

## Definitions & Abbreviations

**A** Taped cores, used after cable reference eg: 318/12ATQ

**Abrasion Resistance** The volume of material abraded from a specific test piece when subject to abrasive wear under specified conditions.

**AF** Aluminium foil

**Admittance** The reciprocal of impedance. Symbol  $y$ ,  $Y^2 = G^2 + B^2$ , Practical unit: Mho

**Ageing Test** An accelerated test whereby elastomeric and plastic compounds are artificially aged under exaggerated conditions in order to assess long-term serviceability in a brief test period.

**Air Spaced Coaxial Cable** One in which air is the essential dielectric material. A spirally wound synthetic filament or spacer may be used to centre the conductor.

**AL or ALI** Aluminium.

**Alloy** A metal formed by combining two or more different metals to obtain desirable properties.

**ALS** A type of cable consisting of insulated conductors enclosed in a continuous, closely fitting aluminium tube.

**Alternating Current (A.C.)** An electric current which alternately reverses its direction in a circuit in a periodic manner, the frequency being independent of the constants of the circuit.

**Ambient Temperature** The temperature of a medium (gas or liquid) surrounding an object.

**American Wire Gauge (AWG)** A standard system for designating wire diameter. Also referred to as the Brown & Sharpe (B&S) wire guide.

**Ampacity** See Current carrying capacity.

**Ampere (A)** The practical unit of electric current. An ampere =  $0.1 \text{ emu} = 3 \times 10^9$  esu. The international ampere. The unit of current in common use, being the unvarying current which, when passed through a solution of nitrate of silver in water, will deposit silver at the rate of 1.11800 milligrammes per second.

**Ampere-hour (Ah)** A commonly employed unit of quantity of electricity. The quantity measured in ampere-hours is equal to the product of the mean current in amperes, and the time in hours during which it flows. One ampere-hour is equal to 3600 coulombs.

**Annealing** The heat treatment of a material designed to change its physical or electrical properties.

**Antioxidant** An organic chemical compound added to elastomeric and some plastic materials, which protects the compound against oxidative attack during processing and/or subsequent service.

**Arc Resistance** The time required for an arc to establish a conductive path in a material.

**Armour Clamp** (Armour-gland, Armour-grip). A fitting for gripping the armour of a cable.

**Armoured Cable** A cable provided with a wrapping of metal (usually tape or wire) for the purpose of mechanical protection.

**Armouring** A metal covering usually applied in the form of tape or wire, intended to protect a cable from mechanical damage.

**AS** Aluminium screen or shield.

**ASA** Aluminium Strip Armour.

**Attenuation** The reduction in the amplitude of a wave motion due to losses which occur during the passage along a conductor.

**Attenuation Constant** Symbol - see propagation constant.

**Audio Frequency** Frequencies audible to the human ear, usually considered to be in the range of 20 to 20,000 Hz.

**AWA** Aluminium Wire Armour.

**AWG** Abbreviation for American Wire Gauge.

**AWM** Designation for appliance wiring material.

**Band Marking** A continuous circumferential band applied to a conductor at regular intervals for identification purposes.

**Basic Conductor-load** The limiting conductor-load per unit length assumed for the purposes of design.

**Bedding** A layer of material applied to a cable beneath the armouring.

**Bifurcating-box** A dividing box for two-core cable.

**Binder** A spirally served taped or threaded used for holding assembled cable components in place awaiting subsequent manufacturing operations.

**Bond Strength** Amount of adhesion between bonded surfaces, eg. in cemented ribbon cable.

**Braiding** A method of covering a core or cable whereby a number of threads or wires are applied helically and others applied helically in the opposite direction with the two layers being interwoven one with the other.

**Breakdown (Puncture)** A disruptive discharge through the insulation.

**Breakdown Voltage** The voltage at which the insulation between two conductors breaks down.

**Breakout** The point at which a conductor or group of conductors breaks out from a multiconductor cable to complete circuits at various points along the main cable.

**BS** British Standard

**Building Wire** Wire used for light and power, 600 volts or less, usually not exposed to outdoor environments.

**Bunched Cables** Cables are said to be bunched when two or more are contained within a single conduit, duct or groove, or if not enclosed, are not separated from each other.

**Bunched Conductor** A stranded conductor in which all of the wires are twisted together in the same direction, and with the same lay throughout.

**Buried Cable** A cable installed directly in the earth without use of underground conduit. Also called 'Direct burial cable'.

**Busbar** A relatively short conductor forming a common connection jumper between a number of circuits connected separately thereto.

**Cable** A length of single insulated conductor (Solid or stranded) or two or more such conductors, may or may not be protected with an overall mechanical protective covering.

**Cable Assembly** A completed cable and its associated hardware ready to install.

**Cable-bond** (Cable-sheath bond). An electrical connection for the armouring or lead sheathing of a cable.

**Cable Joint** The connection between the ends of two lengths of cable.

**Cable, Star Quad** A multicore radio or television relay cable in which the conductors are arranged in quads and each consists of four conductors twisted together, the diagonally opposite conductors constituting a pair circuit.

**Cable, Wave-length Constant or Phase Constant** Symbol - See propagation constant.

**Cabling** The twisting together of two or more conductors to form a cable.

**Calculated Effective Area** Of a conductor of a cable. The area of a solid conductor of the same resistivity and having the same resistance as that of an equal length of cable. In the case of split conductor cable, the calculated effective area is the sum of the cross-sections of each of the two or more sections into which the conductor is divided.

**Capacitance** (Capacity) The property of a conducting body by virtue of which a quantity of electricity has to be imparted to it to produce a difference of potential between it and the surrounding bodies. The ratio of the charge on a conductor is its potential when all neighbouring conductors are at zero potential. The ratio of the charge of a capacitor, i.e. the total electric flux between its electrodes, to the potential difference between them. Symbol C, Practical unit: Farad.

**Capacitance Unbalance** The inequalities of the capacitance of the wires of a telephone circuit to other wires or to earth which will produce interference. Various forms of unbalance arise according to the circuits concerned in the measurement, hence side to side unbalance, pair to pair unbalance, pair to earth unbalance etc.

**Carrier Frequency** Any frequency higher than the audio frequency which may carry an audio frequency as a modulation.

**Catenary Wire** A wire or strand, usually of high-tensile steel, which is attached to poles and which supports the weight of a cable either by suspenders or by being incorporated into the make-up of the cable.

**CB** Copper Braid.

**CCS** Copper Covered Steel.

**CELPE** Cellular Polyethylene.

**Characteristic Impedance** The impedance that would be offered by a transmission line if it were of infinite length. Thus a transmission line may be terminated with a matching impedance and line impedance at the transmitting end would be characteristic impedance of the cable symbol  $Z_0$ .

**Circuit** A number of conductors connected together for the purpose of carrying a current.

**Circular Conductor** A conductor, the cross-section of which is circular.

**Cladding** A method of applying a layer of metal over another metal whereby the junction of the two metals is continuously welded.

**Coaxial Cable** A two-conductor cable in which one conductor is on the form of a hollow tube and the second conductor is enclosed within it and insulated from it. Such cables are used at high frequencies and the electrical field is substantially contained within the outer conductor.

**Cold Bend Temperature** A test applied to insulated and/or sheathed cables, and sometimes to the compound in sheet form, to determine the lowest temperature at which a test piece does not fracture or crack when wound on a standard mandrel under specified conditions.

**Cold Flexibility Temperature** The temperature at which a test piece of standard dimensions is twisted through 200° by the application of a standard torque.

**Colour Code** A system for circuit identification through use of solid colours and contrasting tracers.

**Composite Conductor** A conductor consisting throughout its length of two or more metal conductors providing parallel paths sharing the load. Note: This should not be confused with 'Composite (telephone) Cable', which contains insulated wires of different sizes but not different metals.

**Compound** (1) A mixture of basic ingredient, such as rubber or a plastic, with a number of other ingredients to impart special properties.

(2) A mixture of waxes and pigments applied to the exterior surface of cables as a protection.

**Concentric Cables** A cable containing two or more separate conductors, arranged concentrically with insulation between them. Unless otherwise qualified, the term denotes a cable consisting of two conductors only.

**Concentric Stranding** in a wire or cable, the measurement of the location of the centre of the conductor with respect to the geometric centre of the surrounding insulation.

**Conductance** With D.C. The reciprocal of resistance. With A.C. The component of the current

in phase with the e.m.f divided by the e.m.f. The resistance divided by the square of the impedance. Symbol G, Practical unit: Mho

**Conductivity** The reciprocal of volume resistivity.

**Conductor** (1) Of a cable core, The conducting portion, consisting of a single wire or a group

of wires assembled together and in contact with each other or connected in parallel.

(2) A body of substance which offers a low resistance to the passage of an electric current.

**Conductor-load** The load per unit length to which an overhead conductor may be subjected

due to its weight, including insulation and external causes such as wind or ice.

**Conduit** In wiring, a tube mounted on or in a wall or other support intended for the reception of

cables for the distribution of electricity.

**Connector** A device used to physically and electrically connect two or more conductors.

**Contact** The parts of a connector which actually carry the electrical current and are touched

together or separated to control flow.

**Continuity Cable-bond** A cable-bond used for bonding across joints between consecutive lengths of cable.

**Continuity check** A test used to determine whether electrical current flows continuously throughout the length of cable.

**Control Cable** A multiconductor cable manufactured for operation in control or signal circuits.

**Copolymer** A resin resulting from the polymerisation together of two or more different monomers. The copolymer formed is not the same as a physical mixture of the respective polymers, e.g. vinyl chloride-acetate copolymer.

**Core** of a cable. A single conductor with its insulation, but not including any mechanical protective covering.

**Cord** A flexible insulated cable.

**Corrosion** The destruction of a metal by chemical reaction.

**Coulomb (C)** The practical unit of quantity of electricity, being the amount of electricity passing in a circuit when 1 ampere flows for one second.

A coulomb =  $0.1 \text{ emu} = 3 \times 10^9$  esu.

**Coverage** The percentage of completeness with which a metal braid covers the underlying surface.

**Cradle Centres** A specifically made centre, usually of a rubber or plastic material, designed to fill the centre of a single-layer multicore cable so as to hold the insulated conductors in their positions.

**CRCS** Abbreviation for continuous rigid cable support, Synonymous with cable tray.

**Creep** The dimensional change with time of a material under load.

**Cross-Linked** Inter-molecular bonds between long chain thermoplastic polymers by chemical or electron bombardment. The properties of the thermosetting material are usually improved.

**Cross-sectional Area** of a conductor of a cable. The sum of cross-sectional areas of the

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## Definitions & Abbreviations

**C.S.A** Abbreviation for the Canadian Standards Authority, a non-profit making, independent organisation which operates a listing service for electrical and electronic materials and equipment. The Canadian counterpart of the Underwriters Laboratories.

**CSA** Cross-sectional area.

**CSP** Chlorosulphonated Polyethylene (refer to 'Q')

**Cu** Symbol for Copper.

**Cure** see vulcanisation.

**Current Carrying Capacity** The maximum current that an insulated conductor can safely carry without exceeding the insulation and sheath temperature limitations.

**Current Density** The quantity of current flowing in unit cross-sectional area of a conductor; usually expressed in amperes per sq.cm. or amperes per sq.in.

**Cut-Through Resistance** The ability of a material to withstand mechanical pressure, usually a sharp edge or small radius without separation.

**Cycle** (Complete cycle) The complete series of changes in a periodically varying quantity, e.g. an alternating current, during one period.

**Decibels** The unit of power-level difference, measure by  $10 \log_{10} W_2/W_1$ , where  $W_2$  is a power controlled by  $W_1$ . Used as a measure of response in all types of electrical communication circuits. One decibel = 0.11513 Nepers. Symbol db.

**Density** The mass of unit volume of a substance, expressed in such units as grams per cubic centimetre or lbs per cubic foot.

**Derating Factor** A factor used to derate the current carrying capacity of a wire when used in environments other than that for which the value was established.

**Dielectric** A substance capable of supporting an electric stress.

**Dielectric Constant (K)** The ratio of the capacitance of a condenser with dielectric between the electrodes to the capacitance when air is between the electrodes. Also called Permittivity and Specific Inductive Capacity.

**Dielectric Strength** The voltage which an insulation can withstand before breakdown occurs. Usually expressed as a voltage gradient e.g. volts per mm.

**Dielectric Test** A test where a voltage higher than the rated voltage is applied for a specified time to determine the adequacy of the insulation under normal conditions.

**Direct Capacitance** The capacitance measured directly from conductor to conductor through a single insulating layer.

**Direct Current (D.C.)** An electric current flowing in one direction only and which does not have any appreciable pulsations in magnitude. Abbrev D.C. or d.c.

**Direct Current Resistance (D.C.R)** The resistance offered by any circuit to the flow of direct current.

**Direction of Lay** The lateral direction in which the strands of conductor run over the top of the cable conductor as they recede from an observer looking along the axis of the conductor or cable. Also applies to twisted cores.

**Dissipation Factor** The tangent of the loss angle of the insulating material.

**Distribution Cable** Multicore telephone cables for external installation intended to connect a number of subscribers' lines to central distribution points.

**Distribution, Systems of** A mode of distribution of electrical energy characterised by the kind of current, the number of conductors, and in the case of A.C., the number of phases.

**Two-wire system:** A system of distribution with D.C. or single phase A.C., comprising two conductors only, between which the load is connected.

**Three-wire system:** A system of distribution with D.C or single phase A.C. comprising two conductors and a middle or neutral wire, the supply being taken from the middle wire and with the outer conductor, the middle wire carrying only the difference-current and usually being connected to earth.

**Balanced three-wire system:** A three-wire system to which the loads connected between the middle wire and the outer wires are equal.

**Two-phase three-wire system:** A system of distribution with A.C., comprising three conductors which form two circuits, supplied by two currents having a relative phase displacement of a quarter of a period. Consumers' circuits are generally connected between the common conductor and one of the two outer conductors.

**Two-phase four-wire system:** A system of distribution with A.C. comprising four conductors which form two distinct circuits supplied by currents having a relative phase displacement of one quarter of a period.

**Two-phase five-wire system:** The preceding system with an additional common neutral wire, usually connected to earth.

**Three-phase three-wire system:** A system of distribution comprising three conductors connect to a three-phase supply.

**Three-phase four-wire system:** A system of distribution comprising four conductors of which three are connected to a three-phase supply and the fourth to a neutral point in the source of supply.

**Earth:** A connection to the general mass of the earth by means of an earth electrode. An object is said to be earthed when it is electrically connected to an earth electrode without a fuse, switch, circuit breaker, resistor or reactor in the earth connection.

**Earthed system:** A system of distribution in which the neutral point, or one conductor is normally connected to earth or is not permitted to depart from earth potential whilst in service.

**Earth-return system:** A system of distribution comprising one insulated conductor, the return being formed by connections to earth.

**Solidly-earthed system:** An earthed system in which the neutral point, or one conductor, is connected to a low resistance earth without the interposition of any extraneous resistance or impedance.

**Insulated system:** A system of distribution in which no point is normally connected to earth.

**Shunt or parallel system:** A system of distribution in which all the consuming devices are so connected as to have the same nominal voltage applied to them.

**Series system:** A system of distribution in which the consuming devices to be supplied are so connected that they all carry the same current.

**Two-conductor insulated wiring system:** A two wire system in which both conductors are insulated throughout and without deliberate connection to earth.

**Two-conductor earthed wiring system:** A two-wire system in which both conductors are insulated throughout their length except at one point where one of them is connected to earth.

**Earthed concentric system:** A two-wire system in which one of the conductors, (known as the internal conductor), is completely surrounded throughout its length by the other conductor (known as the external conductor), which is effectively earthed.

**Two-conductor earthed-return wiring system:** A two-wire system on which one conductor is insulated and the other un-insulated throughout its length.

**Drain Wire** in a cable, The un-insulated wire laid over the components and used as an earth connection. Normally laid in contact with a foil screen.

**Drawing** In wire manufacture. Pulling the metal through a die or series of dies to reduce the diameter to a specified size.

**Drop Wire** A telephone cable, usually consisting on one insulated telephone pair, which is used to connect a subscribers' premises to open wire lines on poles.

**Duct** A passageway formed underground, or in a wall, intended to receive one or more cables which may be drawn in.

**DWA** Double Galvanised Steel Wire Armour.

**Earth** Connection to the main mass of the earth by means of a conductor having a very low impedance.

**Earth-wire** (1) A conductor connected to earth and usually situated to the associated line conductors. (2) A conductor which is normally at earth potential and which runs parallel to the conductors of a transmission and is connected to earth at intervals.

**EB** Extruded Bedding, under Armour.

**Effective Resistance** of a circuit element with alternating current. The component of the terminal voltage in phase with the current divided by the current. The power dissipated in heat divided by the square of the current. Symbol  $R_e$ . Practical unit: Ohm.

**Electric Current** The flow of electricity along any path or around any circuit. In the electrostatic system of units, unit current is defined as that current which flows when unit quantity of electricity passes through any cross-section of the conductor per second. In the electromagnetic and practical of units, unit current is defined as the current which produces a certain specified effect. In the electromagnetic system, unit of current is that which flowing in a circular turn of radius centimetres, produces at its centre a magnetism force of 2 units. In the practical system, unit of current is that which deposits 1.11800 milligrammes of silver per second from a solution of silver nitrate. Symbol I. Practical unit: Ampere.

**Electric Strength** (Dielectric strength, Disruptive strength) The property of an insulating material which enables it to withstand electric stress, or the stress which it can successfully withstand. It is usually expressed in kilovolts per millimetre under specified conditions.

**Electric Stress** (Dielectric stress) The stress occurring in an insulating material when subjected to an electric force. It is practically synonymous with electric force.

**Electromagnetic System of Units** (EM units) A system of absolute electrical units based on the C.G.S system and having its primary electrical unit, the unit magnetic pole. It involved the permeability of free space as a fourth fundamental unit.

**Electromotive Force** (e.m.f) of a source. That force which tends to cause a movement of electricity in a circuit. The electrical condition for generating electromagnetic energy by the transfer of electricity in a certain direction. It is measured by the amount of energy generated by transfer of unit quantity of positive electricity in that direction. This direction is called the direction of electromotive force.

The e.m.f in a circuit is the excess of the sum of the e.m.f's of its constituent parts in one direction over the sum of those in the other direction. It is equal to the line integral of the electric force around the circuit. Symbol E. Practical unit Volt or V.

**Electrostatic System of Units** (E.S units) This system of absolute electrical units based on the C.G.S system, and having, as its primary electrical unit, the unit of quantity or charge. It involves the choice of the permittivity of free space as a fourth fundamental unit.

**Elongation at break** The tensile strain in a test piece stretched to breaking point, the conditions being such that stress is substantially uniform over the cross section.

**EPR** Ethylene Propylene Rubber (refer to 'T')

**Equipment Wire** Insulated wire used for internal wiring of any form of telecommunication equipment.

**ETPC** Abbreviation for electrolytic tough pitch copper. It has a minimum conductivity of 99.9%

**Extrusion** A method of converting a material into long lengths of constant cross-section by uniaxial conditions, usually high temperature, at which the material is plastic. Pressure is applied to the plastic material so as to force it through an orifice which, in the instance of cable manufacture is usually annular in section with the cable or conductors contained therein.

**Farad (F)** The practical unit of electrostatic capacitance. A farad =  $10^{-9}$  emu =  $9 \times 10^{-10}$  esu.

**Fatigue Resistance** Resistance to metal crystallisation which leads to conductors or wires breaking from flexing.

**Figure 8 Cable** An aerial cable configuration in which the conductors and the steel strand which supports the cable are integrally jacketed. A cross section of finished cable approximates the figure 'eight'.

**Filler** A fine powder (e.g. china clay, carbon black, talc) sometimes added to plastic or elastomeric materials for imparting special properties e.g. carbon black in natural rubber to give abrasion and tear resistance.

**Fillers** Textile or non-hygroscopic material laid in interstices of a cable to maintain a void free cable of round cross section.

**Flat Cable** A cable with two smooth or corrugated but essentially flat surfaces.

**Flat Conductor** A wire having a rectangular cross section as opposed to round or square conductors.

**Flame Resistance** The ability of a material not to propagate flame once the heat source is removed.

**Flammability** The measure of the material's ability to support combustion.

**Flexible Cable** A cable containing one or more cores, each formed of a group of wires, the diameters of the wires being sufficiently small to afford flexibility.

**Flexible Core (Flex)** A flexible cable having conductor of small cross-sectional area. Two flexible cords twisted together are known as twin flexible cord.

**FP** Flameproof

**FR** Flame Retardant or Flame Resistant

**Galvanising** A process for coating iron or steel with zinc, by immersing it in a bath of molten zinc.

**Gauge** A term used to denote the physical size of a wire.

**GFB** Glass Fibre Braid

**GFT** Glass Fibre Taped

**GSWB** Galvanised Steel Wire Braid

**Hard Drawn Copper Wire** Copper wire that has not been annealed after drawing.

**HD** Heavy Duty or High Density.

**Helical Stripe** A continuous, coloured, spiral stripe applied to a conductor for circuit identification purposes.

**Hertz (Hz)** A term replacing cycles-per-second as an indication of frequency.

**High Voltage** Generally, a wire or cable with an operating voltage in excess of 600 volts.

**High-voltage Test** A test, applied to a machine, transformer, cable or other apparatus, whereby a voltage greater than the working voltage is applied between parts intended to be insulated from one another, with a view to testing the adequacy of the insulation.

**HOFR** Heat and Oil Resistant, Flame Retardant.

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## Definitions & Abbreviations

**Hygroscopic** Capable of absorbing moisture from the air.

**Hypalon** Dupont's trade name for their chlorosulphonated polyethylene, an ozone resistant synthetic rubber.

**Impedance** The ratio of the r.m.s electromotive force in a circuit to the r.m.s current which is produced thereby. Symbol  $Z$ .  $Z^2 = R^2 + X^2$ .

**Inductance** The property of a circuit or a circuit element that opposes a change in current flow, thus causing current changes to lag behind voltage changes. Measuring unit : Henrys.

**Inductive Couplings** Crosstalk resulting from the action of the electro-magnetic field of one conductor on the other.

**Insulation** A material having resistance to the flow of electric current. Often called a dielectric in radio frequency cable.

**Insulator** An appliance used to insulate and usually also to support a conductor.

**Insulation Resistance** (Insulance) The resistance under prescribed conditions between two conductors or systems normally separated by an air insulating material.

**IPCEA** Abbreviation for Insulated Power Cable Engineers Association.

**Irradiation** In insulation, the exposure of the material to high energy emissions for the purpose of favourably altering the molecular structure.

**Jacket** An outer non metallic covering applied over an insulated wire or cable.

**KG/KM** Kilograms per Kilometre.

**Kilovolt-ampere (kVA)** A unit equal to 1000 volt-amperes.

**Kilowatt** A unit of power equal to 1000 watts. A kilowatt is approximately equal to 1.34 British Horse-power.

**KV** Kilo volts, A unit equal to 1000 volts.

**LA** Lead alloy, grades B,D or E

**Lacquer** A liquid resin or compound applied to textile braid to prevent fraying, moisture absorption, etc.

**Laminated Tape** A tape consisting of two or more layers of different materials bonded together.

**Lapping** The helical application of a tape, or bands of threads, over a central core so as to substantially cover the core beneath. It may be applied with either a small gap, butting or with an overlap.

**LAS** Lead Alloy Sheath.

**Laying-up** The twisting together of insulated conductors or units in layers to form a multicore cable.

**LC** Lead covered.

**Lead-covered Cable** A cable provided with a lead sheath for the purpose of excluding moisture from the conductors and insulation thereof, such sheath consisting either of commercially pure lead or, alternatively, of pure lead to which a small percentage of rarer metals has been added for hardening purposes.

**Left-Bright** The term is used when cable is armoured and no further operations are performed e.g. no external sheath added, SWA left-bright.

**Length of Lay** (Lay) of a cable. The axial length of one complete turn of the helix formed by the core, in the case of a cable, or of the wire, in the case of a stranded conductor.

**LHCL** Low Hydrogen Chloride.

**Loaded Cables** Telephone cables in which the inductance is increased by the introduction of inductance coils into the circuit or by magnetism applied to the conductors. The increased inductance decreases the overall attenuation of the system.

**Longitudinal Shield** A tape shield, flat or corrugated, applied longitudinally with the axis of the core being shielded.

**Loss** Energy dissipated without accomplishing useful work.

**Loss Factor** The product of the dissipation and dielectric constant of an insulating material.

**Low Loss Dielectric** An insulating material that has a relatively low dielectric loss, such as polyethylene.

**LTCWB** Aluminium Laminate Tape under Tinned Annealed Braid.

**LY** Lead Alloy, Grades B, D or E.

**Main** A conductor or an assemblage of conductors for the transmission and/or distribution of electrical energy.

**Mho** A name sometimes used for the practical unit of conductance, it the conductance of a body having a resistance of one ohm.

**Multicore Cable** A cable containing three or more cores not arranged concentrically.

**Mutual Capacitance** Capacitance between two conductors when all other conductors including ground are connected together and then regarded as an ignored ground.

**NBR** Nitrile Butadiene Rubber

**Neper** The unit of attenuation in which the ration of the sent current of a transmission system to the received current, both flowing through equal impedances, is equal to the base of Neperian logarithms. One neper is equal to 8.686 decibels.

**NIPLAS** Compound PVC/Acrylonitrile Butadiene Rubber.

**NYLON** Long Chain of Synthetic Polyamides.

**O.D** Overall Diameter

**OFHC** Abbreviation for oxygen-free, high conductivity copper. It has no residual deoxidant 99.95% minimum copper content and an average annealed conductivity of 101%.

**OFR** Oil Resistant, Flame Retardant.

**Ohm** The practical unit of resistance. Symbol  $\Omega$ .

(a) True ohm. The true value of the ohm. An ohm =  $10^9$  emu =  $1/9 \times 10^{-11}$  esu.

(b) International ohm (STANDARD OHM: B.o.T OHM). The unit of resistance in common use, being the resistance offered at the temperature of melting ice, to an unvarying electrical current by a column of mercury 14.4521 grammes in mass, of uniform cross-sectional area and 106.300 centimetres in length.

**OI** Oxygen Index

**Overlap** The amount of trailing edge laps over the leading edge of a spiral tape wrap.

**Oxygen Index** Percentage of oxygen necessary to support combustion in a gas mixture of oxygen and nitrogen.

**P** refer to 'PCP'

**PAC** Plain Annealed Copper.

**Pb** Lead.

**PBB** Phosphor Bronze Braid.

**PBWB** Phosphor Bronze Wire Braid.

**PCP** Polychloroprene (Rubber).

**PCW** Plain Copper Wire.

**PCWB** Plain Copper Wire braid.

**PE** Polythene or Polyethylene.

**PE (C)** Cellular Polyethylene

**Percent Conductivity** Conductivity of a material expressed as a percentage of copper.

**Permeability** (Absolute) Of a material or medium. The ratio of a magnetic flux density to the magnetising force producing it. Symbol for the absolute permeability of free space : in the emu system = 1.

**Permittivity** (Absolute) Of a dielectric medium or space. In the electrostatic system of units 4 times the ratio of the electric displacement to the electric force at the same point. In the practical system; the capacitance of unit cube. Symbol for the absolute permittivity of a vacuum:  $\epsilon$ . In the electrostatic system = 1. In the practical system:

$$= \frac{1}{4 \times 9 \times 10^9} \text{ farad per cm cube.}$$

**Permittivity** Relative Dielectric Constant of a dielectric medium. The ration of the electric flux density produced in the medium to that produced in free space by the same electric force.

**PILC** Paper Insulated/Lead Covered

**Pitch** in flat cable, the nominal distance between the index edges of two adjacent conductors.

**Pitch Conductor** Diameter of a circle passing through the centre of the conductors in any layer of a multicore conductor cable.

**Plain Conductor** A conductor consisting of one metal only.

**Plastic** (Thermosetting Thermoplastic) The term plastic is rather ambiguous; it can be understood to be a synthetic organic material , whose chief component is a resinous base. At some stage in its manufacture is either plastic (capable of being shaped) or liquid (capable of being cast) and at some later stage assumes a more or less rigid condition. A plastic is either thermosetting (cures or sets under action of heat and cannot be re-melted) or is thermoplastic (softens by heat and can be re-melted or re-moulded).

**POLY** refer to 'PE'

**Polyhalocarbon** A general name for polymers containing halogen atoms. The halogens are fluorine, chlorine, bromine and iodine.

**Polymer** A product of polymerisation.

**Polymerisation** A chemical reaction involving the condensation or addition of certain organic molecules in the process of which they are linked to form large molecules of very high molecular weight.

**Polyolefin** Any of the polymers and copolymers of the ethylene family of hydrocarbons.

**Potential Difference (P.D.)** A difference between the electrical states existing at two points tending to cause a movement of electricity from one point to another. It is measured by the amount of work done in transferring unit quantity of electricity from one point to the other. Symbol: V, Practical unit Volt.

Note: It is assumed that the work done is independent of the path followed between the two points. When this is not the case, as in the presence of varying magnetic fields, the concept of potential difference is not strictly applicable.

**Power** The rate of doing work. Symbol P, Units Watts, Kilowatt

**Primary Insulation** The first layer of non-conductive material applied over a conductor, whose prime function is to act as electrical insulation.

**Proofed Tape** A tape applied to the insulation of rubber-insulated cables and composed of cotton cloth coated with rubber compound.

**Propagation Time** Time required for a wave to travel between two points on a transmission line.

**PTFCE** Polymono-chlorotrifluoroethylene.

**PTFE** Polytetrafluoroethylene.

**Pulse Cable** A type of coaxial cable constructed to transmit repeated high voltage pulses without degradation.

**PVC** Polyvinyl Chloride.

**PWP** PVC/SWA/PVC Cable.

**Q** refer to 'CSP'

**Rated Temperature** The maximum temperature at which an electric component can operate for extended periods without loss of its basic properties.

**Reactance** The component of the applied voltage in quadrature with the current, divided by the current. Symbol: X; Practical unit: Ohm

**Reactance Drop** With A.C. that component of the voltage drop which is in quadrature with the current and equals the current in amperes multiplied by the reactance in ohms between two points.

**Reference Edge** Edge of cable or conductor from which measurements are made. Sometimes indicated by a thread, stripe, printing or other identifying mark. Conductors are usually identified by their sequential position from the reference edge, with the number one conductor closest to the edge.

**Reflection Loss** The part of signal which is lost due to reflection of power at a line discontinuity

**Resin** A synthetic organic material formed from the union (polymerisation) of one or more monomers.

**Resistance** That property of a body by virtue of which it resists the flow of electricity through it causing a dissipation of electrical energy as heat. It is equal to the constant difference of potential applied to the ends of the body divided by the current which it produces when the body has no e.m.f acting therein. Symbol: R, Practical unit: Ohm.

**Resistance Drop** With A.C. that component of the voltage drop which is in phase with the current and equals the current in amperes multiplied by the resistance in ohms between the two points.

**Retractile Cable** A cable that returns by its own energy from an extended condition to its original contracted form.

**Ribbon Cable** A flat cable of individually insulated conductors lying parallel and held together by means of adhesive or woven textile yarns.

**Ring Main** (Ring) A main closed upon itself or by bringing the ends to a common busbar, and in which the direction of flow energy at some point depends on the distribution of load.

**R.M.S** Root Mean Square (of electrical current value).

**R.M.S Value** Of amperes, volts, or other recurring variable quantities. The square root of the mean value of the square of the instantaneous values taken over one complete cycle.

**Root Mean Square** The effective value of an alternating current of voltage.

**RP** Reduced Propagation.

**RT** Radial Thickness

**S** Hessian and Compound served.

**S Twist** A direction of twisting also known as 'left-hand', used to depict a direction of lay. The opposite of Z twist.

**Safety Factor** (Factor of Safety) The ratio of the stress which produces permanent injury or breakdown, to the maximum normal working stress.

**SB** Screen Braid.

**SBR** Styrene Butadiene Rubber.

**SCCS** Silver Plated Copper Covered Steel.

**Screen** A conducting covering for a cable or a circuit to shield it from electrical interference.

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## Definitions & Abbreviations

- Segmental Conductor** A conductor, the cross-section of each segment of which is a radial section of an annulus.
- Self Extinguishing** The characteristic of a material whose flame is extinguished after the igniting flame is removed.
- Serving** Of an armoured or metal-sheathed cable. A layer of layers of fibrous material, which may be permeated with waterproofing compound, applied to the exterior of the cable.
- Served Lead-covered cable** A lead-covered cable having an exterior layer of protecting material, such as Jute, yarn or tape.
- Shaped Conductor** A conductor, the cross-section of which is other than circular.
- Sheath** The tubular covering of a cable, usually extruded, which forms a complete and waterproof coating, it may be made of Lead, Aluminium, rubber or plastic material.
- SGFB** Silicone Rubber, Glass Fibre Braid.
- Shield** In cables, a metallic layer placed around a conductor or group of conducting to prevent electrostatic or electromagnetic interference between the enclosed wires and external fields.
- Signal Cable** A cable designed to carry current of less than 1 ampere per conductor.
- Sleeving** A braided, knitted or woven tube.
- Solid Conductor** A conductor consisting of a single wire, which may be composite.
- Spark Testing** A process in which an earthed cable is passed through an electrode at a high electrical potential so as to detect any defect in the cable insulation.
- SPB** Silver Plated Braid
- SPC** Silver Plated Copper
- SPBC** Silver Plated Copper Braid
- SPCC** Silver Plated Copper Conductor
- SPCWB** Silver Plated Copper Wire Braid
- Specific Gravity** The ratio of the density (mass per unit volume) of a material to that of water.
- STA** Steel Tape Armour
- Straight-through Joint** A joint used for connecting two lengths of conductor or cable in series.
- Stranded Conductor** A conductor made up of a number of wires twisted together. When the conductor consists of more than one layer, alternate layers are twisted in opposite directions.
- Stranding** (1) The conductors of the cable are stranded when the individual wires are twisted together, regularly in layers without any twist being imparted to the individual wires. (2) In telephone cables the term stranding is used in a sense synonymous with laying-up.
- Surface Resistivity** The resistance of a material between two opposite sides of a unit square of its surface. It is usually expressed in ohms.
- SWA** Steel Wire Armour
- T** Refer to 'EPR'
- TAC** Tinned Annealed Copper.
- Tank Test** A voltage dielectric test in which the test sample is submerged in water and voltage is applied between the conductor and water as ground.
- Tape Wrap** A spirally applied tape over an insulated or un-insulated wire.
- TBC** Taped braided and Compounded.
- TCT** Tinned Copper Tape.
- TCW** Tinned Copper Wire.
- TCWB** Tinned Copper Wire Braid
- Tear Strength** The force required to cause a nick cut in a test piece to extend by the tearing of the material, the force acting in a direction substantially normal to the plane of the cut.
- Tee-joint** A joint used for connecting a branch conductor or cable to a main conductor or cable where the latter continues beyond the branch.
- Temperature Coefficient** The change in the magnitude of any property of a substance (e.g. its resistance) caused by rise of 1°C in the temperature and expressed as a fraction of the magnitude at some definite temperature adopted as standard.
- Temperature Rating** The maximum temperature at which an insulating material may be used in a continuous operation without loss of its basic properties.
- Tensile Strength** The ultimate tensile stress required to stretch a test piece to breaking point, the conditions being such that the stress is substantially uniform over a cross-section.
- Tensile Stress** Stress is the average load per unit of cross-section. The tensile stress is the stress applied to stretch a test piece.
- Thermal Resistance** (1) That property of a substance or body which causes it to resist the transmission of heat. It is measured by the ratio of the difference in temperature to the steady flow of heat produced thereby. It is preferably expressed as a number of degrees celsius per watt transmitted. (2) Of a cable. The resistance to the flow of heat, expressed in thermal ohms, of one centimetre length of the cable, offered by the path from the conductor to the external surface of the cable (Lead sheathed protective covering).
- Thermal Resistivity** (Specific Thermal Resistance) A measure of the property of a material which resists the flow of heat therein. It is usually expressed in thermal ohms per centimetre cube.
- Thermoplastic** A material which softens when heated and becomes firm on cooling.
- Thermoset** A material which hardens or sets when heat is applied, and which once set cannot be re-softened by heating. The application of heat is called 'curing'.
- Tinned Conductors** A conductor (usually copper), the wire of which are covered with a thin coating of tin.
- Tolerance** The permissible divergence of an actual magnitude from that prescribed.
- TPBB** Tinned Phosphor Bronze Braid.
- TPBWB** Tinned Phosphor Bronze Wire Braid.
- TQ** EPR/CSP (refer to 'EPR' and 'CSP')
- Tray** A cable tray system is a unit or assembly of units in sections and associated fittings, made of metal or other non-combustible material forming from a rigid structural system used to support cables. Cable tray systems (previously termed continuous rigid cable supports.) Include ladders, troughs, channels, solid bottom trays, and similar structures.
- Triaxial Cable** A cable construction having three coincident axes, such a conductor, first shield and second shield all insulated from one another.
- Troughing** A preformed channel in which cables are laid to protect them against external mechanical damage.
- TRS** Tough Rubber Sheath.
- UL** Abbreviation for Underwriters Laboratories which operates a listing service for electrical and electronic materials and equipment.
- VC** Varnished Cambric
- Velocity Ratio** The ratio of the velocity of propagation in the cable to the velocity of propagation in free space.
- VIR** Vulcanised Insulated Rubber (more commonly VRI).
- Volt (V)** The practical unit of electromotive force and potential difference. It is that electromotive force or potential difference which, applied steadily to a conductor the resistance of which is 1 ohm, produces a current of 1 ampere.
- Voltage** Strictly a difference of electrical potential expressed in volts, but also used in a more general way as a synonym for difference or electrical potential.
- Volt-ampere (V.A.)** A unit in terms of which the product of the r.m.s. amperes and the r.m.s. volts is expressed.
- Voltage Drop** The voltage between any two given points on a conductor, With D.C, the voltage drop equals the current in amperes multiplied by the resistance in ohms between the two points. With A.C. the voltage drop equals the current in amperes multiplied by the impedance in ohms between the two points.
- Voltage Rating** The highest voltage that may be continuously applied to a wire in conformance with standards of specifications.
- VP** Butyl/PCP (refer to 'V' and 'P').
- VRI** Vulcanised Rubber Insulation.
- Vulcanisation** A process usually brought about by application of heat, whereby elastomeric long-chain molecules are cross-linked to give elastic non-thermoplastic compounds. The cross-linking is affected by the inclusion of certain vulcanising agents, in case of natural rubber, these consist of sulphur and organic compounds called accelerators.
- Water Testing** A method of testing a cable in which the cable is completely immersed in water for a specified time and then subjected to electrical tests whilst still immersed.
- Watt** A unit of electric power.
- Wire** A conductor either bare or insulated.
- XLPE** Cross Linked Polyethylene.
- Y** Refer to 'PVC'

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