

Category 1 Standard

S1121 Cables: Electric, Data and Fibre Optic

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1 Purpose

- 1.1 The purpose of this Standard is to define the performance requirements of cables in order to control safety and consistency throughout LU.

2 Scope

- 2.1 This standard applies to all electric and fibre optic cables except d.c. traction feeder cables. It does not however define all the performance requirements necessary for any particular cable.
- 2.2 This standard defines testing methods
- 2.3 This standard replaces 2-01001-005 A1. The Standard has been re formatted and re-numbered. There were no technical changes.

Note: Ownership of the above standard has passed to LU's PPP contract suppliers for their supply chain application.

- 2.4 This standard supports the following LU policies.

Note: The identification of Policies shown below shall have no material impact upon Infracore or other Suppliers beyond the obligations already contained in this Category 1 Standard. They are provided for LU reference purposes only.

Number	Title	Version
1-01102-001	Governing Safety and the Environment-Health and Safety	A1
1-01102-004	Governing Safety and the Environment-Environment	A1
1-01103-002	Planning for the Future-Management of Technology	A1

3 Requirements

3.1 General

3.1.1 Environmental

Products shall be assessed to ensure that the products and wastes can be reused, re-cycled or rendered harmless and that any discharges are controlled to minimise any environmental impact during the whole operational process including decommissioning.

3.1.2 Life expectancy

- 3.1.2.1 The cable, once installed, shall be capable of service for 40 years, or such time as defined in the cable specific requirements of section 3.2, or for the stated operational life of the equipment in which the cable is installed.

- 3.1.2.2 During the cables service life, excluding involvement in fires, it shall not emit or exude any gaseous, liquid or solid material that is hazardous to people or affects the safe operation of equipment.

3.1.3 Fire performance requirements



All cables shall meet the requirements of LU Standard 1-085 Fire Safety Performance of Materials.

Note: Such requirements are dependent on the installation location of the cables. In locations where no requirements are defined cables compliant with BS 6004, BS 5467 or BS 6724 may be used.

3.1.4 Physical Requirements

3.1.4.1 Conductors

3.1.4.1.1 Only tin coated conductors, shall be used where any detrimental reaction may occur between the conductor and insulation.

3.1.4.1.2 Complete stranded conductors shall not be jointed.

3.1.4.1.3 If the strands used to make up the conductor, or the conductor itself in the case of a solid conductor, has been jointed then the tensile strength of a 250 mm length of stranding containing a joint, when tested in accordance with BS EN ISO 6892-1, shall not be less than 90 percent of an adjacent length of stranding not containing a joint.

3.1.4.2 Insulation

3.1.4.2.1 It shall be possible to remove the insulation from the conductor without damage to the conductor or any tin coating.

3.1.4.2.2 It shall be possible to easily strip the bedding from the cable without damage to the insulation of the cores.

3.1.4.3 Sheath

3.1.4.3.1 The sheath shall be closely applied to the underlying cable. It shall be possible to remove the sheath and any integrally applied bedding or fillers or both without damage to the underlying cable.

3.1.4.3.2 The outer surface of the cable sheath shall not present installation difficulties.

3.1.4.3.3 The cable sheath shall be marked at intervals not greater than 2m, either by printing in a contrasting colour or embossing, to include at least the following information:

- a) manufacturers Name;
- b) voltage designation or the cables specified operating voltage or the cable specification and its revision status;
- c) cable construction (i.e. size and number of cores);
- d) for products complying with the Fire Performance Requirements of section 3.1.3. a manufacturers recognised description indicating such properties shall be used or if none exists the letters 'LSC'.

3.1.4.3.4 The size of marking characters shall be suitable to be read without the aid of magnification.

3.1.4.4 Minimum internal bending radii.

The cable shall be capable of withstanding bending to the minimum internal radii in Table 1, during and following installation, without detriment to the cables performance or life expectancy.

Cable type	Overall diameter of complete cable	Factor to be applied to the overall diameter of the cable to determine the minimum internal radius of bend
Single Core NON-armoured cables with circular stranded conductors for installation in conduit, trunking or ducts	Less than 10mm From 10mm to 25mm Greater than 25mm	2x 3x 6x
NON-armoured cables except as above	Less than 10mm From 10mm to 25mm Greater than 25mm	3x 4x 6x
Armoured cables	All diameters	8x
Cables with screens	All diameters	6x
Cables with metallic moisture barriers	All diameters	12x
Coaxial cables	All diameters	12x
Fibre optical cables NON-armoured	All diameters	15x
Fibre optical cables armoured	All diameters	20x

Table 1 - Minimum bending radii

3.1.5 Electromagnetic Compatibility

The system in which cables are installed shall comply with LU Standard 1-222 Electromagnetic Compatibility (EMC).

3.2 Cable specific Requirements

3.2.1 Low voltage power and lighting cables.

The cable shall not be used in the safety critical parts of any safety critical low voltage system.

Note 1: Cables used on d.c. traction systems will be subjected, during normal operation, to voltage transients of the following peak magnitudes and durations:

- a) 5 kV for 1 millisecond and;
- b) 4 kV for 6 milliseconds and;
- c) 3 kV for 10 milliseconds and;
- d) 2 kV for 20 milliseconds and;
- e) 1.5 kV for 100 milliseconds and;
- f) 1 kV for 1 second.

Note 2: Cables defined in this section are not for use unprotected laid direct on ballast.

3.2.1.1 Single core power cable - insulated non sheathed - limited fire hazard - 450/750v