

ERITECH® ERICORE Downconductor

The ERITECH ERICORE Downconductor

As an integral part of the ERITECH® SYSTEM 3000, the screened, insulated ERITECH ERICORE® downconductor conveys the lightning discharge current to ground with minimal danger of sideflashing. A unique semi-conductive outer sheath allows electrostatic bonding of the building through cable securing saddles.

The ERITECH ERICORE downconductor evolved after extensive studies of potential voltage rise in structures due to lightning injection. This cable is comprised of carefully selected dielectric materials, which create capacitive balance and help ensure insulation integrity under high impulse conditions.

The unique ability of ERITECH ERICORE to confine a discharge current and simultaneously support electrical bonding helps ensure minimal risk to building, occupants and sensitive electronics.

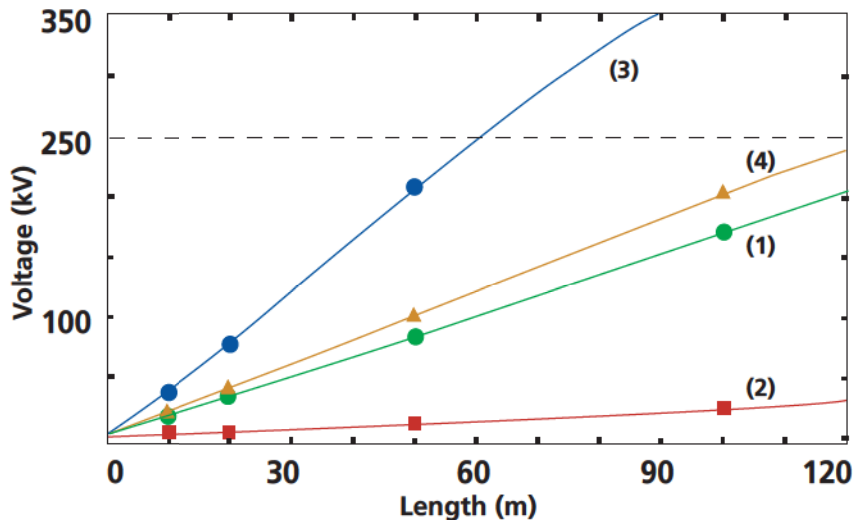


Cutaway diagram showing the composite layers of ERITECH ERICORE Downconductor. Inset: ERITECH ERICORE upper termination.

Technical and Design Characteristics of ERITECH® ERICORE

The ERITECH® ERICORE downconductors have been designed to meet criteria for an effective and reliable downconductor, with the following key characteristics:

- low inductance per unit length
- low surge impedance
- carefully controlled internal electric field distribution to minimize field stresses under current impulse conditions
- carefully designed, stress reducing upper termination



	Type Discharge	% less than	Waveshape (µs)	di/dt (max) (kA/µs)	Peak Current (kA)
● 1	-ve	50	5.5/75	24.3	70.1
■ 2	+ve	50	22/230	2.4	28.7
● 3	-ve	95	1.8/30	65.0	51.9
▲ 4	+ve	95	3.5/25	32.0	59.1

Statistics taken from IEC 62305 Part 1.

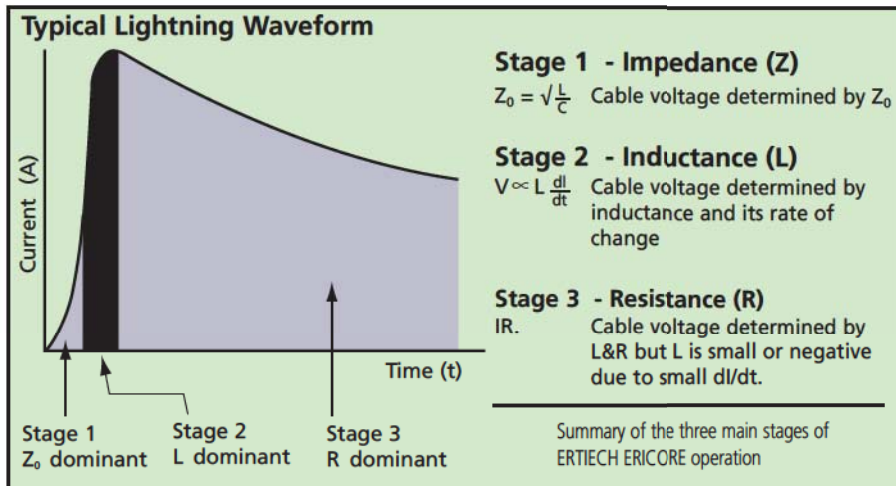


The ERITECH ERICORE Downconductor is easily retrofitted to existing structures. Inset: ERITECH® Lightning Event Counter (LEC IV) installed to register strikes to ERITECH® SYSTEM 3000.

To understand the technical value of the cable, it is first necessary to review the problems associated with normal downconductors. A value of inductance of 1.6 µH/m is normally regarded as quite small. However, when a current is impressed which is rising at the rate of 10¹⁰ Amperes per second, the effect of this inductance becomes dominant. As an example, a single 60 meter downconductor will rise to a value in excess of 1,000,000 volts with the application of an average discharge. It is for this reason that the ERITECH ERICORE downconductor has a significant advantage over conventional downconductors.



ERITECH® ERICORE DOWNCONDUCTOR



ERITECH® ERICORE offers purpose-designed performance in each phase of the lightning control process to help convey the energy safely to the grounding system.

As an example, consider the following comparison between the same 50 m length of conventional downconductor (25 mm x 3 mm copper tape) and ERITECH ERICORE downconductor, using the air breakdown electric field (nominally 3 MV/m) and cable termination voltage (250 kV) as the criterion for "failure" of the downconductors.

The conventional downconductor will, conservatively, cause a flashover or structure dielectric breakdown when carrying lightning currents of only ~ 30 kA. On the other hand, the ERITECH ERICORE screened/insulated downconductor can easily handle far greater lightning currents. This magnitude of lightning current is exceeded in only ~ 5% of lightning events or approximately once every 30 years in a region with a ground flash density of 5 strikes/km²/yr (approximately 80 thunder days/yr).

Main Benefits

- Lightning impulse is contained within the cable and the semiconductive outer sheath is bonded to the structure via metallic saddles, which means that the risk of sideflashing is negligible
- The low characteristic impedance of the cable minimizes internal dielectric failure
- The cable is able to be routed away from sensitive equipment, electrical wiring, structural steel and human work areas
- Use of a single downconductor as opposed to multiple downconductors
- Ease of installation
- Minimal maintenance

ERITECH ERICORE Characteristic	
Characteristic impedance (Ω)	<12
Inductance (nH/m)	37
Capacitance (nF/m)	0.75
Cross Sectional Area of Conductor - mm ²	55
Resistance R_{DC} (mΩ/m)	0.5
Resistance $R_{impulse}$ (mΩ/m)*	6
Upper Termination Voltage withstand (kV)	250
Weight (kg/m)	1.2
Diameter (mm)	36

Characteristics of ERITECH ERICORE downconductor.
* Due to skin effect

Why Use ERITECH ERICORE?

The ERITECH ERICORE downconductor cable is purpose-designed low inductance, low impedance cable designed to minimise voltage build-up due to lightning impulses. This cable provides significantly higher performance than any normal HV cable and is specially designed for the control of lightning impulses.

The main danger in controlling lightning impulses is the very fast voltage and current rise times following the capture of the lightning strike.

To further understand the technical value of the cable, it is necessary to review the lightning mechanism and resulting voltage build-up. The voltage between inner conductor and outer sheath is determined by three different parameters. These are dominant at different stages during the operation of the cable in conveying lightning energy to ground (as shown in The Typical Lightning Waveform Table.)