

Conductors

Introduction

By far the largest and most important component of any structural lightning protection or earthing system is the actual conductor.

Selection of the correct conductor type for the installation is highly important, and is likely to be the initial consideration of a lightning protection or earthing system designer.







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A comprehensive range of Furse copper and aluminium conductors is available in each of the main globally recognized standard formats, i.e. flat tape, solid circular and stranded (note, copper stranded only). Additionally each format is available in a variety of conductor sizes, to meet differing lightning protection and earthing requirements.

Specification will depend on whether the application is for an above ground structural lightning protection system, or a below ground earthing installation.



Conductor colour chart

Colour	Standard	
Black	18B29*	
Green	BS 6746C	
Grey	00A07*	
Stone	08B23*	
White	10B15*	
Brown	06C39*	

*PVC colours to BS 5252

Conductors for structural lightning protection systems

Furse lightning protection conductors are available in copper and aluminium. Copper can be supplied bare, tinned, PVC, LSOH and lead covered. It is used for most installations due to its high conductivity, anticorrosive properties, and its flexibility for use in air, in earth and in concrete. Aluminium can be supplied bare or with PVC coating.

The following sizes are suitable for the majority of above ground lightning protection systems:

- **Flat tape conductor**
25 x 3 mm bare tape, or 25 x 3 mm PVC covered tape
- **Solid circular conductor**
8 mm diameter bare or PVC covered solid circular conductor
- **Stranded conductor**
70 mm² bare or PVC covered stranded conductor

Conductor colour chart

The choice of a lightning protection conductor is usually governed by its aesthetic impact on the structure to be protected. For many people the term lightning protection conductor conjures up an image of a discoloured copper strip running down the spire of a church. This would clearly be unacceptable to the owner/architect of a modern structure.

In order to reduce the impact of an external system Furse offer a range of UV stabilized PVC covered tapes and solid circular conductors in colours chosen to match most common building materials.

Standard PVC colours are shown in the chart above, with special colours available to order.

Conductors for earthing systems

For below ground earthing applications we offer a large range of bare copper tape, solid circular and stranded conductors thus offering the designer of the system the correctly rated conductor without the need to oversize.

Conductor Size (mm)	C.S.A. (mm ²)	kA for 1 Sec	kA for 3 Sec
12.5 x 1.5	18.75	3.3	1.9
12.5 x 3	37.5	6.6	3.8
20 x 1.5	30	5.3	3.0
20 x 3	60	10.6	6.1
25 x 1.5	37.5	6.6	3.8
25 x 3	75	13.2	7.6
25 x 2	50	8.8	5.1
25 x 4	100	17.6	10.2
25 x 6	150	26.4	15.2
30 x 2	60	10.6	6.1
30 x 3	90	15.8	9.1
30 x 4	120	21.1	12.2
30 x 5	150	26.4	15.2
31 x 3	93	16.4	9.5
31.5 x 4	126	22.2	12.8
31 x 6	186	32.7	18.9
38 x 3	114	20.1	11.6
38 x 5	190	33.4	19.3
38 x 6	228	40.1	23.2
40 x 3	120	21.1	12.2
40 x 4	160	28.2	16.3
40 x 5	200	35.2	20.3
40 x 6	240	42.2	24.4
40 x 6.3	252	44.4	25.6
50 x 3	150	26.4	15.2
50 x 4	200	35.2	20.3
50 x 5	250	44.0	25.4
50 x 6	300	52.8	30.5
50 x 6.3	315	55.4	32.0
50 x 7	350	61.6	35.5
50 x 8	400	70.4	40.6
50 x 10	500	88	50.8
60 x 10	600	105.6	61
80 x 6	480	84.4	48.8
100 x 6	600	105.6	61

These conductor ratings are based upon the recommendations of BS 7430 with an initial conductor temperature of 30°C and a maximum temperature of 250°C

Furse earthing conductors form an integral part of the single earthing arrangement for a structure, whether they provide the means of connection to the final earth electrode (earth rod or plate), or whether they comprise the earth electrode itself (through an earth grid or ring earth arrangement).

An earth conductor must be capable of carrying the maximum expected earth fault current and leakage current likely to occur at a structure. The size or minimum cross-sectional area of the conductor must therefore be gauged in accordance with these criteria.

A good earth conductor must also:

- Be able to withstand mechanical damage
- Be compatible with the material of the earth electrode
- Resist the corrosive effect of local soil conditions

Furse conductors effectively meet these requirements and are available in a range of sizes to meet differing current ratings (see table left). Copper conductor is recommended as, following BS 7430, aluminium should not be installed in contact with soil, nor in damp areas, and it should not be used to make the final connection to an earth electrode.

