp of specially high luminous efficacy, often of the reflector type, for lighting objects to be photographed.

2.3.8 *Photoflash Lamp* — Lamp giving a single high light output by combustion within a bulb for a very brief period and only used for lighting objects to be photographed.

2.3.9 *Electronic-flash Lamp* — Discharge lamp, operated with electronic equipment, giving a high light output for a very brief period, capable of repetition, and used for lighting objects to be photographed or for stroboscopic observation.

2.3.10 *Darkroom Lamp* — Lamp, which by reason of its spectral distribution and low light output, does not noticeably affect photographic sensitized material in the time for which it is usually exposed in the darkroom.

2.3.11 *Enlarger Lamp* — Lamp of high luminous efficacy, with a high diffusing bulb, designed for use in photographic enlarger.

2.3.12 *Blended Lamp* — Lamp containing in the same bulb a mercury vapour lamp element and an incandescent lamp filament connected in series. The bulb may be diffusing or coated with a fluorescent material.

2.3.13 *Moore (Light) Lamp (Tube)* — Lamp in which the light is produced by high tension discharge in nitrogen or carbon dioxide, without any fluorescent material. The two gases give their characteristic spectral radiations: nitrogen a golden yellow light, carbon dioxide a pure white.

2.3.14 *Black Light Lamp*; *Woods Lamp* — High pressure, or low pressure (with phosphor) mercury vapour lamp, designed to emit UV-A radiation and little or no visible radiation.

2.3.15 *Daylight Lamp* — Lamp giving light with a spectral distribution approaching that of daylight.

2.3.16 *Infra-red Lamp* — Lamp which radiates especially strongly in the infra-red and in which the light production is not of direct interest.

2.3.17 *Ultra-violet Lamp* — Lamp which radiates especially strongly in the ultra-violet, and in which the light production is not of direct interest.

2.3.18 *Tungsten Ribbon Lamp* — Incandescent lamp in which the luminous element is a tungsten ribbon.

NOTE — This type of lamp is particularly used as a standard in pyrometry and spectral radiometry.

2.3.19 *Point-Source Lamp* — Lamp of high luminance so constructed that it can be considered as a point source.

2.3.20 *Bactericidal (Germicidal) Lamp* — Low-pressure mercury vapour lamp with a bulb which transmits the bactericidal UV-C radiation.

2.3.21 *Spectroscopic Lamp* — Discharge lamp which gives a well-defined line spectrum and which, in combination with filters, may be used to obtain monochromatic radiation.

2.3.22 *Electroluminescent Source (Panel) Lamp* — Luminous source in which the light is produced by electroluminescence.

3. COMPONENTS OF THE LAMPS AND AUXILIARY APPARATUS

3.1 Luminous Element — The part of a lamp which emits light.

3.2 Filament — Threadlike conductor, usually of tungsten (or of carbon), which is heated to incandescence by the passage of an electric current.

3.3 Straight Filament — Filament which is uncoiled and straight or which consists of uncoiled straight portions.

3.4 Single-coil Filament — Filament wound in the form of a helix.

3.5 Coiled-coil Filament — Helical filament wound into a larger helix.

3.6 Bunch Filament — Coiled filament in the form of a series of vees.

3.7 Uniplaner Filament — Filament in which the different sections are or the axes of the coils are all in the same plane.

3.8 Line Filament — Straight filament or one in which the axis of the coil is a straight line.

3.9 Continuous Coiling — Coiling such that the filament has no uncoiled part.

3.10 Space Winding — Coiling in which the coiled sections are separated at intervals by uncoiled portions.

3.11 Bulb — Transparent or translucent gas tight envelope enclosing the luminous element.

3.12 Clear Bulb — Bulb which is transparent to visible radiation and may be coloured.

3.13 Frosted Bulb — Bulb which is made diffusing by roughening its inner or outer surface.

3.14 Opal Bulb — Bulb in which all, or a layer, of the material diffuses the light.

3.15 Internally Coated Bulb — Bulb coated internally with a thin diffusing layer.

3.16 Metallized Bulb — Bulb having part of its interior or exterior surface coated with a metallic film to form a reflecting surface so that the light is sent in particular directions.

3.17 Enamelled Bulb — Bulb coated with a layer of translucent enamel.

3.18 Coloured Bulb — Bulb made of glass coloured in the mass, or of clear glass coated internally or externally with a coloured layer which may be ansparent of diffusing.

3.19 Hard Glass Bulb — Bulb made of glass with a high softening point and resistance to thermal shock.

3.20 Cap — That part of a lamp which holds it in a lampholder and usually provides connection to the electric supply.

NOTE — The cap (base) of a lamp and its corresponding holder (socket) are generally identified by one or more letters followed by a number which indicates approximately the principal dimensions (generally the diameter) of the cap in millimetres.

The following code is recommended:

B — bayonet cap (for example, B 22)

BA — bayonet automobile cap (for example, BA 15)

BM — bayonet cap for mining lamps

E — Edison screw cap (for example, E 10, E 27, E 40)

F — single contact pin cap

G — cap with two or more pins (for example, G 13)
(This group also incorporates the former bi-post caps.)

K — cap with flexible connection(s)

P — prefocus cap (for example, P 28)

R — recessed contact(s) cap (for example, R 17)

S — shell cap

SV — shell cap with conical end (festoon cap)

T — cap for telephone lamps

W — cap (base) of lamp making direct electrical contact on the lead-in wires, the glass part being essential for the fit in the holder (socket).

The use of descriptive form of designations, such as 'normal bayonet', 'miniature', 'medium', 'goliath' or 'mogual', 'festoon' — which correspond to the types B 22, E 10, E 27, E 40, SV, respectively — is deprecated.

3.21 Screw Cap; Edison Screw Cap — Cap (type E) in the form of a screw thread.

3.22 Bayonet Cap — Cap (type B) with small pins on its shell which engage in slots in a lampholder.

3.23 Pin Cap — Cap (types F, G) which has one or more pins for fixing it in the lampholder.

3.24 Pre-focus Cap — Cap (type P) which enables the luminous element to be brought into a specified position relative to the cap during manufacture of the lamp. By this means, reproducible positioning can be assured when the lamp is inserted in a suitable lampholder.

3.25 Lamp Foot — The glass and metal structure which supports the essential elements of a lamp.

3.26* — Part of a lamp comprising the stem tube, the exhaust tube, the pinch and possibly the stud.

3.26.1 *Stem Tube* — Tubular part of a lamp foot, in glass, flared into a plate-like shape at one end for sealing on to the bulb.

*Suitable term is under consideration.

3.26.2 *Stud* — Part of a lamp foot, consisting of a glass rod ending generally in a button in which the supports are fixed.

NOTE — In practice, the glass rod is sometimes called the *cane*, and the stud is only the button on the end.

3.27 Support — Metal wire used to support a filament of a lamp.

3.28 Support Hook — Extremity of a support in the shape of a hook.

3.29 Pigtail — Extremity of a support in the shape of a curl.

3.30 Lead-in Wire — Metal conductor which carries the current from the cap to the luminous element or to the electrodes.

3.31 Seal Wire — Metal wire or ribbon which forms part of a lead-in wire, sealed in the pinch and having an expansion coefficient compatible with that of the glass used for the pinch or the bulb.

3.32 Exhaust Tube — Glass tube connecting with the interior of the bulb through which the lamp is evacuated or gas-filled.

3.33 Pinch — Part of a lamp composed of a mass of glass pinched between two metal jaws during construction, into which the lead-in wires are sealed.

NOTE — In lamps with a foot, the pinch is formed by fusing together the end of the tubular part of the foot, the exhaust tube and the shed.

3.34 Contact Plate — Piece of metal, insulated from the shell of the cap, which is connected to one of the lead in wires and provides an electric contact with the lampholder.

3.35 Pin (Post) — Piece of metal in the form of a smooth or ribbed cylinder or of special shape, fixed at the end of the cap so as to engage in the corresponding hole in a lampholder. This piece, insulated from the cap, is connected to one of the lead-in wires and provides electrical contact with the lampholder.

NOTE — The terms 'pin' and 'post' generally indicate a difference in size, a pin being smaller than a post.

3.36 Bayonet Pin — Small piece of metal, which projects from the shell of a cap, particularly a bayonet cap, and which engages in the slots in a lampholder.

3.37 Deflector — Disc of metal or mica mounted in a gas-filled lamp, prependicular to its axis, in order to reduce the circulation of hot gases in the civinity of the pinch and cap and so protect them from overheating.

3.38 Getter — Substance introduced into a lamp in order to improve the vacuum or the purity of the enclosed gas or gases by physico-chemical action.

NOTE — In an incandescent vacuum lamp getter has the additional effect of retarding the blackening of the bulb.

3.39 Lampholder — An accessory used for usually connecting a lamp to an electrical circuit. It may also in addition support the lamp.

3.40 Moisture-proof Lampholder — Lampholder designed for use under damp or humid conditions as well as in the open air. Such a lampholder is made of materials unaffected by humidity and so constructed that it is waterproof and vapour-proof.

3.41 Main Electrode — Electrode through which the discharge current passes.

3.42 Starting Electrode — Auxiliary electrode for starting the discharge in a lamp.

3.43 Cold (Hot) Cathode — Cathode in a discharge lamp operating under glow (arc) discharge conditions.

3.44 Emissive Material — Material deposited on a metal electrode to promote the emission of electrons.

3.45 Starting Strip — Narrow conducting strip placed longitudinally on the internal or external wall of a tubular discharge lamp for assisting in starting. The strip may be connected to an electrode or to the shell of cap.

3.46 Fluorescent (Luminescent) Material; Phosphor — Material (usually solid) which exhibits photoluminescence (electroluminescence).

3.47 Starting Device — Electrical apparatus which provides the conditions required for starting a discharge.

3.48 Starter — Device for starting a discharge lamp (in particular a fluorescent lamp) which provides for the necessary preheating of the electrodes or causes a voltage surge or both in combination with the series ballast.

3.49 Ballast — Equipment used with discharge lamps for stabilising the discharge.

NOTE — A ballast may be resistive, inductive or capacitative or a combination of these. A starter may be incorporated in the ballast.

3.50 Homogeneous (Plain) Carbon — Carbon electrode of uniform composition.

3.51 Cored Carbon — Carbon electrode with a central core containing a mixture of carbon and some special material designed to stabilize the arc or to increase its luminous intensity or both.

3.52 Impregnated Carbon — Carbon electrode impregnated with metallic salts or having a core containing metallic salts for the purpose of increasing the luminous efficacy.

3.53 Series (Shunt) Differential Arc Regulator — Apparatus in which the arc length is regulated by an electromagnetic device in series (in parallel) (partly in series and partly in parallel) with the arc.

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*Rules for making alphabetical indexes.

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INDIAN STANDARDS

ON

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(Part XXVII)-1969 Static power convertors
(Part XXVIII)-1971 Instrument transformers
(Part XXIX)-1971 Mining terms
(Part XXX)-1971 Overhead transmission and distribution of electrical energy
(Part XXXI)-1971 Magnetism
(Part XXXII)-1971 Cables, conductors and accessories for electricity supply
(Part XXXIII)-1972 Piezo-electric filters
(Part XXXIV)-1972 Cinematography
(Part XXXV)-1972 Rotating Machines
(Part XXXVI)-1972 Radio interference
(Part XXXVII)-1972 Tariff for electricity
(Part XXXVIII)-1973 Transformers