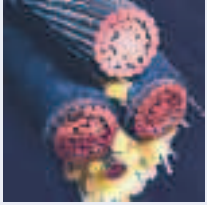

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Additional Technical Information

Glossary

A

A - Ampere.
Abrasion Resistance - Ability to resist surface wear.
AC - Alternating current.
Accelerator - A substance, usually an organic chemical compound, that hastens a chemical reaction, especially one that reduces the curing or hardening time of a thermosetting resin, or the time of vulcanisation of an elastomeric compound.
Accelerated Ageing - A test that duplicates long-time environmental conditions in a relatively short time.
Acceptance test - Made to demonstrate the degree of compliance with specified requirements.
ACSR - (Aluminium conductor, steel reinforced) - A bare composite of aluminium and steel wires usually aluminium around steel.
Admittance - The reciprocal of impedance.
Symbol: y, $Y^2 = G^2 + B^2$. Practical unit: Mho.
Ageing - The irreversible change of material properties after exposure to an environment for an interval of time.
Air Core Cable - A telephone cable in which the interstices in the cable core are not filled with a moisture barrier.
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 - Aluminium.
Alloy - A substance having metallic properties and being composed of an elemental metal and one or more chemical elements.
Alpeth - An aerial telephone cable having an aluminium screen.
ALS - A type of cable consisting of insulated conductors enclosed in a continuous, closely fitting aluminium tube.
Ambient - Conditions existing at a test operating location prior to energising of equipment.
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 and Sharpe (B&S) wire gauge.
Ampacity - The rms current which a device can carry within specified temperature limitations in a specified environment; dependent upon a) temperature ratings, b) power loss, c) heat dissipation.
Ampere - A standard unit of current. Designated as the amount of current that occurs when one volt of emf is applied across one ohm of resistance. An ampere of current is produced by one coulomb of charge passing a point in one second.
Ampere-hour - 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.
Amplitude - The maximum value of a varying wave-form.
Analog - Pertaining to data from continuously varying physical quantities.
Anneal - To soften and relieve strains in any solid material, such as metal or glass, by heating to just below its melting point and then slowly cooling it. This also generally lowers the tensile strength of the material, while improving its flex life.
ANSI - (American National Standards Institute) - An organisation that publishes nationally (US) recognised standards.
Approved - Acceptable to the authority having legal enforcement.
Arc Resistance - The time required for an arc to establish a conductive path in a material.
Armour-clamp - A fitting for gripping the armour of a cable.
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 sheath.
ASA - Aluminium Strip Armour.
ASP - A filled direct burial telephone cable used in areas subject to rodent attack. It consists of a filled cable core, corrugated aluminium screen, corrugated steel tape, flooding compound and polyethylene sheath.
ASTM - (American Society of Testing and Materials) - A group wiring standards for testing materials and specifications for materials.
Attenuation - The reduction in the amptitude of a wave motion due to losses which occur during the passage along a conductor.
Attenuation Constant - A rating for a cable or other transmitting medium, which is the relative rate of amplitude decrease of voltage or current in the direction of travel. It is measured in decibels per unit length of cable.

Glossary

Audio Frequency - Frequencies audible to the human ear, usually considered to be in the range to 20 to 20,000Hz. Normally speech lies in the range 200 to 3400Hz.
AWA - Aluminium Wire Armour.
AWG - American Wire Gauge. A wire diameter specification. The lower the AWG number, the larger the wire diameter.

B

Balanced Line - A cable having two identical conductors with the same electromagnetic characteristics in relation to other conductors and to ground.
Ballast - A device designed to stabilise current flow.
Bandwidth - The difference between the upper and lower limits of a given band of frequencies. Expressed in Hertz.
Band Marking - A continuous circumferential band applied to a conductor at regular intervals for identification.
Base Ambient Temperature - The temperature of a cable group when there is no load on any cable of the group or of the duct bank containing the group.
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 immediately below the armouring.
Birfurcating-box - A dividing box for two core cable.
Binder - A tape or thread used for holding assembled cable components in place.
Birdcage - The undesired unwinding of a stranded cable.
Bonding - The method used to produce good electrical contact between metallic parts of any device. Used extensively in automobiles and aircraft to prevent static build up. Also refers to the connectors and straps used to bond equipment.
Braid - A group of textile or metallic filaments interwoven to form a tubular structure which may be applied over one or more wires, or flattened to form a strap.
Braid Angle - The smaller of the two angles formed by the strand and the axis of the cable being screened.
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.
Bridge - A circuit which measures by balancing four impedances through which the same current flows.
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 wires are twisted together in the same direction and with the same lay throughout.
Bunching - The conductor of a cable is bunched when a number of individual wires are laid parallel and then twisted as a whole. In this case there is a twist in the individual wires. It is used for flexible cables.
Buried Cable - A cable installed directly in the earth without use of underground conduit.
Bus-bar - Uninsulated tinned copper wire used as a common lead.
Butyl Rubber - A synthetic rubber with good electrical insulating properties.

C

Cable - A length of single insulated conductor (solid or stranded) or two or more such conductors may or may not be provided with an overall mechanical protective covering.
Cable Assembly - A completed cable and its associated hardware ready to install.
Cable, Belted - A multiconductor cable having a layer of insulation over the assembled insulated conductors.
Cable-bond - An electrical connection for the armouring or lead sheathing of a cable.
Cable, Bore-hole - The term given to vertical riser cables in mines.
Cable Joint - The connection between the ends of two lengths of cable.
Cable, Multiple Twin - A multicore telephone cable in which two insulated conductors are twisted together to form a pair and two such pairs are twisted together to form a quad. This form of cable is not now commonly used.
Cable, Pressure - A cable having a pressurised medium (gas or oil) as part of the insulation.

Glossary

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. Also known as spiral four cable.

Cable, Tray - A multiconductor cable having a non-metallic jacket, designed for use in cable trays.

Cabling - The method by which a group of insulated conductors is mechanically assembled (or twisted together).

Capacitance - The ability of a dielectric material between conductors to store electricity, when a difference of potential exists between the conductors.

Capacitance Reactance - The opposition to alternating current due to the capacitance of a capacitor, cable, or circuit.

Capacitance Unbalance - The inequalities of the capacitances 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.

Capacitor - Two conducting surfaces separated by a dielectric material. The capacitance is determined by the area of the surface, type of dielectric and spacing between the conducting surfaces.

Capillary Action - The travelling of liquid along a small interstices due to surface tension.

Carrier Frequency - Any frequency higher than 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 included in the make-up of the cable.

Cathodic Protection - Reduction or prevention of corrosion by making the metal to be protected the cathode in a direct current circuit.

CB - Copper Braid.

CCS - Copper Covered Steel.

Cellular Polyethylene - Expanded or "foam" polyethylene, consisting of individual closed cells of inert gas suspended in a polyethylene medium, resulting in a desirable reduction of dielectric constant.

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 sending end would be the characteristic impedance of the cable Symbol Z_0.

Circuit - A system of conducting mediums designed to pass an electric current.

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

Circular Mil - A term used to define cross sectional areas using an arithmetic short-cut in which the area of a round wire is taken as "diameter in mils (.001") squared".

Coaxial Cable - A cylindrical transmission line composed of a conductor centred inside a metallic tube or shield, separated by a dielectric material and usually covered by an insulating jacket.

Coil Effect - The inductive effect exhibited by a spiralwrapped shield, especially above audio frequencies.

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 temperatures at which a test piece of standard dimensions is twisted through an angle of 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.

Compound - (1) A mixture of a basic ingredient, such as rubber or a plastic, with a number of other ingredients designed to impart special properties. (2) A mixture of waxes and pigments applied to the outside of cables as a protection.

Concentric Cable - 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 - A group of uninsulated wires twisted together and containing a centre core with subsequent layers spirally wrapped around the core to form a single conductor.

Concentricity - 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.

Glossary

Conductivity - The ability of a material to allow electrons to flow, measured by the current per unit of voltage applied. Also, it is the reciprocal of resistivity.
Conductor - A material suitable for carrying an electric current.
Conductor Stress Control - The conducting layer applied to make the conductor a smooth surface in intimate contact with the insulation.
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 the flow.
Continuity Cable-bond - A cable-bond used for bonding across joints between consecutive lengths of cable.
Continuity Check - A test to determine whether electrical current flows continuously throughout the length of a single wire or individual wires in a cable.
Continuous Vulcanisation - Simultaneous extrusion and vulcanisation of rubber-like wire coating materials.
Control Cable - A multiconductor cable made for operation in control or signal circuits.
Copolymer - A resin resulting from the polymerisation together of two or more different monmers. The copolymer formed is not the same as a physical mixture of the respective separate 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.
Corona - A discharge of electricity which appears round a conductor when the potential gradient at the surface of the conductor exceeds a certain value.
Corrosion - The destruction of the surface of a metal by chemical reaction.
Coulomb (C) - The unit of quantity of electricity in the practical system. It is the quantity passing in a second when the mean current is one ampere.
Coverage - The percent of completeness with which a metal braid covers the underlying surface.
Cross Cable-bond - A cable-bond used for connecting the armouring or lead sheathing of adjacent cables.
Cross-Linked - Inter-molecular bonds between long chain thermoplastic polymers by chemical or election bombardment means. The properties of the resulting thermosetting material are usually improved.
Cross-Sectional Area - Of a conductor of a cable. The sum of the cross-sectional areas of the component wires of the conductor, that of each wire being measured perpendicular to its individual axis.
C.S.A. - Cross-Sectional-Area.
Current, Alternating (AC) - An electric current that periodically reverses direction of electron flow. The rate at which a full cycle occurs in a given unit of time (generally a second) is called the frequency of the current.
Current Carrying Capacity - The maximum current an insulated conductor can safely carry without exceeding the insulation and sheath temperature limitations.
Current, Charging (I_C) - The current needed to bring the cable up to voltage; determined by capacitance of the cable. After withdrawal of voltage, the charging current returns to the circuit; the charging current will be 90° out of phase with the voltage.
Current Density - (a) At a point. The ratio of the current through a small area normal to the current, at that point, to the area. (b) Average. The ratio of the current flowing in a conductor to the cross-section of the conductor. It is actually expressed in amperes per square centimetre.
Current, Direct (DC) - Electrical current value whose electrons flow in one direction only. It may be constant or pulsating as long as the movement is in the same direction.
Cut-Through Resistance - The ability of a material to withstand mechanical pressure without damage.

D

Decibel - The unit of attenuation is defined by the number of decibels in a transmission system being equal to 10 times the logarithm to use base 10 of the ratio of the sent power to the received power. One decibel = 0.11513 Nepers Symbol db.
Delay Line - A cable made to provide very low velocity of propagation with long electrical for transmitted signals.
Demand - (1) The measure of the maximum load of a utility's customer over a short period of time.

Glossary

Derating Factor - A factor used to reduce current carrying capacity when the cable is used in environments other than the standard.
Dielectric - An insulating (nonconducting) medium.
Dielectric Absorption - The storage of charges within an insulation; evidenced by the decrease of current flow after the application of a DC voltage.
Dielectric Breakdown - Any change in the properties of a dielectric that causes it to become conductive. Normally a catastrophic failure of an insulation because of excessive voltage.
Dielectric Constant - Also called permittivity. That property of a dielectric which determines the amount of electrostatic energy that can be stored by the material when a given voltage is applied to it. Actually, the ratio of the capacitance of an identical capacitor using a vacuum as a dielectric.
Dielectric Loss - The power dissipated in a dielectric as the result of the friction produced by molecular motion when an alternating electric field is applied.
Dielectric Strength - The maximum voltage which an insulation can withstand without breaking down; usually expressed as a gradient-vpm (volts per mil).
Dielectric Test - A test which a voltage higher than the rated voltages applied for a specified time to determine the adequacy of the insulation under normal conditions.
Direct Burial Cable - A cable installed directly into the earth.
Direction of Lay - The lateral direction in which the strands of a 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.
Dividing-box - A closed box in which the cores of multicore cable can be connected to external conductors.
Drain Wire - An uninsulated wire in contact with a screen throughout its length and used for terminating the screen.
Drawing - In wire manufacture, pulling the metal through a die or a series of dies to reduce diameter to a specified size.
Drop Wire - A telephone cable, usually consisting of 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.

E

EMF - Voltage (electromotive force).
ECTFE - (Halar) Allied Co. trademark for ethylene chlorotrifluoroethylene.
Earth - Terminology for zero-reference ground.
Earthing Cable-bond - A cable bond used for connecting the mouring or lead sheathing of a cable to earth.
EB - Extruded Bedding under Armour.
Eccentricity - Like concentrically, a measure of the centre of a conductor's location with respect to the circular cross section of the insulation. Expressed as a percentage of displacement of one circle within the other.
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 head divided by the square of the current. Symbol R. Practical unit ohm.
Elastomer - Any material that will return to its original dimensions after being stretched or distorted.
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 that current which produces a certain specified effect. In the electromagnetic system, unit 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 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 - The property of an insulating material when subjected to an electric force. It is practically synonymous with electric force.
Electromagnetic - Referring to the combined electric and magnetic fields caused by electron motion through conductors.
Electron - An elementary particle containing the smallest negative electric charge.
Electrostatic - Pertaining to static electricity, or electricity at rest. An electric charge, for example.
Electrostatic Coupling - The transfer of energy by means of a varying electrostatic field. Capacitive coupling.

Glossary

Elexar - (TPE) Shell trademark for thermoplastic elastomer.
EP, EPM, EPR, EPDM - See rubber ethylene propylene.
EPDM - Ethylene propylene diene monomer.
EPR - Ethylene propylene rubber.
ETFE - (Tefzel) Du Pont trademark for fluorinated tetrafluoroethylene.
Equipment Wire - Insulated wire used for the internal wiring of any form of telecommunication equipment.
External Interference - The effects of electric waves or fields which cause sounds other than the desired signal. Static.
Extrusion - A method of converting a material into long lengths of constant cross-section by utilising conditions, usually high temperatures, 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.

F

FEP - (Teflon) Du Pont trademark for fluorinated ethylene propylene.
Fibreoptics - Transmission of energy by light through glass fibre.
Filled Cable - A telephone cable construction in which the cable core is filled with a material that will prevent moisture from entering or passing through the cable.
Filler - A fine powder (e.g. china clay, carbon black, talc) sometimes added to plastic or electromeric 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 shaped conductors.
Flat Conductor Cable - A cable with a plurality of flat 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 Cord - A flexible cable having a conductor of small cross-sectional area. Two flexible cords twisted together are known as twin flexible cords.
Foamed Plastics - Insulations having a cellular structure.
FR - Flame Resistant or retardant.
FR-1 - A flammability rating established by the Underwriters Laboratories for wires and cables that pass a specially designed vertical flame test. The designation has been replaced by VW-1.
Frequency - The number of cycles per second. The reciprocal of the period.
Fuse - A device for opening a circuit by means of a conductor designed to melt when an excessive current flows. The fuse comprises all the parts that form the complete device.
Fusing-current - Applied to fuse-link. The actual current at which the fuse-element in a fuse will melt under specific conditions.

G

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.
Ground - A conducting connection between an electrical circuit and the earth or other large conducting body to serve as an earth thus making a complete electrical circuit.
GSWB - Glavanised Steel Wire Braid.

H

Halar - (ECTFE) Allied Co. trademark for ethylene chlorotrifluoroethylene.
Hard Drawn Copper Wire - Copper wire that has not been annealed after drawing.
Harness - An arrangement of wires and cables, usually with many breakouts, which have been tied together or pulled into a rubber or plastic sheath, used to interconnect an electric circuit.

Glossary

Hash Mark Stripe - A non-continuous helical stripe applied to a conductor for identification.
Hazardous - Ignitable vapours, dust, or fibres that may cause fire or explosion.
HD - Heavy Duty or High Density.
HDPE - High Density polyethylene.
Heat Seal - A method for sealing a tape-wrap jacket by thermal fusion.
Heat Shock - A test to determine stability of a material by sudden exposure to a high temperature for a short period of time.
Helical Stripe - A continuous, coloured, spiral stripe applied to a conductor for circuit identification.
Hertz (Hz) - A term replacing cycles-per-second as an indication of frequency.
High Voltage - Generally, a wire or cable with an operating voltage of 11000 V and above.
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.
HMWPE - High molecular weight polyethylene.
HOFR - Heat and Oil Resistant, Flame Retardant.
Hot Modulus - Stress at 100% elongation after 5 minutes of conditioning at a given temperature.
HR - Heat resistant.
Hygroscopic - Readily absorbing and retaining moisture.
Hypalon - (CSP) Du Pont trademark for chlorosulphenated polyethylene.

I

I - Symbol used to designate current.
IEEE - Institute of Electrical and Electronics Engineers.
Impact Strength - A test for determining the punishment a cable can withstand without physical or electrical breakdown by impacting with a given weight, dropped a given distance, in a controlled environment.
Impedance - The total opposition a circuit, cable or component offers to alternating current. It includes both resistance and reactance and is generally expressed in ohms.
Impedance, characteristic - In a transmission cable of infinite length, the ratio of the applied voltage to the resultant current at the point the voltage is applied. Or, the impedance which makes a transmission cable seem infinitely long, when connected across the cable's output terminals. For a waveguide, it is the ratio of rms voltage to total rms longitudinal current at certain points on a diameter, when the waveguide is match-terminated.
Impedance, High - Generally, the area of 25,000 ohms or higher.
Impedance, Low - Generally, the area of 1 through 600 ohms.
Impedance Match - A condition whereby the impedance of a particular circuit cable or component is the same as the impedance of the circuit, cable, or device to which it is connected.
Impulse Voltage or Current - A unidirectional voltage (or current) which, without appreciable oscillations, rises rapidly to a maximum value and falls more or less rapidly to zero.
Inductance - A property of a conductor or circuit which resists a change in current. It causes current changes to lag behind voltage changes and is measured in henreys.
Induction - The phenomenon of a voltage, magnetic field, or electrostatic charge being produced in an object by lines of force from the source of such fields.
Inductive Couplings - Crosstalk resulting from the action of the electro-magnetic field of one conductor or the other.
Insulation - A material having good dielectric properties which is used to separate close electrical components, such as cable conductors and circuit components.
Insulation Resistance - The resistance under prescribed conditions between two conductors or systems of conductors normally separated by an insulating material.
Insulator - An appliance used to insulate and usually also to support a conductor.
Interference - Disturbances of an electrical or electromagnetic nature that introduce undesirable responses into other electronic equipment.
Irradiation - In insulations, the exposure of the material to high energy emissions for the purpose of favourably altering the molecular structure.
Interstice - The space or void between assembled conductors and within the overall circumference of the assembly.
Intrinsically Safe - Incapable of releasing sufficient electrical or thermal energy under normal or abnormal conditions to cause ignition of a specific hazardous atmospheric mixture in its most ignitable concentration.

Glossary

Ionisation - The formation of ions. Ions are produced when polar compounds are dissolved in a solvent and when a liquid, gas or solid is caused to lose or gain electrons due to the passage of an electric current.
Isolation - The ability of a circuit or component to reject interference, usually expressed in db.

J

Jacket - An outer non-metallic productive covering applied over an insulated wire or cable.
Jumper - In an overhead line. A length of conductor, not under tension, which forms the electrical connection of the line conductor between two anchor-clamps.
Junction-box - A closed box, usually placed underground, to which the ends of feeders and distributing mains are brought with the object of connecting them to each other and protecting them from mechanical damage.

K

Kapton - Du Pont trademark for polyimide.
Kilo - Prefix meaning thousand.
Kirchoff's Laws - (1) The algebraic sum of the currents at any point in a circuit is zero. (2) The algebraic sum of the product of the current and the impedance in each conductor in a circuit is equal to the electromotive force in the circuit.
KV - Kilovolt (1000 Volts).
KVA - Kilovolt ampere.
Kynar - (PVDF) Pennwaly trademark for polyvinylidene flouride.
KW - Kilowatt.

L

LA - Lead Alloy Grades B, D or E.
Lay - Pertaining to wire and cable, the axial distance required for one cabled conductor or conductor strand to complete one revolution about the axis around which it is cabled.
Lay Direction - The twist in the cable as indicated by the top strands while looking along the axis of the cable away from the observer. Described as right-hand or left-hand.
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 band of threads, over a central core so as substantially to 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.
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, pure lead to which a small percentage of rarer metals has been added for hardening purposes.
Leakage - The undesirable passage of current over the surface of or through an insulator.
Leakage Distance - The shortest distance along an insulation surface between conductors.
Left Bright - The term is used when cable is armoured and no further operations are then involved, e.g. 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.
Line Voltage - The value of the potential existing on a supply or power line.
Load - A device that consumes or converts the power delivered by another device.
Longitudinal Shield - A tape shield, flat or corrugated, applied longitudinally with the axis of the core being shielded.
Loop Mile - A mile of paired circuit, in a telephone cable.
Loss - The portion of energy applied to a system that is dissipated and performs no useful work.
Loss Angle - Of a capacitor or dielectric under alternating electric stress. The angle by which the angle of lead of the current falls short of 90 degrees.
Low Loss Dielectric - An insulating material that has a relatively low dielectric loss, such as polyethylene or Teflon.
LTCWB - Aluminium Laminate Tape laid under Tinned Annealed Braid.

M

Magnetic Field - The region within which a body or current experiences magnetic force.

Glossary

Magnetic Flux - The rate of flow of magnetic energy across or through a surface (real or imaginary).
Main - A conductor or an assemblage of conductors for the transmission and/or distribution of electrical energy.
Mega - Prefix meaning million.
Megarad - A unit for measuring radiation dosage.
Melinex - ICI trademark for polyester.
Melt Index - The extrusion rate of a material through a specified orifice at specified conditions.
Mho - A name sometimes used for the practical unit of conductance. It is the conductance of a body having a resistance of one ohm.
MHz - Megahertz (one million cycles per second) Formerly mc.
Micro - Prefix meaning one-millionth.
Modules of Elasticity - The ratio of stress (force) to strain (deformation) in a material that is elastically deformed.
Moisture Absorption - The amount of moisture, in percentage, that a material will absorb under specific conditions.
Moisture Resistance - The ability of a material to resist absorbing moisture from the air or when immersed in water.
Monomer - The basic chemical unit used in building a polymer.
MTW - Thermoplastic insulated machine tool wire.
Multicore Cable - A cable containing three or more cores not arranged concentrically.
Mutual Capacitance - Capacitance between two conductors when all other conductors are connected together.

N

NBR - Nitrile Butadene Rubber. A material with good oil and chemical resistance.
Neper - The unit of attenuation in which the ratio of the sent current of the transmission system to the received current, both flowing through equal impedances, is equal to the base of Neperian logarithms. One nepar is equal to 8,686 decibels.
Neoprene - A synthetic rubber with good resistance to oil, chemical, and flame. Also called polychloroprene.
Network - An aggregation of conductors intended for the distribution of electrical energy.
NIPLAS - Compound PVC/Acrylonitrile Butadiene Rubber.
Nomex - Du Pont trademark for a temperature resistant, flame retardant nylon.
Nylon - An abrasion-resistant thermoplastic with good chemical resistance. Polyamide.

O

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 conductivity of 101%.
OFR - Oil resistance, flame retardant.
Ohm - The electrical unit of resistance. The value of resistance through which a potential difference of one volt will maintain a current of one ampere.
Ohm's Law - Stated $E = IR$, $I = E/R$, or $R = E/I$, the current I in a circuit is directly proportional to the voltage E, and inversely proportional to the resistance R.
Oscillating Current - An electric current which alternately reverses its direction in a circuit in a periodic manner, the frequency being dependant solely on the constants of the circuit.
Osmosis - The diffusion of fluids through membranes.
Output - The useful power or signal delivered by a circuit or device.
Overhead Line - An electric line situated above ground, usually with the conductors supported on separate insulators.
Oxygen Index - A test to rate flammability of materials in a mixture of oxygen and nitrogen.
Ozone - Extremely reactive form of oxygen, normally occurring around electrical discharges and present in the atmosphere in small but active quantities. In sufficient concentrations, it can break down certain rubber insulation under tension (such as bent cable).

P

PAC - Plain Annealed Copper.
PAP - A commonly used term for air core (unfilled) direct burial telephone cable with a corrugated aluminium shield.
Parallel Circuit - A circuit in which the identical voltage is presented to all components and the current divides among the components according to the resistances of the impedances of the components.
Pb - Lead.
PBB - Phosphor Bronze Braid.
PBWB - Phosphor Bronze Wire Braid.
PCP - Polychloroprene.
PCW - Plain Copper Wire.

Glossary

PCWB - Plain Copper Wire Braid.
PE - Polythene or polyethylene.
Peak - The maximum instantaneous value of a varying current or voltage. Also called crest.
PE (C) - Cellular Polyethylene.
PE (S) - Solid Polyethylene Insulation.
PE (TT) - Thread and Tube Polyethylene Insulation.
PEEK - ICI Trademark for Polyether Ether Ketone.
Percent Conductivity - Conductivity of a material expressed as a percentage of that of copper.
Permeability - (Absolute) Of a material or medium. The ratio of a magnetic flux density to the magnetising force producing it.
Permeability - (Relative) Of a material or medium. The ratio of the magnetic flux density produced in the medium to that produced in a vacuum by the same magnetising force.
Permeance - The reciprocal of reluctance.
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.
Permittivity - (Relative Dielectric Constant) Of a dielectric medium. The ratio of the electric flux density produced in the medium to that produced in free space by the same electric force.
PFA - (Teflon) Du Pont trademark for perfluoroalkoxy.
PGFB (PTFE) - Glass Fibre Braid.
Phase - The location of a position on a waveform of an alternating quality, in relation to the start of a cycle. Measured in degrees, with 360 corresponding to one complete cycle.
Phase Sequence - The order in which the successive members of a periodic wave set reach their positive maximum values: a) zero phase sequence - no phase shift; b) plus/minus phase sequence - normal phase shift.
PICAS - Paper Insulated Corrugated Aluminium Sheathed.
Pico - Prefix meaning one-millionth of a one-millionth.
PILC - Paper Insulated Lead Covered.
Pitch - In flat cable, the nominal distance between the index edges of two adjacent conductors.
Pitch Diameter - Diameter of a circle passing through the centre of the conductors in any layer of a multiconductor cable.
Plain Conductor - A conductor consisting of one metal only.
Plastic - High polymeric substances, including both natural and synthetic products, but excluding the rubbers that are capable of flowing under heat and pressure.
Plastic Deformation - Change in dimensions under load that is not recovered when the load is removed.
Plasticiser - A chemical added to plastics to make them softer and more flexible.
Polybutadiene - A type of synthetic rubber often blended with other synthetic rubbers to improve their properties.
Polyethylene - A thermoplastic material having excellent electrical properties.
Polyhalocarbon - A general name for polymers containing halogen atoms. The halogens are fluorine, chlorine, bromine and iodine.
Polymer - A substance made of many repeating chemical units or molecules. The term polymer is often used in place of plastic, rubber, or elastomer.
Polymeric - Describing a material formed by polymerisation. e.g. polymeric plastiser.
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.
Polypropylene - A thermoplastic similar to polyethylene but stiffer and having higher softening point (temperature).
Polyurethane - Broad class of polymers noted for good abrasion and solvent resistance. Can be solid or cellular form.
Polyvinyl Chloride - A general purpose thermoplastic used for wire and cable insulations and sheaths.
Power Loss - The difference between the total power delivered to a circuit, cable, or device and the power delivered by that device to a load.
PPE - Polypropylene ethylene.
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 a rubber compound.
Propagation Constant - A complex constant which defines the change in an amplitude and phase of the potential or current along a transmission line.
Propagation Time - Time required for a wave to travel between two points on a transmission line.
PTFE - (TFE Teflon) Polytetrafluoroethylene.

Glossary

Pulling Eye - A device fastened to a cable to which a hook may be attached in order to pull the cable into or from a duct.
Pulse - A current or voltage which changes abruptly from one value to another and back to the original in a finite length of time. Used to describe one particular variation in a series of wave motions.
Pulse Cable - A type of coaxial cable constructed to transmit repeated high voltage pulses without degradation.
Put-up - Packaging of finished wire or cable.
PVC - Polyvinyl Chloride.
PVDF - (Kynar) Pennwalt trademark for polyvinylidene fluoride.

R

R - Symbol for resistance or resistor.
Rad - The unit of radiation dose which is absorbed equal to .01 joule/kilogram.
Rated Temperature - The maximum temperature at which an electric component can operate for extended periods without loss of its basic properties.
Reactance - In DC circuits, the opposition a material offers to current, measured in ohms. In AC circuits, resistance is the real component of impedance and may be higher than the value measured at DC.
Reactance Drop - With AC, 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 the two points.
Reflection Loss - The part of a signal which is lost due to reflection of power at a line discontinuity.
Reluctance - Of a magnetic circuit. The ratio of the magnetomotive force acting in the circuit to the resulting magnetic flux.
Reluctivity - The reciprocal of permeability.
Resin - A synthetic organic material formed by the union (polymerisation) of one or more polymers.
Resistance - In DC circuits, the opposition a material offers to current, measured in ohms. In AC circuits, resistance is the real component of impedance and may be higher than the value measured at DC.
Resistance Drop - With AC, 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.
Resistivity - (p) A material characteristic opposing the flow of energy through the material; expressed as a constant for each material: p is affected by temperature, contamination, alloying, coating, etc.
Resonant Frequency - Of an oscillating circuit. A frequency at which there occurs a decrease through zero of the rate of change with frequency of some specified current or potential difference, or a passage through zero of some specified phase angle, in the response of a circuit to a specified sinusoidal excitation.
Retractile Cable - A cable that returns by its own energy from an extended condition to its original contracted form.
RFI - Abbreviation for radio frequency interference.
RG/U - "RG" is the military designation for coaxial cable, and "U" stands for 'general utility'.
Ribbon Cable - A flat cable of individually insulated conductors lying parallel and held together by means of adhesive or woven textile yarn.
Ringing Out - The process of locating or identifying specific conductive paths by means of passing current through selected conductors.
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.
RMS - Root-mean-square. The effective value of an alternating current of voltage.
Roentagen - The amount of radiation that will produce one electrostatic unit of ions per cubic centimetre volume.
Rope Strand - A conductor composed of a centre group of twisted strands surrounded by layers of twisted strands.
RP - Reduced Propagation.
RT - Radial Thickness.
Rulen - Du Pont trademark for their flame retardant polyethylene insulating material.

S

SB - Screen Braid.
SBR - Styrene Butadiene Rubber.
SCCS - Silver Plated Copper Covered Steel.
Screen/Shield - A sheet, screen, or braid of metal, usually copper, aluminium, or other conducting material placed around or between electric circuits or cables or their components, to contain any unwanted radiation, or to keep out of an unwanted interference.

Glossary

Sealing-box - A closed box fitted to one end of a cable where connection is made with an external conductor, in such a manner as to protect the insulation of the cable from air or moisture.
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.
Separable Insulated Connector - An insulated device to facilitate power cable connections and separations.
Series Circuit - A circuit in which the components are arranged end-to-end to form a single path for current.
Serving - Of an armoured or metal-sheathed cable. A layer or layers of fibrous material, which may be permeated with waterproof, applied to the exterior of the cable. A layer or layers of waterproof compound may also be present.
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 of lead, aluminium, rubber or plastic material.
SGFB - Silicone Rubber-Glass Fibre Braid.
Signal - Any visible or audible indication which can convey information. Also, the information conveyed through a communication system.
Signal Cable - A cable designed to carry current of less than 1 ampere per conductor.
Silicone - A material made from silicon and oxygen. Can be thermosetting elastomer or liquid form. The thermosetting elastomer form is noted for high heat resistance.
Skin Effect - The tendancy of alternating current, as its frequency increases, to travel only on the surface of a conductor.
SNM - A cable designed for use in hazardous locations consisting of insulated conductors in an extruded non-metallic jacket which is then covered with an overlapping spiral metal tape and wire shield and jacketed with an extruded moisture, flame, oil, corrosion, fungus and sunlight-resistant non-metallic material.
Solid Conductor - A conductor consisting of a single wire, which may be composite.
Span-length - The distance between two adjacent points of support of a conductor.
Spark Testing - A process in which an earthed cable is passed through an electrode at a high electrical potential so as to detect any defects in the cable insulation.
SPB - Silver plated braid.
SPC - Silver plated copper.
SPBC - Silver plated copper braid.
SPCC - Silver plated copper conductor.
SPCW - Silver plated copper wire.
SPCWB - Silver plated copper wire braid.
Specific Gravity - The ratio of the density (mass per unit of volume) of a material to that of water.
Spiral Wrap - The helical wrap of a tape or thread over a core.
STA - Steel Tape Armour.
Static Charge - An electrical charge that is bound to an object. An unmoving electrical charge.
Straight-through Joint - A joint used for connecting two lengths of conductor or cable in series.
Strand - A single uninsulated wire.
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 the 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.
Static Charge - An electrical charge that is bound to an object. An unmoving electrical charge.
Stress Relief Cone - Mechanical element to relieve the electrical stress at a screened cable termination.
Superconductors - Materials whose resistance and magnetic permeability are infinitesimal at absolute zero (-273°C)
Surface Resistivity - The resistance of a material between two opposite sides of a unit square of its surface. It is usually expressed in ohms.
Surge - A temporary and relatively large increase in the voltage or current in an electric circuit or cable. Also called transient.
Surlyn - Du Pont's trade name for their thermoplastic resin with ionic crosslinks.
SWA - Steel Wire Armour.

Glossary

T

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 uninsulated 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 the 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.
Teflon - Du Pont Companys trademark for fluorocarbon resins.
Tefzel - (ETFE) Du Pont trademark for ethylene tetrafluoroethylene.
Temperature Coefficient - The change in the magnitude of any property of a substance (e.g. its resistance) caused by a rise of 1°C in the temperature and expressed as a fraction of the magnitude at some definite temperature adopted as a standard.
Temperature, Operating - The temperature at which a device is designed or rated for normal operating conditions; for cables: the maximum temperature for the conductor during normal operation.
Temperature Rating - The maximum temperature at which an insulating material may be used in continuous operation without loss of its basic properties.
Tensile Strain - Strain is the alteration of a shape or dimensions resulting from stress. Tension strain is the elongation produced by a tension stress; it is the elongation in the direction of stress expressed as a percentage of the original length.
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 the cross-section.
Tensile Stress - Stress is the average load per unit area of cross-section. The tensile stress is the stress applied to stretch a test piece.
Tension Set - Hitherto commonly known as permanent set or sub-permanent set, is the residual tensile strain after stretching (a) to a given strain, or (b) under a given strain.
Test, Corona - Finding the corona extinction and inception voltage levels; low levels indicate impurities in insulation, or voids within the insulation, or voids between insulation and shield, or broken shields.
Test, U-bend - A test to determine corona discharge and ozone resistance; time to failure is the parameter measured.
TFE - Tetrafluoroethylene. A thermoplastic material having good electrical insulating properties and chemical and heat resistance.
Thermal Ohm - The thermal resistance of a body across the opposite faces of which there is a temperature difference of 1°C when the heat flows at a rate of 1 watt.
Thermocouple - A device using the Seebeck effect to measure temperature.
Thermoplastic - A material which will soften, flow, or distort appreciably when subjected to sufficient heat and pressure. Examples are polyvinyl chloride and polyethylene.
Thermosetting - A material which will not soften, flow, or distort appreciably when subjected to heat and pressure. Vulcanisable. Examples are rubber and neoprene.
THHN - 90°C, 600 Volt nylon jacketed building wire for dry locations.
THWN - 75°C 600 Volt nylon jacketed building wire for wet and dry locations.
Tinned Conductors - A conductor (usually copper), the wire(s) of which are covered with a thin coating of tin.
TPBB - Tinned Phosphor Bronze Wire Braid.
TPBWB - Tinned Phosphor Bronze Braid.
TPR - (TPE) UniRoyal trademark for thermoplastic elastomer.
Transmission Loss - The decrease or loss in power during transmission of energy from one point to another. Usually expressed in decibels.
Transmission Line - An electric line intended solely for the transmission of electrical energy from a generating station, or a sub-station, to other stations or sub-stations.
Thermal Rating - The temperature range in which a material will perform its function without undue degradation.
Transducer - A device for transforming mechanical energy, or for transforming electrical energy to mechanical energy, such as in microphones and loudspeakers, but not motors or generators.

Glossary

Transformer - A static device consisting of winding(s) with or without a tap(s) with or without a magnetic core for introducing mutual coupling by induction between circuits.
Transformer, Auto - Any transformer where primary and secondary connections are made to a single cell.
Transformer, Power - Designed to transfer electrical power from the primary circuit to the secondary circuit(s) to (1) step up the secondary voltage at less current, or (2) step down the secondary voltage at more current; with the voltage-current product being constant for either primary or secondary.
Trifurcating-box - A dividing-box for a three core cable.
Trunk Feeder - A line interconnecting two sources of energy.
TRS - Tough Rubber Sheath.

U

U-Bend Test - See Test, U-bend.
UF - Thermoplastic underground feeder and branch circuit cable.
UHF - Abbreviation for ultra high frequency. 300 to 3,000 MHz.
UL - Abbreviation for Underwriters Laboratories, a non-profit independent organisation, which operates a listing service for electrical and electronic materials and equipment.
Ultrasonic Cleaning - Immersion cleaning aided by ultrasonic waves which cause microagitation.
Unilay - More than one layer of helically laid wires with the direction of lay and length of lay the same for all layers.

V

V - Volt.
VA - Volt-ampere. A designation of power in terms of volts and amperes.
VC - Varnished Cambric.
Velocity of Propagation - The transmission speed of an electrical signal down a length of cable compared to speed in free space. Usually expressed as a percentage.
Velocity Ratio - The ratio of the velocity of propagation in the cable to the velocity of propagation in free space.
VHF - Abbreviation for very high frequency, 30 to 300 MHz.
VIR - Vulcanised Insulated Rubber.
Viscosity - Internal friction or resistance to flow of a liquid: the constant ratio of shearing stress to rate of shear.
Volt - A unit of electrical pressure. One volt is the amount of pressure that will cause one ampere of current in one ohm of resistance.
Voltage - Electrical potential or electromotive force expressed in volts.
Volt-ampere - (VA) A unit in terms of which the product of the rms amperes and the rms volts is expressed.
Voltage, Corona Extinction - The minimum voltage that sustains corona: determined by applying a corona producing voltage, then decreasing the voltage until corona is extinct.
Voltage Drop - The voltage developed across a component or conductor by the current in the resistance or impedance of the component or conductor.
Voltage, Induced - A voltage produced in a conductor by a change in magnetic flux linking that path.
Voltage Standing Wave Ratio - (VSWR) The ratio of the maximum effective voltage to the minium effective voltage measured along the length of a mis-matched radio frequency transmission line.
Voltage to Ground - The voltage between an energised conductor and earth.
Volume Resistivity (Specific Insulation Resistance) - The electrical resistance between opposite faces of a 1cm cube of insulating material, commonly expressed in ohms/centimetre.
VRI - Vulcanised Rubber Insulation.
VSWR - Abbreviation for volume standing wave ratio.
Vulcanise - To cure by chemical reaction that induces extensive changes in the physical properties of a rubber or plastic, brought about by reacting it with sulphur and or other suitable agents; the changes in physical properties include decreased plastic flow, reduced surface tackiness, increased elasticity, much greater tensile strength and considerably less solubility: the process being hastened by heat and pressure; the method of curing thermosetting materials - rubbers, XLP, etc.
VW-1 - A flammability rating established by Underwriters Laboratories for wires and cables that pass a specially designed vertical flame test, formerly designated FR-1.

W

W - Symbol for watt or wattage.
Waterproof Serving - Of an armoured or lead-covered cable. A layer of waterproof material is applied to the exterior of the cable.

Glossary

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 while still immersed.
Watt - A unit of electrical power. One watt is equivalent to the power represented by one ampere of current under a pressure of one volt in a DC circuit.
Wavelength - The distance measured in the direction of propagation, or a repetitive electrical pulse or waveform between two successive points that are characterised by the same phase of vibration.
Wire - A conductor either bare or insulated.

X

X - Symbol for reactance.
XLPE - Cross-linked Polyethylene.

Y

Yield Strength - The minimum stress at which a material will start to physically deform without further increase in load.

Z

Z - Symbol for impedance.
Zyfel - Du Pont's tradename for nylon resins.

Abbreviations

Abbreviations used for standards and regulatory bodies associated with the cable industry

REF	Abbreviation for
ANSI	American National Standards Institute (USA)
BASEC	British Approvals Service for Electric Cables (UK)
BSI (BS)	British Standards Institution (UK)
CEBEC	Comite Electrotechnique Belge (Belgium)
CEI	Comitato Electrotechnico Italiano or Commission Electrotechnique Internationale (Italy)
CEN	European Committee for Standardisation (EEC)
CENELEC	European Committee for Electrotechnical Standardisation (EEC)
CMA	Cable Makers Association (UK)
CSA	Canadian Standard Approval (Canada)
DEF. STAN.	Ministry of Defence Specification (UK)
DEMKO	Denmarks Elektriske Materielkontrol (Denmark)
DGS	Director General Ships (UK)
DIN	Deutches Institute fur Normung (Germany)
DNV	Det Norske Veritas (Scandinavia)
ECMC	Electric Cable Makers Confederation (UK)
EEMUA	The Engineering Equipment and Materials Users Association (UK)
ELOT	Hellenic Organisation for Standardisation (Greece)
ERA	Electrical Research Association (UK)
ESI	Electrical Supply Industry (UK)
ICEA	Insulated Cable Engineers Association (USA)
IEC	International Electrotechnical Commission (Europe)
IEE	Institute of Electrical Engineers (UK)
IEEE	Institute of Electrical and Electronic Engineers (UK)
IEMMEQU (MQ)	Instituto Italiano Del Marchio Di Qualita (Italy)
ISO	International Standards Organisation (UK)
KEMA-KEUR	N.V. Tot Keuring Van Electrotechnische Materialen (Netherlands)
LLOYDS	Lloyds Register of Shipping (UK)
MESC	Material and Equipment Standards and Code (Shell BV) (Netherlands)
MIL	United States Military Specification (USA)
NEMKO	Norsk Electrisk Materiellkontroll (Norway)
NP	IPQ - Instituto Portugues Da Qualidade (Portugal)
NSAI	National Standards Authority of Ireland (Ireland)
OCMA	Oil Companies Materials Association (UK)
OVE	Usterreichischer Berband Fur Elektrotechnik (Austria)
SEMKO	Svenska Electriska Materiel Kontrollanstalten (Sweden)
SETI	Elektriska Inspektoratet (Finland)
SEV	Schweizerischer Elekrotechnischer Verein (Switzerland)
UNEL	Unificazione Electretechnia (Italy)
UNE	AEE - Association Electrotechnica y Electronich Espanola (Spain)
UL	Underwriters Labotatories (USA)
USE (UTE)	Union Technique De L'electricite (UTE) (France)
VDE	Verband Deutscher Elektrotechniker (Germany)

British Standards

British Standards Associated with Electrical Cable

91 Electric cables, soldering sockets
125 Electric conductors, copper & copper-cadmium, for overhead transmission (superseded by BS7884)
215 Electric conductors, aluminium & steel-cored aluminium
638 Flexible cables, arc-welding
801 Cable sheaths, lead and lead alloy
1441 Galvanised steel wire, for submarine cables (superseded by BS EN 10257-2)
1442 Galvanised steel wire, for land cables (superseded by BS EN 10257-1)
1791 Electric conductors, copper, cotton-covered
1843 Insulated cables, twin compensating cables, thermocouples, colour codes
1990 Communication transmission lines, wood poles
2316 Coaxial cables, radiofrequency
2848 Cable sheaths, flexible (superseded by BS EN 60684-2)
3242 Electric conductors, aluminium alloy, stranded, for power transmission (superseded by BS EN 50183)
3573 Communication cables, polyolefin insulated & sheathed copper-conductor cables
3858 Electric cables, sleeves, binding & identification
3988 Electric conductors, aluminium solid conductors, for insulated cables
4066 Electric cables, tests under fire conditions (superseded by BS EN 60332-1 and BS EN 60332-3)
4553 Insulated cables, PVC & XLPE-insulated, split concentric, copper (superseded by BS EN 50189)
4565 Electric conductors, steel wire for reinforcing aluminium conductors (superseded by BS EN 50189)
4579 Electric cables, mechanical & compression joints in connectors (superseded by BS EN 61238-1)
4653 Electric conductors, copper, paper-covered
4737 Insulated cables, PVC-insulated, for intruder alarm systems
4799 Electric conductors, copper glass fibre lapped
4801 Electric conductors, copper, glass fibre braided
4808 Communication cables, LE, PVC insulated & sheathed
4927 Electric conductors, copper, textile-covered
5055 Insulated cables, PVC & elastomer-insulated, for discharge-tube installations (superseded by BS EN 50143)
5308 PE and PVC-insulated instrumentation cables, intrinsically safe
5372 Electric cables, terminations for 3 core and 4 core insulated cables, dimensions
5467 Power & wiring cables, armoured thermosetting-polymer insulated for electricity supply
5593 Sheathed cables, aluminium-sheathed CONSAC cables
5819 Communication cables, for interconnection between video recorders & television receivers
6004 Insulated cables, PVC-insulated, non-armoured
6007 Insulated cables, single-core, rubber-insulated, un-sheathed power cables
6141 Flexible conductors, for high temperature zone
6231 Single-core cables, PVC-insulated, for switchgear & controlgear
6234 Insulated cables, polyethylene
6346 Power & wiring cables, PVC-insulated, for electricity supply
6360 Electric conductors, insulated cables
6387 Electric cables, fire-resistant, tests
6425 Electric cables, combustion gases, test methods
6469 Insulated cables, insulation & sheaths, test methods (superseded by BS EN 60811)
6480 Power cables, impregnated paper-insulated, lead or lead alloy sheathed electric cables
6485 Electric conductors, PVC-covered overhead power line conductors
6500 Flexible cables, insulated cords & cables
6622 Power cables, thermosetting-polymer insulated, high-voltage
6708 Flexible cables, trailing cables, mining equipment
6724 Thermosetting polymer insulated, for electricity supply, low smoke
6726 Flexible conductors, for festoon & temporary lighting
6746C Insulated cables PVC-insulation, colour chart
6862 Electric cables, road vehicles

British Standards

British Standards Associated with Electrical Cable

6883	Insulated cables, elastomer insulated cables, for shipwiring & offshore
6946	Electric cables, metal channel support systems
6977	Multicore cables, insulated flexible cables, for lifts
7211	Power cables, thermosetting polymer insulated, non-armoured, low smoke
7365	Electric conductors, hard drawn aluminium wire, for overhead lines
7629	Fire-resistant, 300/500 V non-armoured power & wiring cables
7655	Insulation and sheaths, electric cables
7846	Fire-resistant, 600/1000 V armoured power & wiring cables
7884	Copper and copper-cadmium conductors for overhead transmission
7917	Insulated cables, fire-resistant elastomer insulated cables, for shipwiring & offshore
7919	Insulated flexible cables, rubber-insulated power & lighting cables
9530	Electric cables, cable fitting accessories, assessed quality, for circular electrical connectors
EN50143	Insulated cables, PVC & Elastomer insulated for discharge-tube applications
EN50183	Electric conductors, aluminium alloy stranded, for power transmission
EN50189	Electric conductors, zinc coated wires for reinforcing aluminium conductors
EN60332-3	Electric cables, tests under fire conditions on bunched cables
EN60332-1	Electric cables, tests under fire conditions on single vertical wire or cable
EN60684	Flexible insulating sleevings
EN60811	Insulated cables, insulations & sheaths, test methods
EN61238	Electric cables, mechanical & compression joints in connectors
EN10257	Galvanised steel wire for land and submarine cables

Reference Numbers

Commonly Used Reference Numbers

* = Number of cores

0282	2 core, circular PCP sheathed Miners' cap lamp flexible cord.
0361	Welding cable, tinned copper conductor, vulcanised rubber insulation/tough rubber sheath. BS638.
0361TQ (PC)	Welding cable, plain copper conductor, EPR insulation/CSP sheathed. BS638.
0361 (AL)	Welding cable, aluminium conductor, vulcanised rubber insulation/tough rubber sheathed. BS638.
0361TQ (AL)	Welding cable, aluminium conductor, EPR insulation/CSP sheathed. BS638.
044*Y	Microphone cable, PVC insulation/PVC sheathed (special thickness).
2023	3 core, twisted, vulcanised rubber - cotton braid insulation 300/300 V BS6500, flexible cord.
204*	Circular, vulcanised rubber insulation/cotton braid sheathed 300/300 V BS6500, flexible cord.
2093Y	3 core, PVC heat resisting insulation/PVC heat resisting sheathed. Circular, 300/300 V BS6500, flexible cord.
218*Y	Circular, PVC insulation/PVC sheathed. 300/300 V BS6500, flexible cord.
2192Y	2 core, PVC insulation/PVC sheathed Flat 300/300 V BS5600, flexible cord.
2213	3 core, vulcanised rubber insulation/tough rubber sheathed/cotton braid, 300/300 V BS6500, flexible cord.
2491X	Single-core, PVC insulation 0.5sqmm, 300/500 V BS6500, 1.5sqmm - 4sqmm, 450/750 V BS6004, flexible cord
2492X	Two 2491X twisted, flexible cord
2771D	Single-core, silicone rubber, glass fibre braid insulation 300/500 V BS6500, flexible cord.
2782D	Two 2771D twisted flexible cord.
279*D	Circular, silicone rubber insulation/glass fibre braid sheathed 300/500 V BS6500, flexible cord.
2812X	Flat parallel twin, PVC insulation, 300/300 V BS6500, flexible cord.
309*Y	Circular, PVC heat resistant insulation sheathed 300/500 V BS6500, flexible cord.
318*	Circular, vulcanised rubber insulation/tough rubber sheathed, 300/500 V BS6500, flexible cord.
318*Y	Circular, PVC insulation/PVC sheathed 300/500 V BS6500, flexible cord.
318*P	Circular, vulcanised rubber insulation/PCP sheathed, 300/500 V BS6500, flexible cord.
318*TQ	Circular, EPR insulation/CSP sheathed 300/500 V BS6500, flexible cord.
318*DD	Circular, silicone rubber insulation/silicone rubber sheathed, 300/500 V BS6500, flexible cord.
3192Y	2 core, PVC insulation/PVC sheathed, flat 300/500 V BS6500, flexible cord.
322*Y	Circular, PVC insulated/PVC sheathed/galv. mild steel spiral interlocking armour - with or without PVC sheath 300/500 V BS6500, flexible cord.
326*Y	Circular, PVC insulation/PVC bedded/galv. mild steel wire braid/PVC sheathed, 300/500 V BS6500, flexible cord.
367*	Circular, vulcanised rubber insulation/non metallic braided, lift flexible, 300/500 V BS6977, flexible cord.
380*Y	Circular, PVC insulation/PVC bedded/plain copper wire braid screened/PVC sheathed, 300/500 V BS6500, flexible cord.
380*P	Circular, vulcanised rubber insulation/tough rubber sheathed/tinned copper wire braid screened/PCP sheathed, 300/500 V BS6500, flexible cord.
380*TQ	Circular, EPR insulation/CSP bedded/tinned copper wire braid screened/CSP sheathed, 300/500 V BS6500, flexible cord.
398*	Heavy duty circular, vulcanised rubber insulation/PCP sheathed 450/750 V BS6007, flexible cord.
6101T	Single-core, EPR - braided and compounded insulation 450/750 V BS6007, wiring cable.

Reference Numbers

Commonly Used Reference Numbers

618*Y	Circular, PVC insulation/PVC sheathed 1sqmm - 35sqmm 300/500 V BS6004. 50sqmm - 630sqmm gen in acc BS6346, wiring cable.
6192P	2 core, vulcanised rubber insulation/PCP sheathed Flat 300/500 V BS6007, festoon wiring cable.
619*Y	Flat, PVC insulation/PVC sheathed 300/500 V BS6004, wiring cable.
624*Y	Flat, PVC insulation - laid up in parallel with a bare ECC within one interstice/PVC sheathed 300/500 V BS6004, wiring cable.
638*Y	Circular, PVC insulation/PVC sheathed 300/500 V gen in acc BS6004, flexible cord.
638*TQ	Circular, EPR insulation/CSP sheathed, 450/750 V BS6007, flexible cable.
638*DD	Circular, silicone rubber insulation/silicone rubber sheathed 450/750 V BS6007, flexible cable.
6491X	Single-core, PVC insulation 1 sqmm - 630sqmm. 450/750 V BS6004.
657*TQ	Circular, EPR insulation/CSP sheathed 600/1000 V BS6883, shipwiring cable. (circular conductors).
657*TQ (S)	As 657*TQ but with shaped conductors
658*TQ	Circular, EPR insulation/CSP bedding/galv. mild steel wire braid armour/CSP sheathed. 600/1000 V BS6883, shipwiring cable (circular conductors).
658*TQ (S)	As 658*TQ but with shaped conductors.
659*TQ	Circular EPR insulation/CSP bedded/tinned phospher bronze braid armour/CSP sheathed 600/1000 V BS6883, shipwiring cable (circular conductors).
659*TQ (S)	As 659*TQ but with shaped conductors
6701X	Single-core, PVC insulation 450/750 V BS 6004, flexible cord.
680*TQ	Circular, EPR insulation/CSP bedded/tinned copper wire braid screen/CSP sheathed, 450/750 V gen to BS6007, flexible cord.
694*X	Circular, PVC insulation/PVC bedded/single steel wire armoured/PVC sheathed 600/1000 V BS6346, mains wiring cable.
694*X (S)	As 694*X but with shaped conductors.
HO7V-R	Single-core, PVC insulation 4sqmm. - 400sqmm, 450/750 V to BS6004.
HO7V-U	Single-core, PVC insulation, 1.5sqmm - 2.5sqmm, (solid) 450/750 V to BS6004.
HO5V-U	Single-core, PVC insulation, 1.0sqmm (solid) 300/500 V to BS6004.
HO5RR-F	Circular, vulcanised rubber insulation/tough rubber sheathed. 300/500 V to BS6500
HO3VV-F	Circular, PVC insulated/PVC sheathed, 300/300 V to BS6500.
HO3VVH2-F	Flat 2 core, PVC insulated/PVC sheathed, 300/300 V to BS6500.
HO5VV-F	Circular, PVC insulated/PVC sheathed, 300/500 V to BS6500.
HO5VVH2-F	Flat, 2 core, PVC insulated/PVC sheathed, 300/500 V to BS6500.
HO5V-K	Single-core, PVC insulation 0.5sqmm - 1.0sqmm, 300/500 V to BS6500.
HO7V-K	Single-core, PVC insulation, 1.5sqmm - 2.5sqmm, 450/750 V to BS6004.
HO7RN-F	Circular, rubber insulated/rubber sheathed, 450/750 V to BS6007.
SIF	Silicone insulated single-core flexible 300/500 V.
SIHF	Silicone rubber insulated/Silicone rubber sheathed, 300/500 V.
(AL)	To denote aluminium conductors. To be added after other suffix, if used e.g. 6491X(AL) and 6242Y(AL).
(S)	Shaped conductors.

Harmonised Reference Construction

Designation system for cables complying with the European Harmonisation Standard, (Mark<HAR>)

Cable Reference

1 2 3 4 5 -6 7 8 9

1. Basic Standards
   - H Harmonised Standards
   - A Authorised National Standards
   - N Non Authorised National Standards
2. Rated Voltage
   - 03 100/100 Volt < 300/300 Volt
   - 05 300/500 Volt
   - 07 450/750 Volt
   - 1 600/1000 Volt

3 & 4. Insulation & Sheathing Material
   - B Ethylene Propylene Rubber (EPR)
   - G Ethylene-Vinyl-Acetate (EVA)
   - J Glass-Fibre Braid
   - M Mineral
   - N Polychloroprene (PCP)
   - N2 Special Polychloroprene (PCP) for welding cables
   - N4 Chlorosulphonated Polyethylene (CSP)
   - N8 Special water resistant Polycholroprene (PCP)
   - Q Polyurethane
   - Q4 Polyamide
   - R Ordinary EPR or synthetic elastomer rated 60ºC
   - S Silicone Rubber
   - T Textile braid
   - V Polyvinyl-Chloride (PVC)
   - V2 Heat Resistant Polyvinyl-Chloride rated 90ºC (HR PVC)
   - Z Cross Linked Polyolefin Low Smoke Zero Halogen
5. Special Constructions & Shapes
   - H Flat Construction with Divisible Cores (Figure of 8)
   - H2 Flat Construction, Non Divisible Cores
   - H5 Two or more cores twisted together non sheathed
6. Type of Conductor
   - F Flexible for moveable installations (Class 5 IEC60228)
   - H Highly flexible for moveable installations (Class 6 IEC60228)
   - K Flexible for fixed installations (Class 5 IEC60228)
   - R Stranded (Class 2 IEC60228)
   - U Solid (Class 1 IEC60228)
   - Y Tinsel
7. Number of Cores
8. Protective Conductor
   - X Without protective core
   - G With protective core
9. Nominal Cross Section of Conductors in sqmm

Additional Designations

Concentric Conductors & Screens
- A Concentric Aluminium Conductor
- C Concentric Copper Conductor
- A7 Aluminium/Laminate Screen
- C4 Overall Copper Braid Screen
- C5 Cores Individually Copper Braid Screen
- C7 Lapped Copper (Wire, Tape or Strip) Screen

Special Components
- D3 Central Strainer (Textile or Metallic)
- D5 Central Filler (Not Load Bearing)

Armours
- Z2 Steel Wire Armour
- Z3 Flat Steel Wire Armour
- Z4 Steel Tape Armour
- Z5 Steel Wire Braid

Fire & Flame Test

Flame Retardant Cable Tests

IEC60332	The two most widely recognised flame tests for flame retardant cables are IEC60332 Part 1 and IEC60332 Part 3 (identical to BS EN 60332-1-2 and BS EN 60332-3).
IEC60332 Part 1	A vertical flame test on a single wire or cable. (BS EN 60332-1-2).
IEC60332 Part 3	A flame test on bunched cables, 3.5m in length, mounted on a (BS EN 60332-3) vertical cable ladder.

IEC60332 Part 3 has three distinct categories:-

IEC60332-3-22 (40 minute burn) - Large amount of cables on the ladder. (Category A - 7 litres/metre of combustible material).

IEC60332-3-23 (40 minute burn) - Medium amount of cables on the ladder. (Category B - 3.5 litres/metre of combustible material).

IEC60332-3-24 (20 minute burn) - Small amount of cables on the ladder. (Category C -1.5 litres/metre of combustible material).

The cables should not be affected/charred by the flame, beyond 2.5m from the flame source.

Flame Resistant Cable Tests

IEC60331/BS6387 Fire resistant cables are required to retain circuit integrity in the event of a fire. The two most common specifications are IEC60331 and BS6387, which have various performance requirements.

IEC60331 -	Cable to retain circuit integrity for 3 hours @750°C.	
BS6387 -	Cat A	3 hours @ 650°C.
	Cat B	3 hours @ 750°C.
	Cat C	3 hours @ 950°C.
	Cat S	20 minutes @ 950°C.
	Cat W	Fire & Water Spray 15 minutes @ 650°C followed by 15 minutes Water Spray.
	Cat Z	Fire & Mechanical Shock 15 minutes @ 950°C whilst subjecting cable to mechanical shock.

Conductor Resistances

Max. DC Conductor Resistances

Stranded Class 2 Conductors to BS EN 60228 and IEC60228 Single-Core & Multicore Cables

Nominal Conductor Area	Max DC Conductor Resistance @ 20°C		
	Copper Conductors		Aluminium Conductors
	Plain Wires	Metal-coated Wires	
mm^2	ohms/km	ohms/km	ohms/km
0.5	36.0	36.7	-
0.75	24.5	24.8	-
1.0	18.1	18.2	-
1.5	12.1	12.2	-
2.5	7.41	7.56	-
4.0	4.61	4.70	7.41
6.0	3.08	3.11	4.61
10	1.83	1.84	3.08
16	1.15	1.16	1.91
25	0.727	0.734	1.20
35	0.524	0.529	0.868
50	0.387	0.391	0.641
70	0.268	0.270	0.443
95	0.193	0.195	0.320
120	0.153	0.154	0.253
150	0.124	0.126	0.206
185	0.0991	0.100	0.164
240	0.0754	0.0762	0.125
300	0.0601	0.0607	0.100
400	0.0470	0.0475	0.0778
500	0.0366	0.0369	0.0605
630	0.0283	0.0286	0.0469
800	0.0221	0.0224	0.0367
1000	0.0176	0.0177	0.0291

Conductor Resistances

Max. DC Conductor Resistances

Flexible Class 5 Copper Conductors to BS EN 60228 and IEC60228 Single-Core & Multicore Cables

Nominal Conductor Area	Max DC Conductor Resistance @ 20°C	
	Plain Wires	Metal-coated Wires
mm^2	ohms/km	ohms/km
0.22	92.0	92.4
0.5	39.0	40.1
0.75	26.0	26.7
1.0	19.5	20.0
1.25	15.6	16.1
1.35	14.6	15.0
1.5	13.3	13.7
2.5	7.98	8.21
4.0	4.95	5.09
6.0	3.30	3.39
10	1.91	1.95
16	1.21	1.24
25	0.780	0.795
35	0.554	0.565
50	0.386	0.393
70	0.272	0.277
95	0.206	0.210
120	0.161	0.164
150	0.129	0.132
185	0.106	0.108
240	0.0801	0.0817
300	0.0641	0.0654
400	0.0486	0.0495
500	0.0384	0.0391
630	0.0287	0.0292

Conductor Resistances

Max. DC Conductor Resistances

Flexible Class 6 Copper Conductors to BS EN 60228 and IEC60228 Single-Core & Multicore Cables

Nominal Conductor Area	Max DC Conductor Resistance @ 20°C	
	Plain Wires	Metal-coated Wires
mm^2	ohms/km	ohms/km
0.5	39.0	40.1
0.75	26.0	26.7
1.0	19.5	20.0
1.5	13.3	13.7
2.5	7.98	8.21
4.0	4.95	5.09
6.0	3.30	3.39
10	1.91	1.95
16	1.21	1.24
25	0.780	0.795
35	0.554	0.565
50	0.386	0.393
70	0.272	0.277
95	0.206	0.210
120	0.161	0.164
150	0.129	0.132
185	0.106	0.108
240	0.0801	0.0817
300	0.0641	0.0654

Conductor Short-Circuit Ratings

PVC Insulated Cables

Short-Circuit Ratings

Conductor Size mm²	0.2s duration kA	1.0s duration kA	3.0s duration kA
1.5	0.385	0.172	0.099
2.5	0.642	0.287	0.165
4.0	1.02	0.460	0.265
6.0	1.54	0.690	0.398
10	2.57	1.15	0.663
16	4.11	1.84	1.06
25	6.42	2.87	1.65
35	9.0	4.02	2.32
50	12.8	5.75	3.31
70	18.0	8.05	4.64
95	24.4	10.9	6.30
120	30.8	13.8	7.96
150	38.5	17.2	9.95
185	47.5	21.2	12.2
240	61.7	27.6	15.9
300	77.1	34.5	19.9
400	92.1	41.2	23.7
500	115	51.5	29.7
630	145	64.8	37.4

N.B: The above ratings assume an adiabatic temperature rise and are based on a conductor temperature of 70°C at start of short-circuit and 140/160°C* at end of short-circuit.

* 160°C cables up to and including 300mm²

* 140°C cables above 300mm²

Conductor Short-Circuit Ratings

XLPE Insulated Cables

Short-Circuit Ratings

Conductor Size mm²	0.2s duration kA	1.0s duration kA	3.0s duration kA
1.5	0.479	0.214	0.123
2.5	0.799	0.357	0.206
4.0	1.27	0.572	0.330
6.0	1.91	0.858	0.495
10	3.19	1.43	0.825
16	5.11	2.28	1.32
25	7.99	3.57	2.06
35	11.1	5.0	2.88
50	15.9	7.15	4.12
70	22.3	10.0	5.77
95	30.3	13.5	7.84
120	38.3	17.1	9.9
150	47.9	21.4	12.3
185	59.1	26.4	15.2
240	76.7	34.3	19.8
300	95.9	42.9	24.7
400	127	57.2	33.0
500	159	71.5	41.2
630	201	90.0	52.0

N.B: The above ratings assume an adiabatic temperature rise and are based on a conductor temperature of 90°C at start of short-circuit and 250°C at end of short-circuit.

Armour Resistances

Max. DC Resistance of Conductor & Armour for 2, 3, & 4 Core PVC Insulated Cables Having Steel Wire Armour

PVC/PVC/SWA/PVC Cables to BS6346 & ENATS 09-6

Nominal Conductor Area	Max Resistance per Km of Cable @ 20°C			
	Copper Conductor (plain)	Steel Wire Armour Cables with Stranded Copper Conductors		
		Two Core 600/1000 V	Three Core 600/1000 V	Four Core 600/1000 V
mm^2	ohms/km	ohms/km	ohms/km	ohms/km
1.5	12.1	10.2	9.5	9.8
2.5	7.41	8.8	8.2	7.7
4.0	4.61	7.5	7.0	4.6
6.0	3.08	6.8	4.6	4.1
10	1.83	3.9	3.7	3.4
16	1.15	3.4	3.1	2.2

Max. DC Resistance of Conductor & Armour for Auxiliary PVC Insulated Cables Having Steel Wire Armour

PVC/PVC/SWA/PVC Cables to BS6346 & ENATS 09-6 600/1000 V

Nominal Conductor Area	Max Resistance per Km of Cable @ 20°C								
	Copper Conductor (plain)	Steel Wire Armour							
		Number of Cores							
		5	7	10	12	19	27	37	48
mm^2	ohms/km	ohms/km							
1.5	12.1	8.2	7.5	4.4	4.0	3.5	2.3	2.0	1.8
2.5	7.41	6.8	4.6	3.7	3.5	2.3	1.9	1.7	1.2
4.0	4.61	4.1	3.9	2.2	2.2	1.9	1.3	1.1	0.96

Armour Resistances

Max. DC Resistance of Conductor & Armour for Single-Core XLPE Insulated Cables Having Aluminium Wire Armour

XLPE/PVC/AWA/PVC Cables to BS5467
XLPE/LSF/AWA/LSF Cables to BS6724

Nominal Conductor Area	Max Resistance per Km of Cable @ 20°C		
	Copper Conductor (plain)	Aluminium Wire Armour Cables with Stranded Copper Conductors	
		600/1000 V	1900/3300 V
mm^2	ohms/km	ohms/km	ohms/km
50	0.387	1.3	0.75
70	0.268	0.75	0.67
95	0.193	0.67	0.61
120	0.153	0.61	0.42
150	0.124	0.42	0.39
185	0.0991	0.38	0.37
240	0.0754	0.34	0.34
300	0.0601	0.31	0.31
400	0.0470	0.22	0.22
500	0.0366	0.20	0.20
630	0.0283	0.18	0.18
800	0.0221	0.13	0.13
1000	0.0176	0.12	0.12

Armour Resistances

Max. DC Resistance of Conductor & Armour for 2, 3, 4 & 5 Core XLPE Insulated Cables Having Steel Wire Armour

XLPE/PVC/SWA/PVC Cables to BS5467
XLPE/LSF/SWA/LSF Cables to BS6724
MICA/XLPE/LSF/SWA/LSF Cables to BS7846

Nominal Conductor Area	Max Resistance per Km of Cable @ 20°C					
	Copper Conductor (plain)	Steel Wire Armour Cables with Stranded Copper Conductors				
		Two Core 600/1000 V	Three Core 600/1000 V	Three Core 1900/3300 V	Four Core 600/1000 V	Five-core 600/1000 V
mm^2	ohms/km	ohms/km	ohms/km	ohms/km	ohms/km	ohms/km
1.5	12.1	10.2	9.5	-	8.8	8.2
2.5	7.41	8.8	8.2	-	7.7	6.8
4.0	4.61	7.9	7.5	-	6.8	6.2
6.0	3.08	7.0	6.7	-	4.3	3.9
10	1.83	6.0	4.0	-	3.7	3.4
16	1.15	3.7	3.5	1.9	3.1	3.2
25	0.727	3.7	2.5	1.7	2.3	1.8
35	0.524	2.6	2.3	1.8	2.0	1.6
50	0.387	2.3	2.0	1.3	1.8	1.1
70	0.268	2.0	1.8	1.2	1.2	0.94
95	0.193	1.4	1.3	1.1	1.1	-
120	0.153	1.3	1.2	0.76	0.76	-
150	0.124	1.2	0.78	0.71	0.68	-
185	0.0991	0.82	0.71	0.65	0.61	-
240	0.0754	0.73	0.63	0.59	0.54	-
300	0.0601	0.67	0.58	0.55	0.49	-
400	0.0470	0.59	0.52	0.50	0.35	-

Armour Resistances

Max. DC Resistance of Conductor & Armour for Auxiliary XLPE Insulated Cables Having Steel Wire Armour

XLPE/PVC/SWA/PVC Cables to BS5467
XLPE/LSF/SWA/LSF Cables to BS6724 600/1000 V
MICA/XLPE/LSF/SWA/LSF Cables to BS7846 600/1000 V

Nominal Conductor Area	Max Resistance per Km of Cable @ 20°C					
	Copper Conductor (plain)	Steel Wire Armour				
		Number of Cores*				
		7	12	19	27	37
mm²	ohms/km	ohms/km				
1.5	12.1	7.5	4.0	3.5	2.3	2.0
2.5	7.41	6.3	3.5	2.3	1.9	1.7
4.0	4.61	4.0	2.3	2.0	1.7	1.2

* For non-preferred sizes, the maximum resistance shall not be greater than that of the next lowest preferred number of cores.

Gross Cross-sectional Area of Armour for 2, 3 & 4 Core PVC Insulated Cables

PVC/PVC/SWA/PVC Cables to BS6346 and ENATS 09-6 600/1000 V

Nominal Conductor Area	Gross cross-sectional area of round armour wires		
	Steel Wire Armour Cables with Stranded Copper Conductors		
	Two Core	Three Core	Four Core
mm²	mm²	mm²	mm²
1.5	15	16	17
2.5	17	19	20
4.0	20	22	34
6.0	22	34	38
10	40	42	46
16	46	50	72

Gross Cross-Sectional

Gross Cross-sectional Area of Armour for Auxiliary PVC Insulated Cables

PVC/PVC/SWA/PVC Cables to BS6346 and ENATS 09-6 600/1000 V

Nominal Conductor Area	Gross cross-sectional area of round armour wires							
	Number of Cores							
	5	7	10	12	19	27	37	48
mm^2	mm^2	mm^2	mm^2	mm^2	mm^2	mm^2	mm^2	mm^2
1.5	19	20	36	39	45	70	78	90
2.5	22	34	44	45	70	84	92	138
4.0	39	40	72	72	84	131	144	163

Gross Cross-sectional Area of Armour for Single-Core XLPE Insulated Cables

XLPE/PVC/AWA/PVC Cables to BS5467
XLPE/LSF/AWA/LSF Cables to BS6724

Nominal Conductor Area	Gross cross-sectional area of round armour wires
	Cables with Stranded Copper Conductors
	Aluminium Wire Armour 600/1000V
mm^2	mm^2
50	26
70	42
95	47
120	52
150	76
185	84
240	94
300	104
400	147
500	163
630	182
800	260
1000	284

Gross Cross-Sectional

Gross Cross-sectional Area of Armour for 2, 3, 4, & 5 Core XLPE Insulated Cables

XLPE/PVC/SWA/PVC Cables to BS5467 600/1000 V
XLPE/LSF/SWA/LSF Cables to BS6724 600/1000 V
MICA/XLPE/LSF/SWA/LSF Cables to BS7846 600/1000 V

Nominal Conductor Area	Gross cross-sectional area of round armour wires			
	Steel Wire Armour Cables with Stranded Copper Conductors			
	Two Core	Three Core	Four Core	Five Core
mm^2	mm^2	mm^2	mm^2	mm^2
1.5	15	16	17	19
2.5	17	19	20	22
4.0	19	20	22	25
6.0	22	23	36	40
10	26	39	42	46
16	42	45	50	72
25	42	62	70	88
35	60	68	78	100
50	68	78	90	144
70	80	90	131	166
95	113	128	147	-
120	125	141	206	-
150	138	201	230	-
185	191	220	255	-
240	215	250	289	-
300	235	269	319	-
400	265	304	452	-

Gross Cross-sectional Area of Armour for Auxiliary XLPE Insulated Cables

XLPE/PVC/SWA/PVC Cables to BS5467
XLPE/LSF/SWA/LSF Cables to BS6724
MICA/XLPE/LSF/SWA/LSF Cables to BS7846

Nominal Conductor Area	Gross cross-sectional area of round armour wires				
	Number of Cores				
	7	12	19	27	37
mm^2	mm^2	mm^2	mm^2	mm^2	mm^2
1.5	20	39	45	70	78
2.5	24	45	70	84	94
4.0	39	68	80	96	138

Armour Short-Circuit Ratings

Single-Core XLPE/PVC/AWA/PVC 600/1000 V
Single-Core XLPE/LSF/AWA/LSF 600/1000 V

Short-Circuit Ratings

Conductor Size mm²	0.2s duration kA	1.0s duration kA	3.0s duration kA
50	4.83	2.16	1.25
70	7.80	3.49	2.01
95	8.72	3.90	2.25
120	9.66	4.32	2.49
150	14.1	6.31	3.64
185	15.6	6.97	4.02
240	17.4	7.80	4.50
300	19.3	8.63	4.98
400	27.3	12.2	7.04
500	30.2	13.5	7.79
630	33.8	15.1	8.72
800	48.3	21.6	12.5
1000	52.8	23.6	13.6

N.B: The above ratings assume an adiabatic temperature rise and are based on an armour temperature of 80°C at start of short-circuit and 200°C at end of short-circuit.

Armour Short-Circuit Ratings

Two Core XLPE/PVC/SWA/PVC 600/1000 V
Two Core XLPE/LSF/SWA/LSF 600/1000 V
Two Core MICA/XLPE/LSF/SWA/LSF 600/1000 V

Short-Circuit Ratings

Conductor Size mm²	0.2s duration kA	1.0s duration kA	3.0s duration kA
1.5	1.54	0.69	0.398
2.5	1.75	0.782	0.451
4.0	1.95	0.874	0.505
6.0	2.26	1.01	0.583
10	2.68	1.20	0.693
16	4.32	1.93	1.11
25	4.32	1.93	1.11
35	6.17	2.76	1.59
50	7.0	3.13	1.81
70	8.23	3.68	2.12
95	11.6	5.20	3.0
120	12.9	5.75	3.32
150	14.2	6.35	3.67
185	19.7	8.79	5.07
240	22.1	9.89	5.71
300	24.1	10.8	6.24
400	27.3	12.2	7.04

N.B: The above ratings assume an adiabatic temperature rise and are based on an armour temperature of 80°C at start of short-circuit and 200°C at end of short-circuit.

Armour Short-Circuit Ratings

Three Core XLPE/PVC/SWA/PVC 600/1000 V
Three Core XLPE/LSF/SWA/LSF 600/1000 V
Three Core MICA/XLPE/LSF/SWA/LSF 600/1000 V

Short-Circuit Ratings

Conductor Size mm²	0.2s duration kA	1.0s duration kA	3.0s duration kA
1.5	1.65	0.736	0.425
2.5	1.95	0.874	0.505
4.0	2.06	0.920	0.531
6.0	2.37	1.06	0.612
10	4.0	1.79	1.03
16	4.63	2.07	1.20
25	6.37	2.85	1.65
35	7.0	3.13	1.81
50	8.03	3.59	2.07
70	9.26	4.14	2.39
95	13.2	5.89	3.4
120	14.5	6.49	3.75
150	20.7	9.25	5.34
185	22.6	10.1	5.84
240	25.7	11.5	6.64
300	27.7	12.4	7.16
400	31.3	14.0	8.08

N.B: The above ratings assume an adiabatic temperature rise and are based on an armour temperature of 80°C at start of short-circuit and 200°C at end of short-circuit.

Armour Short-Circuit Ratings

Four Core XLPE/PVC/SWA/PVC 600/1000 V
Four Core XLPE/LSF/SWA/LSF 600/1000 V
Four Core MICA/XLPE/LSF/SWA/LSF 600/1000 V

Short-Circuit Ratings

Conductor Size mm²	0.2s duration kA	1.0s duration kA	3.0s duration kA
1.5	1.75	0.782	0.451
2.5	2.06	0.920	0.531
4.0	2.26	1.01	0.583
6.0	3.71	1.66	0.958
10	4.32	1.932	1.12
16	5.14	2.30	1.33
25	7.2	3.22	1.86
35	8.03	3.59	2.07
50	9.26	4.14	2.39
70	13.25	6.03	3.48
95	15.1	6.76	3.90
120	21.2	9.48	5.47
150	23.7	10.6	6.12
185	26.2	11.7	6.77
240	29.7	13.3	7.68
300	32.9	14.7	8.49
400	46.5	20.8	12.0

N.B: The above ratings assume an adiabatic temperature rise and are based on an armour temperature of 80°C at start of short-circuit and 200°C at end of short-circuit.

Armour Short-Circuit Ratings

Five Core XLPE/PVC/SWA/PVC 600/1000 V
Five Core XLPE/LSF/SWA/LSF 600/1000 V
Five Core MICA/XLPE/LSF/SWA/LSF 600/1000 V

Short-Circuit Ratings

Conductor Size mm²	0.2s duration kA	1.0s duration kA	3.0s duration kA
1.5	1.95	0.874	0.505
2.5	2.26	1.01	0.583
4.0	2.57	1.15	0.664
6.0	4.11	1.84	1.06
10	6.98	2.12	1.22
16	7.40	3.31	1.91
25	9.06	4.05	2.34
35	10.3	4.6	2.66
50	14.8	6.62	3.82
70	17.1	7.64	4.41
95	-	-	-
120	-	-	-
150	-	-	-
185	-	-	-
240	-	-	-
300	-	-	-
400	-	-	-

N.B: The above ratings assume an adiabatic temperature rise and are based on an armour temperature of 80°C at start of short-circuit and 200°C at end of short-circuit.

Armour Short-Circuit Ratings

Auxiliary XLPE/PVC/SWA/PVC 600/1000 V
Auxiliary XLPE/LSF/SWA/LSF 600/1000 V
Auxiliary MICA/XLPE/LSF/SWA/LSF 600/1000 V

Short-Circuit Ratings

Conductor Size Number x mm²	0.2s duration kA	1.0s duration kA	3.0s duration kA
7 x 1.5	2.06	0.920	0.531
12 x 1.5	4.0	1.79	1.03
19 x 1.5	4.63	2.07	1.20
27 x 1.5	7.20	3.22	1.86
37 x 1.5	8.03	3.59	2.07
7 x 2.5	2.46	1.10	0.635
12 x 2.5	4.63	2.07	1.20
19 x 2.5	7.20	3.22	1.86
27 x 2.5	8.63	3.86	2.23
37 x 2.5	9.66	4.32	2.49
7 x 4.0	4.0	1.79	1.03
12 x 4.0	7.0	3.13	1.81
19 x 4.0	8.23	3.68	2.12
27 x 4.0	9.88	4.42	2.55
37 x 4.0	41.2	6.35	3.67

N.B: The above ratings assume an adiabatic temperature rise and are based on an armour temperature of 80°C at start of short-circuit and 200°C at end of short-circuit.

Armour Short-Circuit Ratings

Two, Three & Four Core PVC/PVC/SWA/PVC 600/1000 V

Short-Circuit Ratings

Conductor Size Number x mm²	0.2s duration kA	1.0s duration kA	3.0s duration kA
2 x 1.5	1.71	0.765	0.442
2 x 2.5	1.94	0.867	0.501
2 x 4.0	2.28	1.02	0.589
2 x 6.0	2.50	1.12	0.647
2 x 10	4.56	2.04	1.18
2 x 16	5.25	2.35	1.36
3 x 1.5	1.82	0.816	0.471
3 x 2.5	2.17	0.969	0.559
3 x 4.0	2.50	1.12	0.647
3 x 6.0	3.87	1.73	0.999
3 x 10	4.79	2.14	1.24
3 x 16	5.70	2.55	1.47
4 x 1.5	1.94	0.867	0.501
4 x 2.5	2.28	1.02	0.589
4 x 4.0	3.87	1.73	0.999
4 x 6.0	4.34	1.94	1.12
4 x 10	5.25	2.35	1.36
4 x 16	8.21	3.67	2.12

N.B: The above ratings assume an adiabatic temperature rise and are based on an armour temperature of 60°C at start of short-circuit and 200°C at end of short-circuit.

Armour Short-Circuit Ratings

Auxiliary PVC/PVC/SWA/PVC 600/1000 V

Short-Circuit Ratings

Conductor Size Number x mm²	0.2s duration kA	1.0s duration kA	3.0s duration kA
5 x 1.5	2.17	0.969	0.559
7 x 1.5	2.28	1.02	0.589
10 x 1.5	4.11	1.84	1.06
12 x 1.5	4.45	1.99	1.15
19 x 1.5	5.14	2.30	1.33
27 x 1.5	7.98	3.57	2.06
37 x 1.5	8.90	3.98	2.30
48 x 1.5	10.3	4.59	2.65
5 x 2.5	2.50	1.12	0.647
7 x 2.5	3.87	1.73	0.999
10 x 2.5	5.01	2.24	1.29
12 x 2.5	5.14	2.30	1.33
19 x 2.5	7.98	3.57	2.06
27 x 2.5	9.57	4.28	2.47
37 x 2.5	10.5	4.69	2.71
48 x 2.5	15.7	7.04	4.06
5 x 4.0	4.34	1.94	1.12
7 x 4.0	4.56	2.04	1.18
10 x 4.0	8.21	3.67	2.12
12 x 4.0	8.21	3.67	2.12
19 x 4.0	9.57	4.28	2.47
27 x 4.0	14.6	6.53	3.77

N.B: The above ratings assume an adiabatic temperature rise and are based on an armour temperature of 60°C at start of short-circuit and 200°C at end of short-circuit.

Installation Recommendations

PVC* and thermoplastic LSF compounds become increasingly stiff and brittle as the temperature decreases. As a result, if a cable containing these materials is bent too quickly or to too small a radius or is struck sharply at temperatures in the region of 0°C or lower, there is a risk of shattering the thermoplastic components of the cable.

Elastomeric materials retain a reasonable degree of flexibility down to -20°C. It is recommended that such cables are not bent to the minimum bending radius permissible at temperatures below -15°C because of the resultant severe stresses that may be imposed during the installation.

Therefore, to avoid the risk of damage during handling, it is desirable that these cables should be installed only when both the cable and the ambient temperatures have been above the recommended minimum temperature for at least 24 hours, or where special precautions have been taken to maintain the cable above this temperature.

Good installation practices should be followed at all times ensuring that:

- When pulling around bends, side wall pressures are kept to a minimum using skid plates and rollers, etc., where necessary
- The recommended pulling tension should not be exceeded (this is available on request and depends on the method of pulling employed)
- The cable is not bent at radii less than the minimum bending radius recommended
- There are no sharp stones or edges which may damage the cable

To prevent the ingress of moisture into the cable, the ends should be kept capped at all times.

*NOTE. This refers to standard grades of PVC. Special grades are available with improved performance at low temperatures, e.g. “Arctic” grade.

Installation Recommendations - Cable Fixings

Cleat Selection

Choose the design, material and finish of cleat to suit the application.
Aspects to check:
a) Total mechanical load the cleat is expected to have to support.
b) Type of installation, for example normal convoluted cable route or isolated vertical run.
c) Exposure to weather, pollutants and/or radiation.
d) Operating temperature range and/or radiation.
e) Compatibility of the material or finish with the support structure.
f) Size, whenever possible the overall diameter of the actual cable should be measured as cable catalogues only list nominal values.

Correct Spacing

The table below shows the spacings from the IEE Wiring Regulations Guidance Notes Number 1, for cables up to 40mm diameter and Prysmian recommendations for larger cables.

Spacing of Supports on Single Cables in Accessible Positions

Overall Diameter of cables*	Non-armoured rubber, PVC or lead sheathed cables		Armoured cables and corrugated Aluminium sheathed cables		Mineral insulated copper sheathed or aluminium sheathed cables	
	Horizontal	Vertical	Horizontal	Vertical	Horizontal	Vertical
Not exceeding 9	250	400	-	-	600	800
Exceeding 9 but not 15	300	400	350	450	900	1200
Exceeding 15 but not 20	350	450	400	550	1500	2000
Exceeding 20 but not 40	400	550	450	600	-	-
Exceeding 40 but not 50	600	800	900	1100	-	-
Exceeding 50 but not 60	750	1000	950	1100	-	-
Exceeding 60 but not 70	900	1200	1000	1200	-	-
Exceeding 70 and above	1000	1400	1200	1400	-	-

*Normal practise is to consult the cable manufacturer about support spacing on cables exceeding 40mm diameter. The spacing for horizontal runs may be applied also to runs at an angle of more than 30° from the vertical. For runs at an angle of 30° or less from the vertical, the vertical spacing is applicable. The spacing of supports for smooth aluminium sheathed cables may be twice those specified in columns 4 and 5. In long straight heavily loaded power cable installations either loop the cables at suitable intervals or increase the cable spacings by a factor of 1.5. Where the appearance of the cable installation is not important, the spacings could similarly be increased by a factor of 1.5.

Grouping Factors for Cables Laid Direct in the Ground

Three Single-Core Cables In trefoil and laid flat touching horizontal formation (average values)							
							
	No of circuits	Spacing of circuits					
		Touching					
		Trefoil	Flat	0.15m*	0.3m	0.45m	0.6m
600/1000 Volt cables	2	0.77	0.80	0.82	0.88	0.90	0.93
	3	0.65	0.68	0.72	0.79	0.83	0.87
	4	0.59	0.63	0.67	0.75	0.81	0.85
	5	0.55	0.58	0.63	0.72	0.78	0.83
	6	0.52	0.56	0.60	0.70	0.77	0.82
1900/3300 to 12700/22000 Volt cables	2	0.78	0.80	0.81	0.85	0.88	0.90
	3	0.66	0.68	0.71	0.76	0.80	0.83
	4	0.59	0.62	0.65	0.72	0.76	0.80
	5	0.55	0.58	0.61	0.68	0.73	0.77
	6	0.52	0.55	0.58	0.66	0.72	0.76
19000/33000 Volt cables							
	2	0.79	0.81	0.81	0.85	0.88	0.90
	3	0.67	0.70	0.71	0.76	0.80	0.83
	4	0.62	0.65	0.65	0.72	0.76	0.80
	5	0.57	0.60	0.60	0.68	0.73	0.77
	6	0.54	0.57	0.57	0.66	0.72	0.76

* This configuration at 0.15m spacing, may not be practical for the larger size cables.

Grouping Factors for Cables Laid Direct in the Ground

Multicore Cables In horizontal formation (average values)						
						
	No of cables in group	**Spacing of circuits**				
		Touching	**0.15m**	**0.3m**	**0.45m**	**0.6m**
600/1000 Volt cables	2	0.81	0.87	0.91	0.93	0.94
	3	0.70	0.78	0.84	0.87	0.90
	4	0.63	0.74	0.81	0.86	0.89
	5	0.59	0.70	0.78	0.83	0.87
	6	0.55	0.67	0.76	0.82	0.86
1900/3300 to 12700/22000 Volt cables	2	0.80	0.85	0.89	0.90	0.92
	3	0.68	0.75	0.80	0.84	0.86
	4	0.62	0.70	0.77	0.80	0.84
	5	0.57	0.66	0.73	0.78	0.81
	6	0.55	0.63	0.71	0.76	0.80
19000/33000 Volt cables	2	0.80	0.83	0.87	0.89	0.91
	3	0.70	0.73	0.78	0.82	0.85
	4	0.64	0.68	0.74	0.78	0.82
	5	0.59	0.63	0.70	0.75	0.79
	6	0.56	0.60	0.68	0.74	0.78

Ratings Factors for Depth of Laying and Thermal Resistivity of Soil for Cables Laid Direct in Ground

Rating Factors for Depth of Laying (to centre of cable or trefoil group of cables)					
Depth of laying	**600/1000 Volt cables**			**1900/3300 Volt to 19000/33000 Volt cables**	
m	**up to 50mm²**	**70 - 300mm²**	**above 300mm²**	**up to 300mm²**	**above 300mm²**
0.50	1.00	1.00	1.00	-	-
0.60	0.99	0.98	0.97	-	-
0.80	0.97	0.96	0.94	1.00	1.00
1.00	0.95	0.93	0.92	0.98	0.97
1.25	0.94	0.92	0.89	0.96	0.95
1.50	0.93	0.90	0.87	0.95	0.93
1.75	0.92	0.89	0.86	0.94	0.91
2.00	0.91	0.88	0.86	0.92	0.89
2.50	0.90	0.87	0.84	0.91	0.88
3.00 or more	0.89	0.85	0.82	0.90	0.86

Rating Factors for Variation on Thermal Resistivity of Soil						
Size of Cables	**Thermal resistivity of soil in °C m/W**					
mm²	**0.8**	**0.9**	**1.0**	**1.5**	**2.0**	**2.5**
Single-Core						
up to 150mm²	1.15	1.11	1.06	0.91	0.81	0.73
185 - 300mm²	1.17	1.12	1.07	0.90	0.80	0.72
Above 300mm²	1.17	1.12	1.07	0.90	0.79	0.71
Multicore						
up to 16mm²	1.09	1.06	1.04	0.93	0.84	0.77
25 - 150mm²	1.12	1.09	1.05	0.92	0.82	0.77
Above 150mm²	1.14	1.10	1.06	0.92	0.81	0.74

Grouping Factors for Cables in Single Way Ducts

Three Single-Core Cables In trefoil single way ducts, horizontal formation (average values)				
				
	No of circuits	**Spacing of circuits**		
		Touching	**0.45m**	**0.6m**
600/1000 Volt cables	2	0.86	0.90	0.93
	3	0.77	0.83	0.87
	4	0.73	0.81	0.85
	5	0.70	0.78	0.83
	6	0.68	0.77	0.82
1900/3300 to 12700/22000 Volt cables	2	0.85	0.88	0.90
	3	0.75	0.80	0.83
	4	0.70	0.76	0.80
	5	0.67	0.73	0.77
	6	0.64	0.71	0.76
19000/33000 Volt cables	2	0.85	0.88	0.90
	3	0.76	0.80	0.83
	4	0.71	0.76	0.80
	5	0.67	0.73	0.77
	6	0.65	0.71	0.76

Grouping Factors for Cables in Single Way Ducts

Multicore Cables In single way ducts, horizontal formation (average values)					
					
	No of ducts in group	**Spacing of circuits**			
		Touching	**0.3m**	**0.45m**	**0.6m**
600/1000 Volt cables	2	0.90	0.93	0.95	0.96
	3	0.82	0.87	0.90	0.93
	4	0.78	0.85	0.89	0.91
	5	0.75	0.82	0.87	0.90
	6	0.72	0.81	0.86	0.90
1900/3300 to 12700/22000 Volt cables	2	0.88	0.91	0.93	0.94
	3	0.80	0.84	0.87	0.89
	4	0.75	0.81	0.84	0.87
	5	0.71	0.77	0.82	0.85
	6	0.69	0.75	0.80	0.84
19000/33000 Volt cables	2	0.87	0.89	0.92	0.93
	3	0.78	0.82	0.85	0.87
	4	0.73	0.78	0.82	0.85
	5	0.69	0.75	0.79	0.83
	6	0.67	0.73	0.78	0.82

Rating Factors for Depth of Laying and Thermal Resistivity of Soil for Cables in Single Way Ducts

Rating Factors for Depth of Laying (to centre of duct)				
Depth of laying	**600/1000 Volt cables**		**1900/3300 Volt to 19000/33000 Volt cables**	
m	**Single-Core**	**Multicore**	**Single-Core**	**Multicore**
0.50	1.00	1.00	-	-
0.60	0.98	0.99	-	-
0.80	0.95	0.97	1.00	1.00
1.00	0.93	0.96	0.98	0.99
1.25	0.90	0.95	0.95	0.97
1.50	0.89	0.94	0.93	0.96
1.75	0.88	0.94	0.92	0.95
2.00	0.87	0.93	0.90	0.94
2.00	0.87	0.93	0.89	0.93
3.00 or more	0.85	0.91	0.88	0.92

Rating Factors for Variation on Thermal Resistivity of Soil						
Size of Cables	**Thermal resistivity of soil in °C m/W**					
mm²	**0.8**	**0.9**	**1.0**	**1.5**	**2.0**	**2.5**
Single-Core						
up to 150mm²	1.08	1.06	1.04	0.94	0.86	0.80
185 - 300mm²	1.10	1.07	1.04	0.93	0.85	0.78
Above 300mm²	1.11	1.08	1.05	0.93	0.83	0.76
Multicore						
up to 16mm²	1.03	1.02	1.02	0.97	0.91	0.87
25 - 150mm²	1.05	1.03	1.02	0.95	0.89	0.83
Above 150mm²	1.07	1.05	1.03	0.94	0.86	0.81

Values of R1 & R2

PCU/XLPE/PVC/SWA/PVC 600/1000 V
PCU/XLPE/LSF/SWA/LSF 600/1000 V
Cables to BS5467 & BS6724

Conductor Size	Conductor Impedance @ 90°C, 50Hz (R1)	Armour Impedance @ 80°C, 50Hz (R2)			
mm^2	mohms/m	2 core mohms/m	3 core mohms/m	4 core mohms/m	5 core mohms/m
1.5	15.4	13.3	12.4	11.4	10.7
2.5	9.45	11.4	10.7	10.0	8.84
4.0	5.88	10.3	9.75	8.84	8.06
6.0	3.93	9.1	8.71	5.59	5.07
10	2.33	7.8	5.2	4.81	4.42
16	1.47	4.81	4.55	4.03	2.86
25	0.931	4.81	3.25	2.99	2.34
35	0.672	3.38	2.99	2.60	2.08
50	0.500	2.99	2.60	2.34	1.43
70	0.350	2.60	2.34	1.56	1.22
95	0.257	1.82	1.69	1.43	-
120	0.209	1.69	1.56	0.988	-
150	0.175	1.56	1.01	0.884	-
185	0.123	1.07	0.923	0.793	-
240	0.121	0.949	0.819	0.702	-
300	0.106	0.871	0.754	0.637	-
400	0.096	0.767	0.676	0.455	-

PCU/XLPE/PVC/SWA/PVC 600/1000 V
PCU/XLPE/LSF/SWA/LSF 600/1000 V
Cables to BS5467 & BS6724

Conductor Size	Conductor Impedance @ 90°C, 50Hz (R1)	Armour Impedance @ 80°C, 50Hz (R2)				
mm^2	mohms/m	7 core mohms/m	12 core mohms/m	19 core mohms/m	27 core mohms/m	37 core mohms/m
1.5	15.4	9.75	5.20	4.55	2.99	2.60
2.5	9.45	8.19	4.55	2.99	2.47	2.21
4.0	5.88	5.20	2.99	2.60	2.21	1.56

Cross-Reference: AWG - Metric

Standard American Size AWG	Equivalent Metric Size mm^2	Nearest Standard Metric Size mm^2
24	0.22	0.2
22	0.325	0.35
20	0.52	0.5
18	0.82	0.75
16	1.3	1.5
14	2.1	2.5
12	3.3	4.0
10	5.27	6.0
8	8.35	10
6	13.3	16
4	21.2	25
2	33.6	35
1/0	53.4	50
2/0	67.5	70
3/0	85	95
4/0	107.2	120
250MCM	124	120/150
300MCM	149	150
350MCM	194	185/240
400MCM	199	240
444MCM	225	240
500MCM	248	240/300
535MCM	271	300
600MCM	298	300
646MCM	327	300/400
750MCM	348	300/400
777MCM	394	400
1000MCM	497	500

Where equivalent metric size is in-between standard metric sizes, it is advisable to use the larger metric size if replacement is required, although this is dependent on current load requirement, cable type, installation condition etc.

Cross-Reference: Imperial - Metric

Standard Imperial Size Sq inch	Equivalent Metric Size mm^2	Nearest Standard Metric Size mm^2
0.001	0.65	0.75
0.0015	0.97	1.0
0.002	1.3	1.5
0.003	1.94	2.5
0.0045	2.9	2.5/4.0
0.007	4.5	6
0.01	6.5	6
0.0145	9.4	10
0.0225	14.5	16
0.03	19.4	25
0.04	25.8	25
0.06	38.7	35/50
0.075	48.4	50
0.1	64.5	70
0.12	77.4	70/95
0.15	96.8	95
0.20	129	120
0.25	161.3	150/185
0.30	193.5	185
0.40	258.1	240/300
0.50	322.6	300/400
0.60	387.1	400
0.75	483.9	500
0.85	548.4	630
1.0	645.2	630
1.25	806.5	800
1.5	967.8	1000

Where equivalent metric size is in-between standard metric sizes, it is advisable to use the larger metric size if replacement is required, although this is dependent on current load requirement, cable type, installation condition etc.

Business-to-Business Electronic Solutions

Our sophisticated IT systems power our Business-to-Business Electronic Solutions like eAnixter and our online catalogue. With Anixter's eBusiness solutions, customers receive real-time supply chain information to improve efficiency, streamline purchasing and deliver cost savings. By integrating with your business processes, our Web-based solutions provide you with real-time visibility into the supply chain model to speed deployment and ease ordering and tracking.

With Anixter's online catalogue, customers can easily search by part number, keyword, category or attribute to find the network cabling, electrical and electronic wire and cable, and security products they need. The online catalogue also displays detailed specifications and illustrations of many products. Our online Request for Quote (RFQ) feature enables you to build your own bill of materials so your local sales team can contact you with current pricing and availability.

We can also set up a unique catalogue customised for your business. eLink, an Anixter electronic integration solution, allows your EDI, XML and Excel files to be integrated with our system to automate transactions, dramatically reducing procurement and other transaction costs.