



Your "Single Source Supplier" for
Complete Earthing Solutions

LPI[®] EARTHING *Brochure*

LIGHTNING PROTECTION INTERNATIONAL PTY LTD



Who is LPI?

Lightning Protection International Pty Ltd (**LPI**) is a fully owned Australian manufacturer and supplier of direct strike lightning, surge & transient protection equipment and earthing products to a wide range of industries throughout the world.

LPI personnel and their associates have combined experience over many years in servicing customers throughout the world on many types of projects in some of its most lightning prone areas. Our personnel have vast experience in providing direct strike area protection, surge and transient protection and earthing solutions. Our extensive experience has involved risk management, system design, training, certification and installation and commissioning in key industry groups such as:

- Telecommunications & Broadcasting
- Petrochemical, oil & gas
- Highrise buildings and hotels – all types of structures
- Sporting centres and grounds – Golf courses, race tracks, stadiums
- Aviation - Civil & Military
- Mining – coal, gold, nickel, iron, copper, bauxite etc.
- Industrial facilities of all kinds
- Defence – communications, surveillance and storage of armaments
- Power generation and distribution
- Rail / transport systems
- Monuments / Ecological sites

The Total Protection Concept

LPI's 4-Step Approach to Lightning Protection

It is the strategic aim of our company to be able to provide a complete packaged solution. LPI has identified 4 key steps when considering the complete approach to lightning protection, ask for our LPI 4 Step approach to lightning protection.

Our system design approach includes:

- 1** Definition and provision of area protection - Direct Strike
- 2** Creation of a bonded earthing system
- 3** Protection of power lines
- 4** Protection of signal, data and communication lines

LPI Product Offering

Lightning Protection International Pty Ltd offers a comprehensive range of products and services as part of its complete solution to your lightning and earthing problems. These products cover Direct Strike protection, surge and transient protection and earthing solutions.



Stormmaster range of ESE Air Terminals, compliant to NF C 17-102.



Guardian Lightning Protection System 5 – Tested to IEC 60-1:1989.



Conventional lightning protection.



Surge and Transient protection products for power lines - both shunt and series filters.



Surge and Transient protection products for data, communications and signal lines.

This brochure covers the product groups pictured below.

LPI EXOWELD™ range of exothermic welding products for the connection of earthing conductors.



Earth Enhancing Compounds for the lowering of soil resistivity.



Earth rods and a complete range of clamps and accessories.





Contents

Introduction

Who is LPI?	2
LPI Product Offering	2
The Total Protection Concept	2
Earthing Principles	4
The Key Parameters of an Efficient Earthing System	4
The Importance of Low Soil Resistivity	4
The Components required to achieve an Efficient Earthing System	5
Designing for an Earthing System	5
Common Earthing Systems	6

Earth Rods

Copper Rods - A Question of Quality	7
Cost Effective Earth Rods.....	7
LPI Threaded Copperbonded Earth Rods.....	8
LPI Unthreaded Copperbonded Earth Rods	9
Fittings for Threaded and Unthreaded Earth Rods	9
Solid Copper Earth Rods.....	10
Solid Stainless Steel Earth Rods	10
Fittings for Stainless and Solid Copper Earth Rods	10

Mechanical Clamps

Rod to Tape Clamp Type-A	11
Rod to Cable Clamp Type-G	11
U-Bolt Rod Clamp Type-E.....	11
Split Connector Clamp Type-B	11
U-Bolt Rod Clamps	12

Bonds and Clamps

Watermain Pipe Bond.....	12
B-Bond	12
RWP Bond.....	12
Tower Earth Clamp.....	13
Earth Boss	13
Insulators	13

Earth Points

Two and Four Bolt Earth Points.....	13
Earth Points with Pre-Welded Tails.....	14

Static Earth Receptacle

Static Earth Receptacle	14
-------------------------------	----

Prefabricated Crows Foot

Prefabricated Crows Foot	15
--------------------------------	----

Earth Plates

Solid Copper Earth Plates.....	15
Earth Plates - Lattice Copper	15

Conductors

Bare Copper Tape.....	16
PVC Insulated Copper Tape	16
Tinned Copper Tape	16
Flexible Copper Braid.....	17
Bare Stranded Copper Cable.....	17
Tinned Copper Flexible Connectors	17
PVC Covered Stranded Copper Conductor	17

LPI® Exoweld Earthing Connections

What is LPI® Exoweld ?	18
Exothermic Welding process.....	19
Tools and Accessories.....	20

Earth Bars and Disconnect Links

Earth bars	21
Earth Bars with Single Disconnect Link	21
Earth Bars with Twin Disconnect Links	21

Equipotential Bonding

Transient Earth Clamp	22
Insulated Joint Protector.....	23

Earth Pits

Light Weight Earth Pit.....	24
Heavy Duty Earth Pit.....	24
Concrete Earth Pit.....	24
Earth Bond Inspection Pit.....	24

Earth Enhancing Compounds

LPI RESLO-10	25
LPI GRIP	25

Chemical Earth Rods

Chemical Earth Rods - Vertical Installation.....	26
Chemical Earth Rods - Horizontal Installation	26

Earthing Applications

Earthing Product Application Diagram.....	27
LPI's 4 Step Approach to Lightning Protection - Telecommunications Application Diagram.....	28

Additional Information

Research and Development	29
LPI Consultancy Services	29
Notes	30

Additional Literature

Related LPI Publications	Inside Back Cover
--------------------------------	-------------------

Earthing Principles

Why earthing is important

The installation and maintenance of an effective low resistance earthing system is essential for any modern facility for three key reasons:

- Protection of personnel who work within the facility.
- Protection of equipment so as to minimize down time, service interruptions and replacement costs.
- Ensures electrical noise reduction which minimizes voltage potentials between interconnected equipment.

The requirement for effective earthing is critical when considering the following applications:

- Lightning Protection
- Power generation, distribution and transmission
- Telecommunications
- Reduction of static electricity

The Key Parameters of an Efficient Earthing System

- Excellent electrical conductivity
- Low Earth Resistance and Impedance
In order to achieve a low resistance and impedance earth, all connections should be as short and direct as possible. Maximising the surface contact between the soil and all electrodes and conductors is essential for efficient performance.
- Conductors capable of withstanding high fault currents
- Robust Mechanical Connections
All connections should be robust to facilitate a long working life.
- High Corrosion resistance
Copper offers a high conductive and good corrosion resistant material for long lasting burial into the earth mass. It is essential that compatible metals are used in the installation of an earthing system to minimize corrosion.
- Equipotential Bonding
The elimination of dangerous step and touch potentials is achieved through equipotential bonding of all earths.

The Importance of Low Soil Resistivity

While many factors influence the effectiveness of an earthing system, it is the resistance of the earth itself (earth / soil resistance) which has the greatest influence on the overall impedance of an earthing system. Several factors such as soil composition, moisture content, seasonal weather, mineral content and possible contaminants determine the resistivity of the soil.

Soil types and composition vary greatly from one site to the next.

- Rich dark soils high in organic content are typically good conductors due to the retention of moisture which aids in the dissipation of electric currents.
- Sandy soils are ineffective in retaining moisture content due to the high drainage effect of sand and typically have a higher impedance.
- Rocky ground retains virtually no moisture content and as a result is very high in resistance.

Moisture content is the single largest influence on soil resistivity and in most cases the higher the moisture level of the soil the lower the soil resistivity. The installation of a deep driven earthing electrode which reaches the water table beneath the surface represents an ideal earthing system.

Seasonal weather conditions play a significant role in influencing soil resistivity levels over an extended period of time. Areas which are subjected to high annual rainfall will typically have lower soil resistivity levels in comparison to areas which are prone to sustained hot temperatures and drought like conditions, which will result in increased soil resistivity levels. Regions where temperatures fall below freezing will see sharp increases in soil resistivity as the moisture content within the soil freezes.

Typical Resistivity Readings for Varying Soil Types

Soil Type	Typical Resistivity Range – ohm-m
Wet lands	2 – 2.5
Rich Organic Soil (Loam & Clay)	4 – 150
Sand	90 – 8500
Sandy Gravel	300 - 500
Rocky Ground	1000+

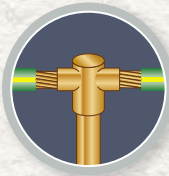
The Components Required to Achieve an Efficient Earthing System

LPI offers a wide selection of earthing products which are used in the installation of low resistance earthing system.



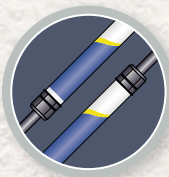
Earth Rods, Tapes and Clamps

LPI copperbonded, solid copper and stainless steel earth rods in combination with copper tapes and connecting clamps form the key components of an earthing system, which provides for the safe and efficient transfer of fault currents and lightning energy into the earth mass. See pages 7-17.



EXOWELD Permanent Connections

The use of EXOWELD exothermic welding process is a safe and efficient way of providing a permanent connection between conductors. See pages 18-20.



Equipotential Earthing

LPI's range of equipotential earth bars, plates, pre-engineered grids and Transient Earth Clamps combine to create a safe equipotential earth plane which serves to protect personnel and equipment. See pages 15, 21-23.



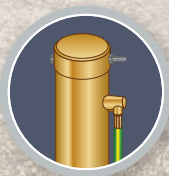
Earth Pits

LPI offers a selection of light weight and heavy duty earth pits which are suitable for most types of earthing and lightning protection installations. See page 24.



Earth Enhancing Compounds

Earth enhancing compounds are applied in and around conductors in an earthing system to reduce soil resistivity and lower earth impedance. See page 25.



Chemical Earth Rods

The installation of a Chemical Earth Rod provides for a low impedance earth in locations of high soil resistivity. Ideal for installation in locations where space constraints make it difficult to install extensive earthing systems. See page 26.

Designing for an Earthing System

There are several key factors to consider when planning the design of an earthing system.

- Applicable standards and codes to be followed:
 1. European – BS 6651, BS EN 1982 : 1999, ENV 61024-1, BS 7430, NFC 17100, NFC 17102.
 2. American – NFPA 780
 3. Australian – AS1768
- Type of facility and the layout of the site with particular consideration given to the available space
- Level of soil resistivity at site
- Corrosive nature of soil
- Future extensions
- Expected life of the facility
- If applicable the status of the existing earthing system
- Influence of seasonal weather conditions on soil resistivity – Dry summer conditions, annual rainfall and freezing winters
- Step and Touch potentials
- Volume of pedestrian traffic

The design and planning of an effective earthing system is important when considering the dangers associated with earth faults and dissipating lightning energy.

The consequences of a badly designed and installed earthing system not only poses dangers to the safety of site personnel and equipment, but it presents an expensive and difficult task if it is determined that modifications or replacement of the system are required after the construction phase has been completed.

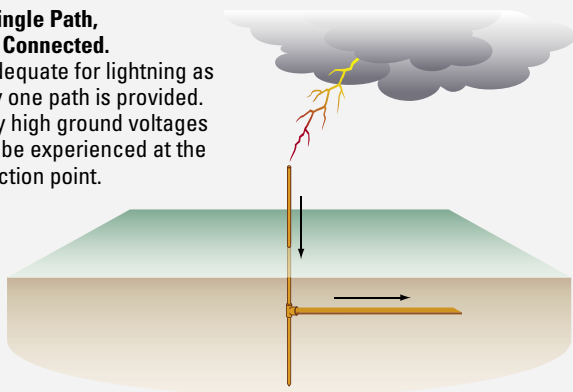
When planning for the optimum earthing system the key design principle to always adhere to involves maximizing the surface area contact between all earthing conductors and the surrounding soil. This assists to lower the resistance of the earthing system and greatly reduces the surge impedance of the earthing system.

Importantly every site is different in its requirements and available space and this influences the design of the system and the materials used, the diagrams on the following page (page 6) provide a sample of common earthing designs:

COMMON EARTHING SYSTEMS

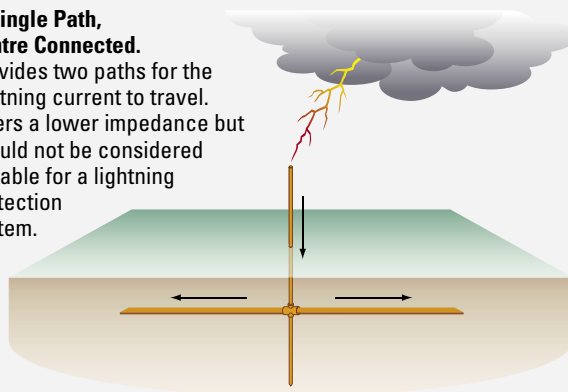
1. Single Path, End Connected.

Inadequate for lightning as only one path is provided. Very high ground voltages will be experienced at the injection point.



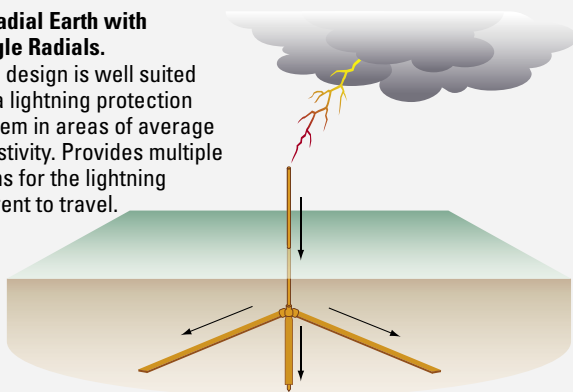
2. Single Path, Centre Connected.

Provides two paths for the lightning current to travel. Offers a lower impedance but should not be considered suitable for a lightning protection system.



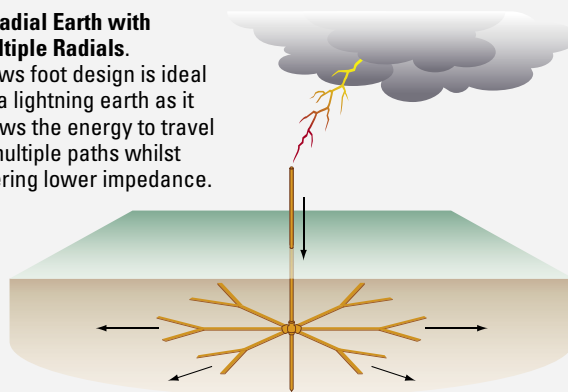
3. Radial Earth with Single Radials.

This design is well suited for a lightning protection system in areas of average resistivity. Provides multiple paths for the lightning current to travel.



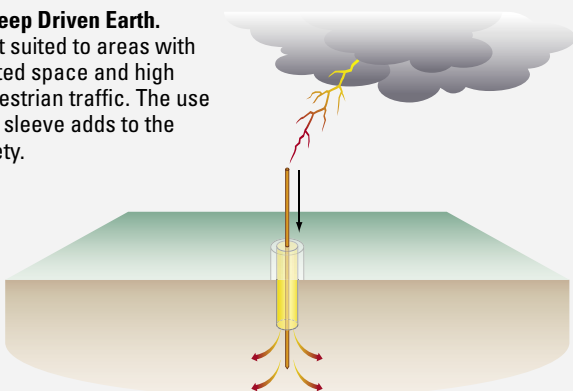
4. Radial Earth with Multiple Radials.

Crows foot design is ideal for a lightning earth as it allows the energy to travel in multiple paths whilst offering lower impedance.



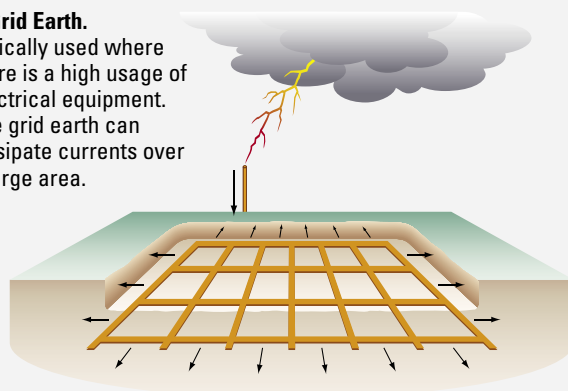
5. Deep Driven Earth.

Best suited to areas with limited space and high pedestrian traffic. The use of a sleeve adds to the safety.



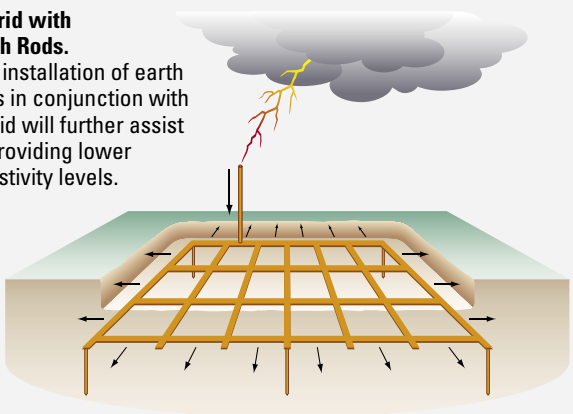
6. Grid Earth.

Typically used where there is a high usage of electrical equipment. The grid earth can dissipate currents over a large area.



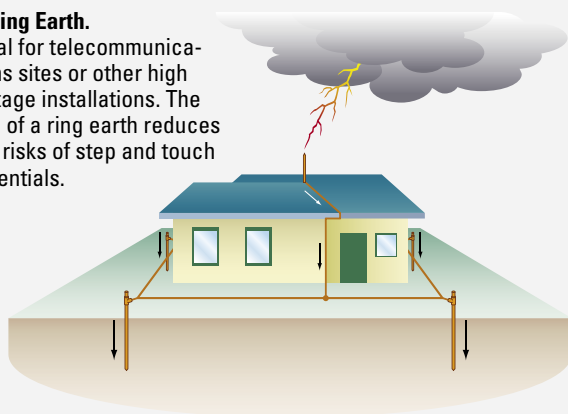
7. Grid with Earth Rods.

The installation of earth rods in conjunction with a grid will further assist in providing lower resistivity levels.



8. Ring Earth.

Ideal for telecommunications sites or other high voltage installations. The use of a ring earth reduces the risks of step and touch potentials.





Earth Rods

Earth rods are commonly utilized as the principle earth electrode in the design and installation of an earthing system.

LPI offers a selection of copperbonded steel, solid copper and stainless steel earth rods which are manufactured to meet International Standards such as BS 6651, BS 7430 and UL 467.

The copperbonded steel cored rod is the most commonly used type of earth rod due to its overall combination of strength, corrosion resistance, low resistance path to earth and cost effectiveness. The LPI copperbonded rods are manufactured by bonding a copper layer to a steel core through an electrolytical process that ensures a perfect and even bonding between the steel and copper. The rod finishing is free of imperfections or peeling. The copper layer, whose minimum thickness is 254 microns (10 mils) is individually and rigorously controlled by a modern set of electronic gauges.

Solid copper and stainless steel earth rods offer a high level of corrosion resistance suitable for installation in aggressive soil conditions.

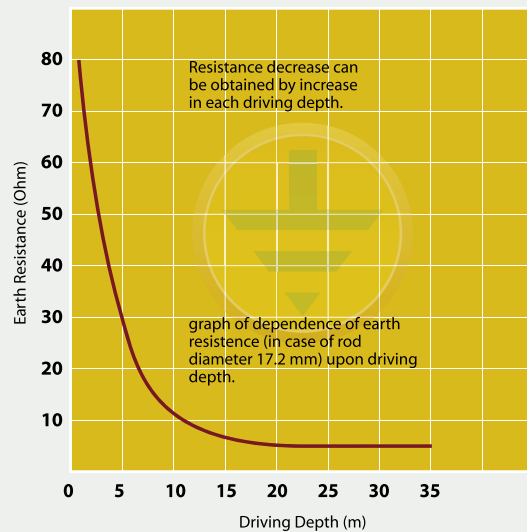
Copper Rods - A Question of Quality

The life expectancy and performance of an earthing system can be influenced by the type and quality of the copper earth rod that is installed. The following photo shows two copper earth rods which have both been subjected to the same pressure load test. The lower earth rod is an LPI copperbonded rod which is free from cracking or tears to the outer sheath following the pressure test. The copperclad rod on top shows clear evidence of cracking and tearing to the outer sheath. The installation of earth rods involves driving the rod into the ground, it is this process where inferior quality copper rods are likely to be damaged resulting in cracks or tearing to the outer sheath which will significantly reduce its serviceable life and placing the integrity of the whole earthing system at risk.

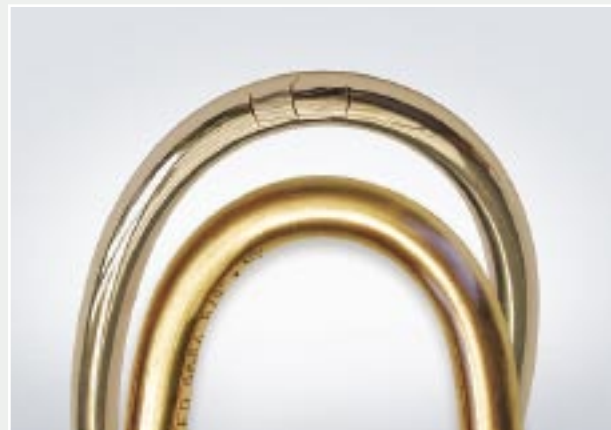
Cost Effective Earth Rods

There are many factors to consider when choosing the most cost effective earth rod for your application.

- Copperbonded earth rods typically have a life expectancy of + 30 years.
- Stainless Steel and Pure copper earth rods typically have a life expectancy of +40 years. The cost of stainless steel and pure copper rods can be up to 5 times the cost of copperbonded earth rods.
- Increasing the diameter of the earth rod plays a minor role in lowering earth resistance. By doubling the diameter of the rod a 10% improvement in earth resistance is gained with a 350% increase in the cost of the rod.
- Where space constraints restrict the installation of an extensive earthing system, deep driven rods provide a cost effective solution in achieving a low resistance earth, but depending on the configuration may still provide a high impedance level.



Dependence of earth resistance upon driving depth.





LPI Threaded Copperbonded Earth Rods



Driving Stud

High tensile steel driving stud which can be used many times over and is suitable for power hammering.

Coupling

Whether connecting rod to rod or driving stud to rod the high strength copper alloy coupling is counter bored to protect the earth rod threads from damage and subsequent corrosion.

Earth Rod

Copperbonded earth rods are made from high tensile low carbon steel and each rod is manufactured by molecularly bonding 99.9% pure electrolytic copper to the low carbon steel core in accordance with national and international standards such as BS 6651, BS 7430 and UL 467. Threads are rolled onto the rod ensuring an even copper covering which eliminates the risk of chipping whilst driving.



Threaded Copperbonded Earth Rods					- CBER
Earth Rod Length (m)	Rod Diameter (mm) A.	Thread Diameter (Inches) B.	Weight per rod (Kg)	Bundle Size	Ordering Code
1.524	14.3	5/8	1.92	10	CBER558*
1.829	14.3	5/8	2.31	10	CBER658
2.134	14.3	5/8	2.69	10	CBER758
2.438	14.3	5/8	3.07	10	CBER858*
3.048	14.3	5/8	3.84	10	CBER1058*
1.524	17.3	3/4	2.86	10	CBER534*
1.829	17.3	3/4	3.44	10	CBER634
2.134	17.3	3/4	4.01	10	CBER734
2.438	17.3	3/4	4.58	10	CBER834*
3.048	17.3	3/4	5.73	10	CBER1034*
2.438	23	1	8.52	10	CBER81
3.048	23	1	10.65	10	CBER101

- Standards: BS 7430, BS 6651, UL 467
- See page 9 for fittings to suit Threaded Earth Rods
- * Denotes those size rods typically available ex-stock from LPI warehouse.



Rod Length		
IMPERIAL MEASUREMENT	METRIC EQUIVALENT (Metre)	
Rod Length 5'	1.524	
Rod Length 6'	1.829	
Rod Length 7'	2.134	
Rod Length 8'	2.438	
Rod Length 10'	3.048	
Diameter of Threaded Rods		
Imperial Measurement	Nominal Metric Equivalent (B)	Actual Metric Diameter (A)
Nominal Thread Diameter 5/8"	15.875mm	14.3mm
Nominal Thread Diameter 3/4"	19.00mm	17.3mm
Nominal Thread Diameter 1"	25.40mm	23.00mm

★ Tolerance = + 0.2 mm.



LPI Unthreaded Copperbonded Earth Rods

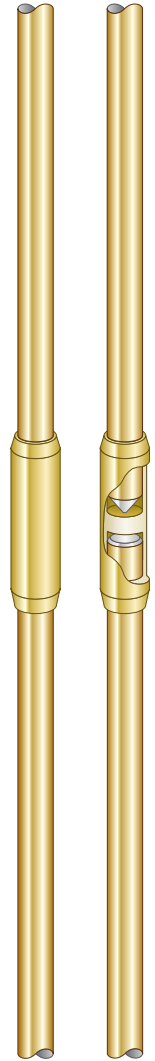
LPI Unthreaded Copper-Bonded Earth Rods are sectional rods which can be coupled together using high strength copper alloy compression couplings. The couplings are tapered so that when the rod is driven into the coupling, the two parts compress to form a conductive connection.



Unthreaded Copperbonded Earth Rods - UTCBER				
Earth Rod Length (m)	Rod Diameter (mm)	Weight per rod (Kg)	Bundle Size	Ordering Code
1.524	14.3	1.92	10	UTCBER558
1.829	14.3	2.31	10	UTCBER658
2.134	14.3	2.69	10	UTCBER758
2.438	14.3	3.07	10	UTCBER858*
3.048	14.3	3.84	10	UTCBER1058*
1.524	17.3	2.86	10	UTCBER534*
1.829	17.3	3.44	10	UTCBER634
2.134	17.3	4.01	10	UTCBER734
2.438	17.3	4.58	10	UTCBER834*
3.048	17.3	5.73	10	UTCBER1034*
2.438	23	8.52	10	UTCBER81
3.048	23	10.65	10	UTCBER101

• Standards: BS 7430, BS 6651, UL 467

* Denotes those size rods typically available ex-stock from LPI warehouse.



Fittings for Threaded Earth Rods - LEH & PH		
Description	Weight Kg	Ordering Code
Coupling for Threaded Earth Rod 5/8"	0.13	LEH-58R
Coupling for Threaded Earth Rod 3/4"	0.13	LEH-34R
Coupling for Threaded Earth Rod 1"	0.15	LEH-1R
Driving Stud for Threaded Earth Rod 5/8"	0.10	PH-58
Driving Stud for Threaded Earth Rod 3/4"	0.15	PH-34
Driving Stud for Threaded Earth Rod 1"	0.17	PH-1

- Couplings are manufactured using high strength copper alloy
- Driving Studs are manufactured using high strength carbon steel
- Standard: UL 467

Fittings for Unthreaded Earth Rods - LEHC		
Description	Weight Kg	Ordering Code
Compression Coupling for Unthreaded Earth Rod 5/8"	0.13	LEHC-58R
Compression Coupling for Unthreaded Earth Rod 3/4"	0.13	LEHC-34R
Compression Coupling for Unthreaded Earth Rod 1"	0.15	LEHC-1R

- Couplings are manufactured using high strength copper alloy
- Standard: UL 467



Solid Copper and Stainless Steel Earth Rods



Solid Copper Earth Rod



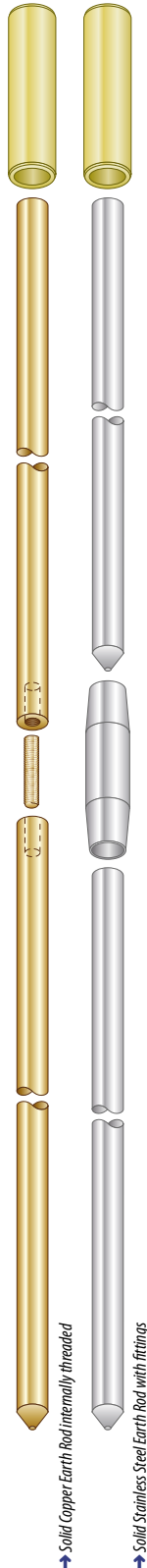
Solid Copper Earth Rod Fittings



Stainless Steel Earth Rod



Stainless Steel Earth Rod Fittings



Solid Copper Earth Rods

LPI Solid Copper Earth Rods are manufactured from hard drawn copper and are best installed in highly corrosive conditions such as soils containing excessive salt content.

Solid Copper Earth Rods (Internally Threaded) - SCER

Earth Rod Length (m)	Rod Diameter (mm)	Weight per rod (kg)	Ordering Code
1.80	15	3.2	SCER1815
3.60	15	6.4	SCER3615

- Other rod sizes available on request, contact LPI for more details.
- Standards: BS 7430, BS 6651

Fittings for Solid Copper Earth Rods - LEHI & PH

Description	Weight (Kg)	Ordering Code
Internal Coupling for Solid Copper Rod 15mm	0.02	LEHI-15-SC
Driving Head	0.335	PH-14

- Coupling manufactured from copper alloy

Solid Stainless Steel Earth Rods

LPI Solid Stainless Steel Earth Rods are manufactured using 316 Grade Stainless steel and are highly resistant to corrosion. Stainless steel rods are best used for earthing installations where the problem of galvanic corrosion may take place between dissimilar metals buried in close proximity to each other.

Solid Stainless Steel Earth Rods - SSER

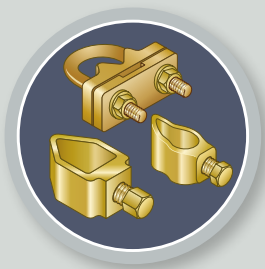
Earth Rod Length (m)	Rod Diameter (mm)	Weight per rod (Kg)	Ordering Code
1.20	14	1.5	SSER1214
1.50	14	2.5	SSER1514
1.80	14	2.7	SSER1814
2.00	14	3.0	SSER2014
2.40	14	3.2	SSER2414
3.00	14	3.5	SSER3014

- Other rod sizes available on request, contact LPI for more details.
- Standards: AS 3679, BS 7430, BS 6651

Fittings for Solid Stainless Steel Earth Rods - LEHC & PH

Description	Weight (Kg)	Ordering Code
Coupling for Solid Stainless Steel Rod 14mm	0.11	LEHC-14-SS
Driving Head	0.335	PH-14

- Coupling manufactured from Stainless Steel

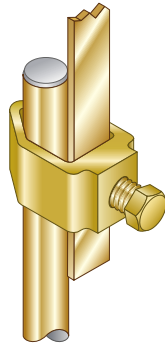


Mechanical Clamps

LPI offers a wide selection of mechanical clamps suitable for use with a combination of rod sizes and conductors or tapes. LPI clamps provide the ability for the user to install a conductive and mechanically secure connection between earth rods and conductors whilst limiting the effects of corrosion.

Rod to Tape Clamp Type A

Suitable for clamping earth rods to tape.



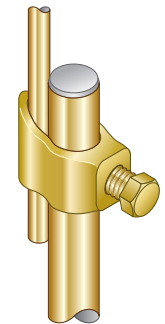
All LPI clamps are manufactured from gunmetal / high strength copper alloy.

Rod to Tape Clamp - Type A			- RTC
Rod Diam. mm	Max Tape size mm	Weight Kg	Ordering Code
14	25	0.15	RTC1425A
16	25	0.15	RTC1625A
20	50	0.20	RTC2050A

• Standards: BS 2874, BS 1400

Rod to Cable Clamp Type G

Suitable for clamping earth rods to conductors.

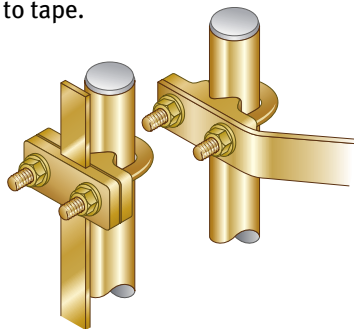


Rod to Cable Clamp - Type G			- RCC
Rod Diam. mm	Max Conductor Range mm ²	Weight Kg	Ordering Code
14	16 – 70	0.15	RCC1470G
16	16 – 95	0.15	RCC1695G
20	16 – 95	0.15	RCC2095G

• Standards: BS 2874, BS 1400

U-Bolt Rod Clamp Type E

Suitable for clamping earth rods to tape.

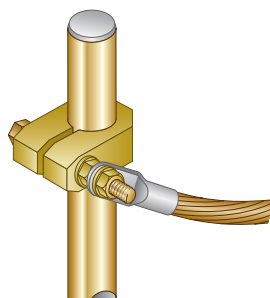


U-Bolt Rod Clamp - Type E			- UBRCE
Rod Diam. mm	Max Tape size mm	Weight Kg	Ordering Code
14	25	0.30	UBRC1425E
16	25	0.30	UBRC1625E
20	50	0.35	UBRC2050E
25	50	0.35	UBRC2550E

• Gunmetal Casting to BS 1400

Split Connector Clamp Type B

Suitable for connecting threaded and unthreaded rods to cable via a lug clamp.

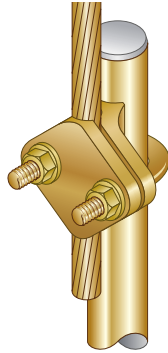


Split Connector Clamp - Type B			- SCGB
Rod Diam. mm	Weight Kg	Ordering Code	
14	0.15	SCGB14B	
16	0.15	SCGB16B	
20	0.30	SCGB20B	
25	0.30	SCGB25B	

• Gunmetal Casting to BS 1400

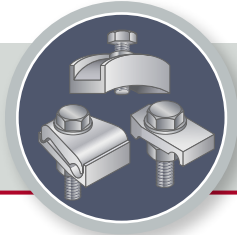
U-Bolt Rod Clamps

Heavy duty clamp for connecting round conductors to an earth rod.



U-Bolt Rod Clamps			- UBRC
Rod Diam. mm	Max Conductor Range mm ²	Weight Kg	Ordering Code
14	16 – 95	0.24	UBRC1495
16	16 – 95	0.40	UBRC1695
20	70 – 185	0.40	UBRC20185
25	70 – 185	0.40	UBRC25185

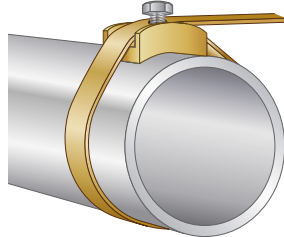
• Gunmetal Casting to BS 1400



Bonds and Clamps

Watermain Pipe Bond

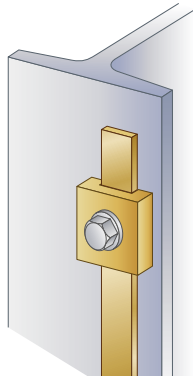
For bonding of metallic water main pipes and copper tape to the earthing or lightning protection system. Manufactured from gunmetal.



Watermain Pipe Bond		- WPB
Tape Size mm	Weight / Kg	Ordering Code
26	.20	WPB25

B-Bond

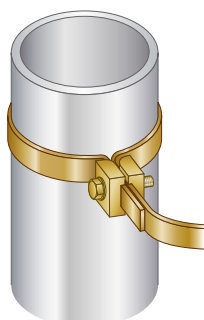
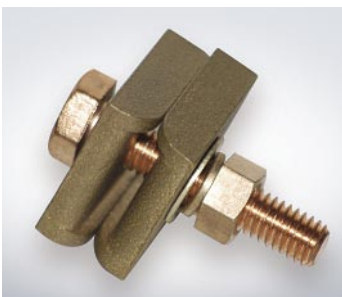
For bonding tape to steel structures. Manufactured from gunmetal.



B-Bond			- BB
Tape Size mm	Bolt Size	Weight Kg	Ordering Code
26	M10	0.12	BB25

RWP Bond

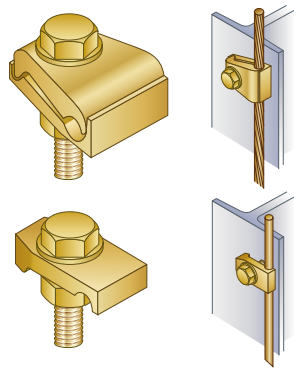
Used for bonding tape to rainwater pipes, handrails etc. Manufactured from gunmetal.



RWP Bond			- RWP
Tape Size mm	Bolt Size	Weight Kg	Ordering Code
26	M10	0.16	RWP25

Tower Earth Clamp

Used for bonding copper cables or wires to steel structures. Manufactured from gunmetal.

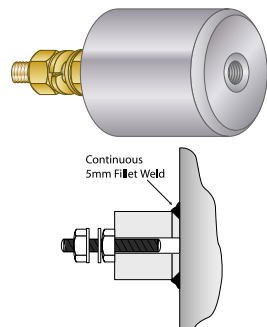


Tower Earth Clamp				- TEC
Conductor Size mm ²	Channel Thickness mm	Bolt Size	Weight Kg	Ordering Code
70 - 120	10	M12	0.17	TEC120

• Gunmetal Casting to BS 1400

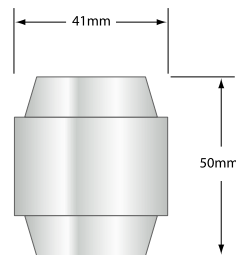
Earth Boss

Designed for welding to steel structures such as tanks and vessels. Manufactured from high tensile mild steel, zinc plated to avoid corrosion and supplied with stud and bolt made of steel, with spring and plain washer.

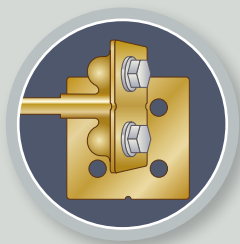


Earth Boss				- EB
Length mm	Diameter mm	Thread Diameter	Weight Kg	Ordering Code
30	38	3/8"	0.30	EB3038
50	50	1/2"	0.86	EB5012

• Mild Steel Grade to BS 970 230M07



Insulator				- IL
Length mm	Diameter mm	Thread Size	Weight Kg	Ordering Code
50	41	M10	0.15	IL10
50	41	M12	0.15	IL12



Earth Points

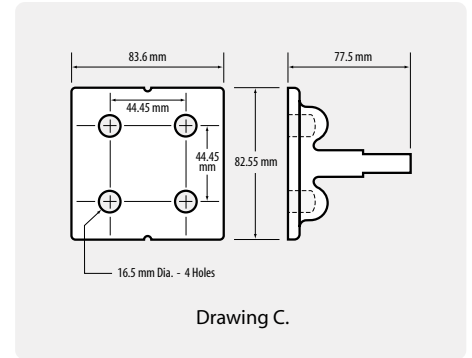
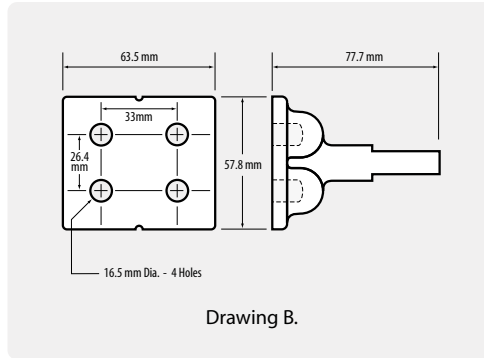
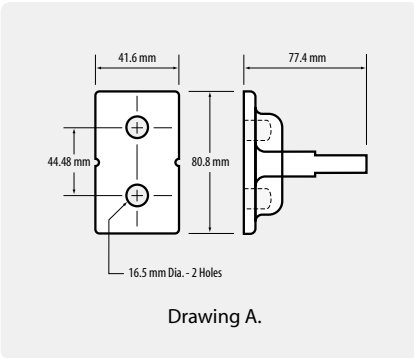
LPI Earth Points used in concrete structures offer convenient earth system connection points. The earth points are used for equipment, machinery and structural earthing after completion of the concrete work.



Earth Points					- EP
Stem Diameter (mm)	Hole Size BSW (Inches)	Holes	Weight - kg	Drawing #	Ordering Code
10.7	1/2	2	0.28	A (see page 14)	EP2120
10.7	1/2	4	0.34	B (see page 14)	EP4120
10.7	1/2	4	0.52	C (see page 14)	EP4240



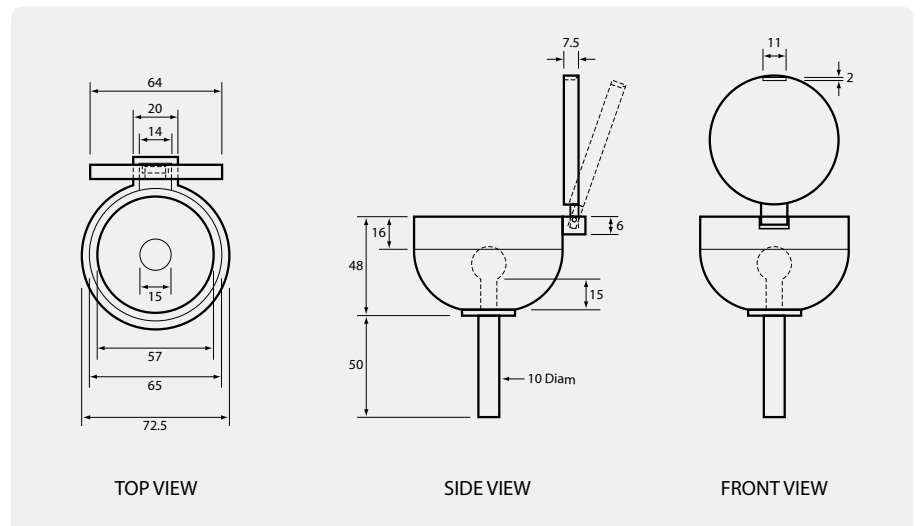
Earth Points with Pre-Welded Tails		- EPT
Description	Weight – Kg	Ordering Code
EP2120 with prewelded 500mm long PVC insulated 70mm cable	.70	EP212057T
EP4120 with prewelded 500mm long PVC insulated 70mm cable	.75	EP412057T
EP4240 with prewelded 500mm long PVC insulated 70mm cable	.95	EP424057T

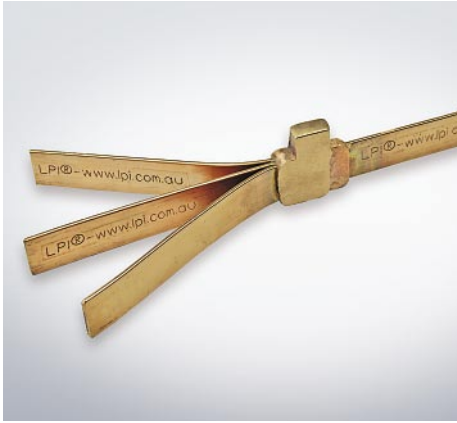


Static Earth Receptacle

The LPI earthing receptacle is a copper alloy casting designed to provide a static discharge point for aircraft refueling tankers. The receptacle is designed for an installation flush with a flat surface.

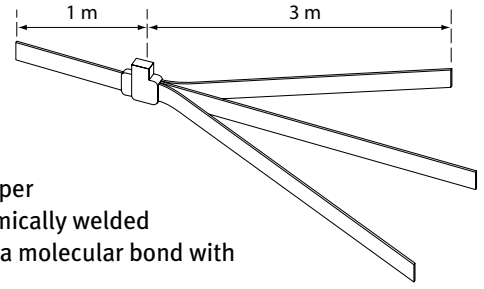
Static Earth Receptacle					- SER
Description	Depth (mm)	Lid Diameter (mm)	Diameter of Ball-Attachment Point (mm)	Weight (Kg)	Ordering Code
Static Earth Receptacle	98	72.5	15	0.80	SER15





Prefabricated Crows Foot

LPI's prefabricated crows foot provides a customized radial earth which is ideal for installation as a lightning protection earth. The radial earth uses lengths of 25mm x 3mm copper tape (99.99% Purity) which are exothermically welded together using LPI EXOWELD to provide a molecular bond with excellent corrosion resistance.



Prefabricated Crows Foot			- PCF
Description	Tape Size (mm)	Weight (Kg)	Ordering Code
Prefabricated Crows Foot	25 x 3	6.7	PCF-25

• Standard: BS EN 13601



Earth Plates - Solid & Lattice

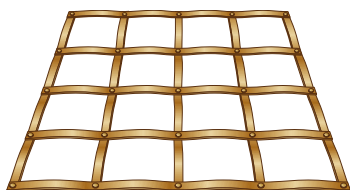
Solid Copper Earth Plates

Copper earth plates are manufactured using oxygen free copper and provide a high level of conductivity. Copper purity is 99.99%.



Solid Copper Earth Plates			- SCEP
Earth Plate Size mm	Weight Kg	Ordering Code	
600 x 600 x 3	9.7	SCEP663	
900 x 600 x 3	14.5	SCEP963	
900 x 900 x 3	22	SCEP993	
900 x 600 x 5	24.15	SCEP965	
600 x 900 x 6	29	SCEP696	

• Standard: AS 2738.2 - 1984



Earth Plates - Lattice Copper					- CEL
Lattice Size (m)	Total Area - Square Metres	Size of Individual Grid (m)	Copper Tape Size (mm)	Weight (Kg)	Ordering Code
2 x 2	4	.5 x .5	25 x 3	13.5	CEL553
2.4 x 2.4	5.76	.6 x .6	25 x 3	16.1	CEL663
3.6 x 3.6	12.96	.9 x .9	25 x 3	24.2	CEL993
4 x 4	16	1 x 1	25 x 3	26.9	CEL113

• Alternative sizes are available. Contact LPI for more information.

• Standard: BS EN 13601



Conductors

The earthing conductor is considered as the most important component of any earthing system.

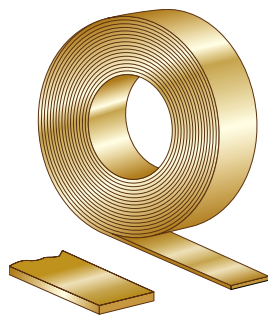
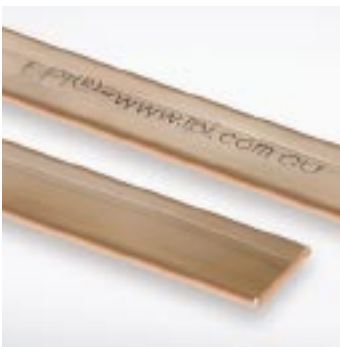
The most commonly used conductors are flat copper tapes or soft drawn stranded copper conductors. Flat copper tape is considered as the most efficient conductor as it provides greater surface contact with the surrounding soil which assists greatly in the dissipation of induced energy.

There are several points to consider when selecting a suitable conductor for an earthing system.

- The conductors physical characteristics must be robust and suitable for the soil conditions. When site conditions are corrosive to copper the use of a tinned copper conductor is recommended.
- The cross sectional area of the conductor must be of adequate size so that it will safely conduct the maximum fault current for a period of time without fusing or melting the conductor.

Bare Copper Tape

- Greater surface contact with the soil
- Pure electrolytic copper
- Low impedance

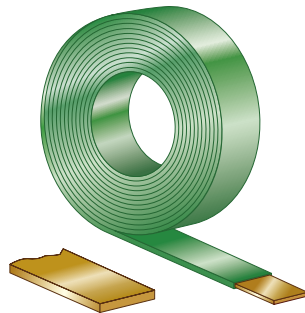


Copper Tape			- CT (Bare)
Conductor Size (mm)	Weight per Metre / Kg	Standard Coil Size (Metre)	Ordering Code
20 x 3	0.53	100	CT203
25 x 3	0.67	100	CT253
50 x 3	1.33	40	CT503
50 x 6	2.67	20	CT506

- Alternative sizes are available for both soft drawn tape and hard drawn copper bar. Contact LPI for more information.
- LPI embossed tapes are available in selected sizes.
- Standard: BS EN 13601

PVC Insulated Copper Tape

- High Conductivity copper tape
- PVC covered in compliance with BS EN 13601 and BS 6746C.

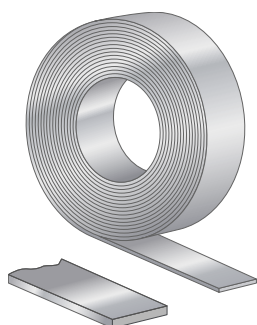
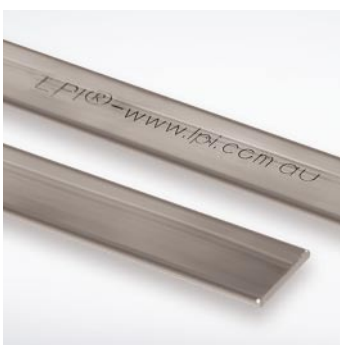


PVC Insulated Copper Tape			- PVCCT
Conductor Size (mm)	Weight per Metre / Kg	Standard Coil Size (Metre)	Ordering Code
20 x 3	0.63	50	PVCCT203
25 x 3	0.77	50	PVCCT253
50 x 3	1.52	40	PVCCT503
50 x 6	2.95	20	PVCCT506

- Alternative sizes are available. Contact LPI for more information.
- Standard colour of PVC covered tapes is green. Alternative colours are available upon request.

Tinned Copper Tape

- High Conductivity copper tape
- Ideal for highly corrosive soil conditions

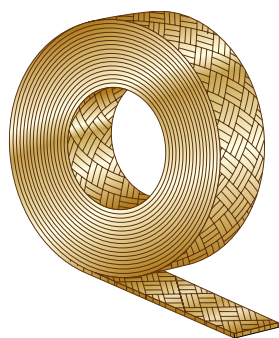


Tinned Copper Tape			- TCT
Conductor Size (mm)	Weight per Metre / Kg	Standard Coil Size (Metre)	Ordering Code
20 x 3	0.53	50	TCT203
25 x 3	0.67	50	TCT253
50 x 3	1.33	40	TCT503
50 x 6	2.67	20	TCT506

- Alternative sizes are available. Contact LPI for more information.
- Standard: BS EN 13601

Flexible Copper Braid

- Manufactured from high conductivity copper wire
- Suitable for earth bonding of gates, metal doors and fences where flexibility is required.

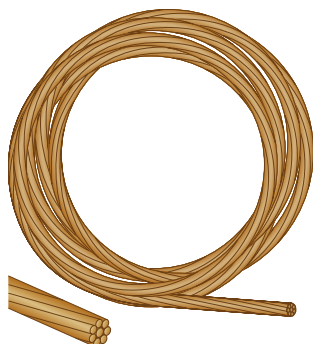


Flexible Copper Braid			- FCB
Overall Size (mm)	Weight per Metre / Kg	Standard mm ²	Ordering Code
12 x 1.5	0.06	8.4	FCB121
19 x 1.5	0.12	12.1	FCB191
19 x 3	0.20	22.4	FCB193
25 x 3	0.32	36.5	FCB253
32 x 6	0.63	81.4	FCB326

- Alternative sizes are available. Contact LPI for more information.
- Standard: BS 4109 - C101

Bare Stranded Copper Cable

- Soft drawn stranded copper cable to BS 6360

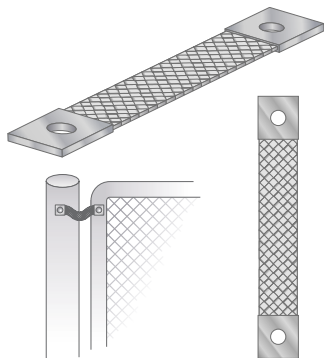


Stranded Copper Cable				- SCC (Bare)
Cross Sectional Area mm ²	Stranding no. / mm Ø	Weight per metre / Kg	Ordering Code	
6	7/1.04	0.05	SCC6	
16	7/1.70	0.15	SCC16	
25	7/2.14	0.23	SCC25	
35	7/2.52	0.32	SCC35	
50	19/1.78	0.43	SCC50	
70	19/2.14	0.62	SCC70	
95	19/2.52	0.86	SCC95	
120	37/2.03	1.09	SCC120	

- Alternative sizes are available. Contact LPI for more information.

Tinned Copper Flexible Connectors

- Pre cut and drilled bonds.
- Suitable for bonding gates, doors and fences.

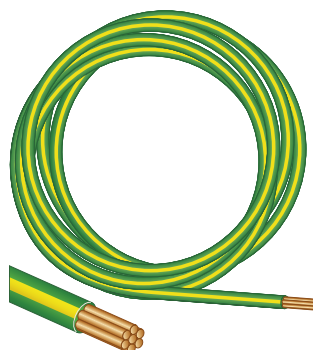
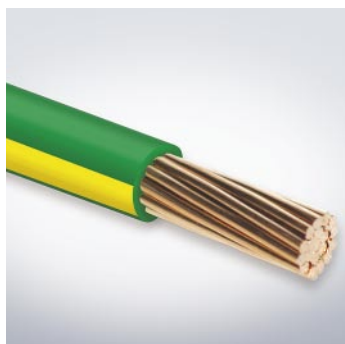


Tinned Copper Flexible Connectors					- TCFC
Overall Braid Dimensions (mm)	Weight Kg	Hole Size mm	Hole Centres Length (mm)	Ordering Code	
25 x 3.5	0.09	12	200	TCFC200	
25 x 3.5	0.12	12	300	TCFC300	
25 x 3.5	0.15	12	400	TCFC400	

- Standard: BS 4109

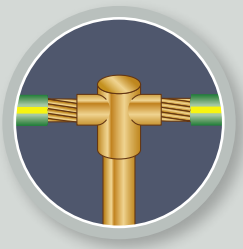
PVC Covered Stranded Copper Conductor

- PVC Covered soft drawn stranded copper cable to BS 6004
- Colour – Green and Yellow



PVC Covered Stranded Copper Conductor				- PVCSCC
Cross Sectional Area mm ²	Stranding no. / mm Ø	Weight per metre / Kg	Ordering Code	
16	7/1.70	0.19	PVCSCC16	
25	7/2.14	0.29	PVCSCC25	
35	7/2.52	0.41	PVCSCC35	
50	19/1.78	0.53	PVCSCC50	
70	19/2.14	0.73	PVCSCC70	
95	19/2.52	1.00	PVCSCC95	
120	37/2.03	1.16	PVCSCC120	

- Alternative sizes are available. Contact LPI for more information.



LPI® EXOWELD

Exothermically welded earthing connections

What is LPI® EXOWELD ?

LPI® EXOWELD is the brand name of exothermic materials which are marketed and sold by Lightning Protection International Pty Ltd, Australia.

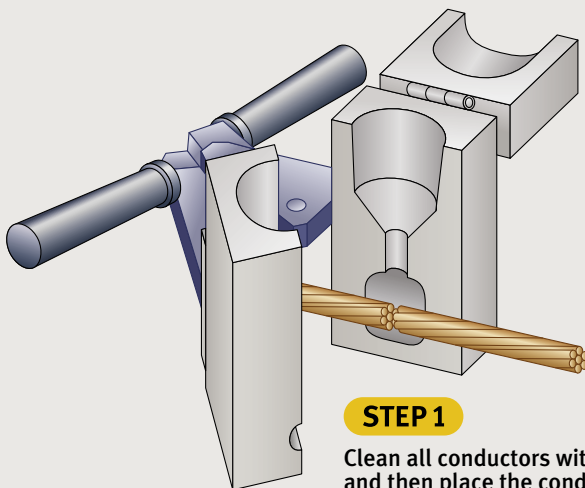
LPI® EXOWELD is a cost effective method of completing a high quality electrical connection. The process is simple to follow and through the use of a high temperature reaction a long lasting, quality electrical bond is created between conductors.

Advantages

1. Does not deteriorate with age as the connections are permanent.
2. Does not loosen as the LPI® EXOWELD connections create a permanent molecular bond.
3. Excellent corrosion resistance.
4. Electrical characteristics are higher than typical mechanical connections.
5. Does not increase resistance above that of the conductor.
6. No external power or heat is required to make connections.
7. Quality can be assessed visually.
8. Easy and simple to install.

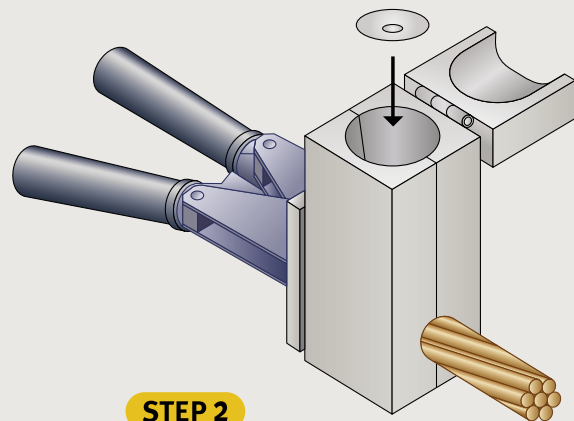
*** Refer to LPI® Exoweld brochure for full details on the range of available Exoweld connections and products.**

Making an LPI® EXOWELD Connection



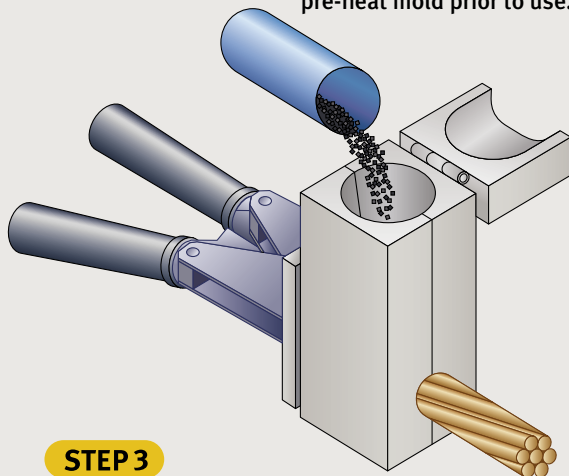
STEP 1

Clean all conductors with a wire brush and then place the conductors into position in the open mold. Be sure to pre-heat mold prior to use.



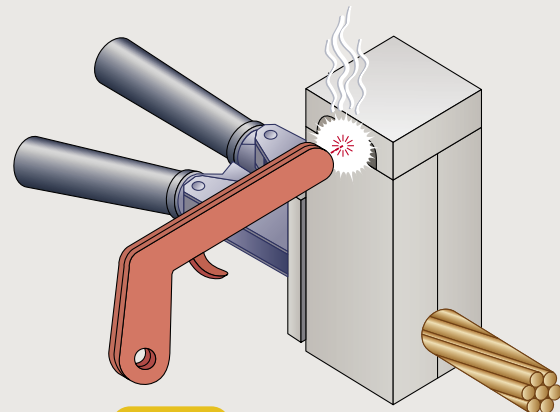
STEP 2

Close the handle clamp to lock the mold into place. Place the disk into position in the mold ensuring it is correctly seated and covering the tap hole.



STEP 3

Place the weld metal into the crucible and position the starting material on the lip of the mold in preparation for ignition.



STEP 4

Close the cover and ignite using flint ignitor. Open the mold after the metal solidifies. Remove the slag from the mold before making the next connection.

Exothermic welding process

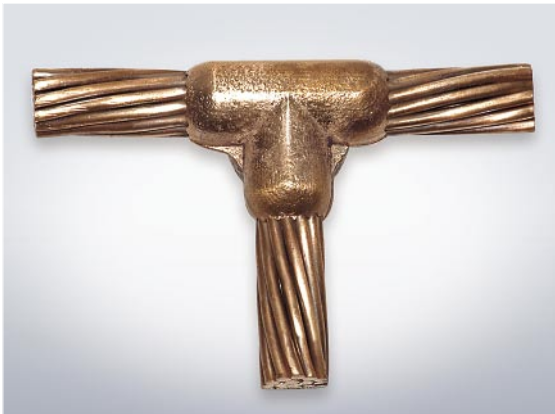
The exothermic welding process is a method of making electrical connections of copper to copper or copper to steel in which no outside source of heat or power is required.

In this process, granular metals (granular copper oxide and aluminium) are placed from a container into a graphite crucible and ignited.

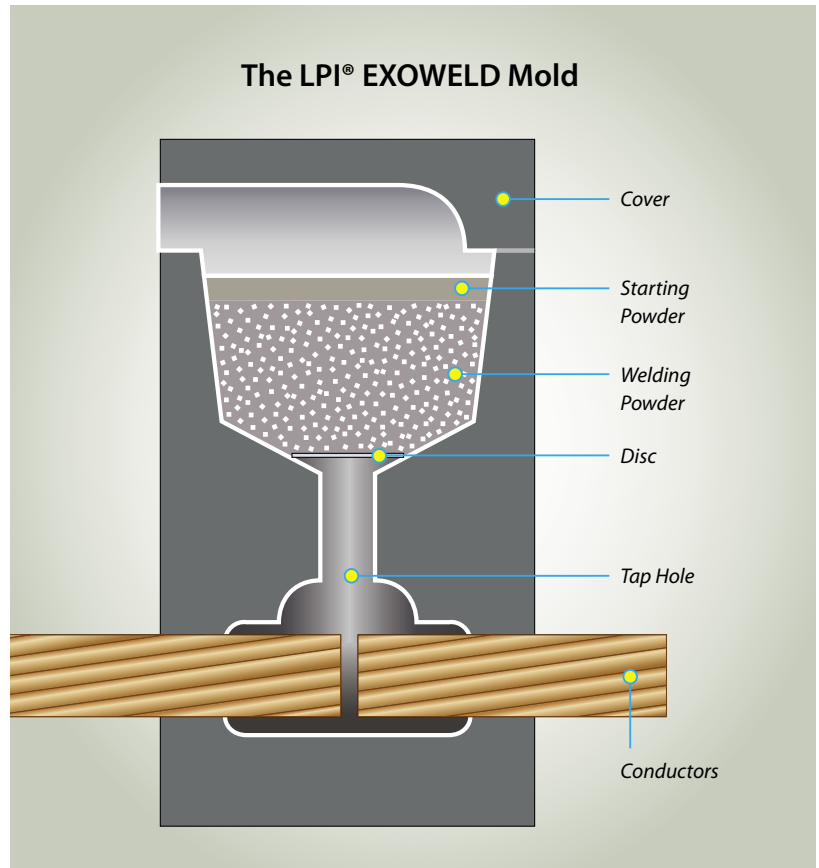
The reduction of copper oxide by the aluminium (exothermic reaction) produces molten copper and aluminium oxide slag.

The slag floats to the surface and the disk melts, allowing molten copper to flow into the weld cavity and complete the weld. The weld is allowed to solidify.

The mold is removed and made ready for the next weld. The process takes seconds to complete.



An Exoweld connection is a perfect molecular bond which provides permanent conductivity over the whole section of the weld, due to molecular bonding between the metal surfaces.



Cross sectional view of an LPI® Exoweld mold, showing the Starting Powder together with the Welding Powder being held in position within the crucible by the sacrificial disk. Conductors are also in place within the weld cavity, ready for ignition of the Starting Powder.

The Starting Powder has an ignition temperature of +450°C and the Welding Powder an ignition Temperature of +900°C. The combination of the starting and welding materials produces a reaction temperature of +2200°C which initiates the molecular bonding between conductors.

LPI® EXOWELD Tools and Accessories

Exothermic weld metal is a mixture of copper oxide and aluminum, packaged by size in a plastic cartridge. The cartridge contains the starting powder at the bottom with the weld metal on top. These cartridges are packaged in boxes along with metal disks. Each weld requires one disk.

Molds

A graphite mold is used for exothermic welding connections. The mold controls the direction and speed of the molten weld metal flow and the formation of the weld.

The graphite used is a high temperature type that lasts for an average of 50 or more welding connections under normal usage.



Disks are used to seal the tap hole.

19mm Dia. disk : for #15 thru #65

26mm Dia. disk : for #90 & #115

38mm Dia. disk : for #150 or larger



Handle Clamps such as the one shown below are required for most molds.



Two types of Handle Clamps are available.

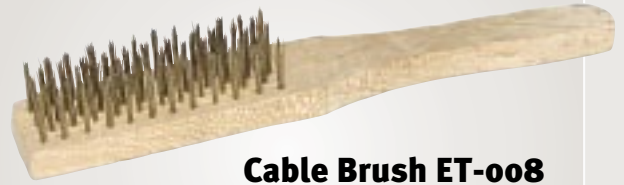
1. EC-M for all molds 3" wide.
2. EC-L for all molds 4" wide.

For some molds, specialized frames with handles are required.



Flint Ignitors EF-R

Flint Ignitors are used to ignite the starting material.



Cable Brush ET-008

is recommended for cleaning heavily oxidized conductors and surfaces prior to the welding connection.

Slag Removal Spade ET-009

is useful for removing the slag from the mold after the welding connection is completed. They are especially useful for horizontally split molds.



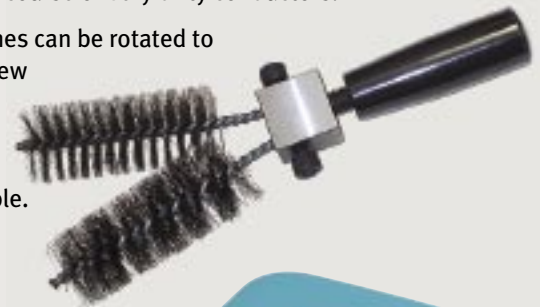
Mold brush EB-R is useful for removing the slag from the mold after the welding connection is completed.



Cable Cleaning Brush ET-008-1

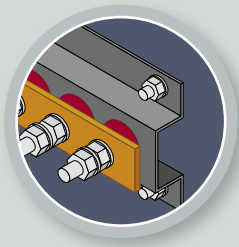
V-Shaped Brush cleans any conductor and is especially useful for coarse or very dirty conductors.

The brushes can be rotated to provide new cleaning bristles and are replaceable.



Mold Sealer ES-M is for sealing molds to eliminate leakage of molten weld metal.





Earth Bars and Disconnect Links



Correct bonding is essential to create an equipotential earth plane between service earths and equipment under fault or transient conditions. The equipotential plane ensures that voltage differentials are not created between earths under fault conditions and ensures the safety of all personnel and equipment.

LPI offers a wide selection of earth bars and disconnect links which provide a single point earthing and bonding location.

All earth bars and disconnect links are supplied with a plastic “non-corrosive” base suitable for exposed installation.



Earth Bars					- EB
Description	Length mm	Width mm	Height mm	Weight Kg	Ordering Code
6 Way	400	80	98	2.10	EB400
8 Way	500	80	98	2.60	EB500
10 Way	600	80	98	3.20	EB600
12 Way	700	80	98	3.70	EB700
14 Way	800	80	98	4.20	EB800
16 Way	900	80	98	4.70	EB900
18 Way	1000	80	98	5.20	EB1000
20 Way	1100	80	98	5.80	EB1100

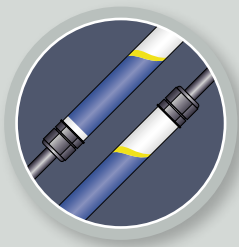
• Alternative sizes are available. Contact LPI for more information.

Earth Bars with Single Disconnect Link					- DL1
Description	Length mm	Width mm	Height mm	Weight Kg	Ordering Code
Single	125	80	98	0.60	DL-1251
6 Way	475	80	98	2.80	DL-4751
8 Way	575	80	98	3.40	DL-5751
10 Way	675	80	98	4.00	DL-6751
12 Way	775	80	98	4.60	DL-7751
14 Way	875	80	98	5.20	DL-8751
16 Way	975	80	98	5.70	DL-9751
18 Way	1075	80	98	6.30	DL-10751
20 Way	1175	80	98	6.90	DL-11751

• Alternative sizes are available. Contact LPI for more information.

Earth Bars with Twin Disconnect Links					- DL2
Description	Length mm	Width mm	Height mm	Weight Kg	Ordering Code
6 Way	550	80	98	3.30	DL-5502
8 Way	650	80	98	3.90	DL-6502
10 Way	750	80	98	4.50	DL-7502
12 Way	850	80	98	5.10	DL-8502
14 Way	950	80	98	5.70	DL-9502
16 Way	1050	80	98	6.30	DL-10502
18 Way	1150	80	98	6.90	DL-11502
20 Way	1250	80	98	7.50	DL-12502

• Alternative sizes are available. Contact LPI for more information.



Equipotential Bonding - Transient Earth Clamp

In many communications and computer installations separate earth systems are often specified for three reasons - noise, security and local regulations can determine that separate earth systems are to be employed.

It is not uncommon for separate earths for lightning, mains power, computer (quiet earth) and communications to be installed.

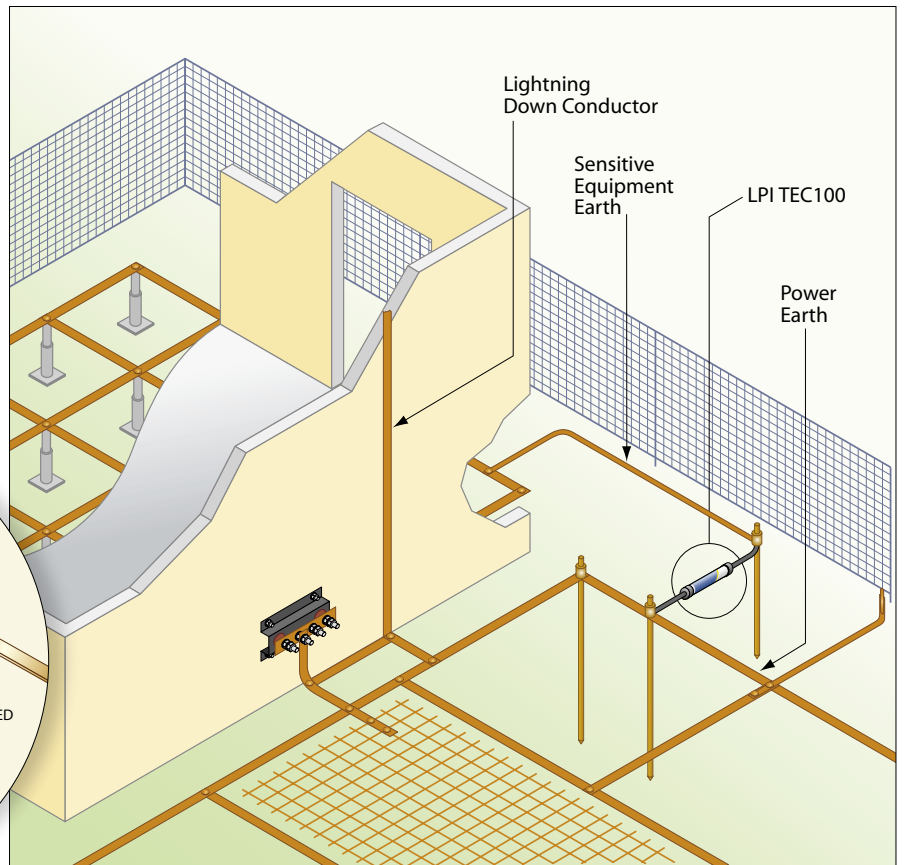
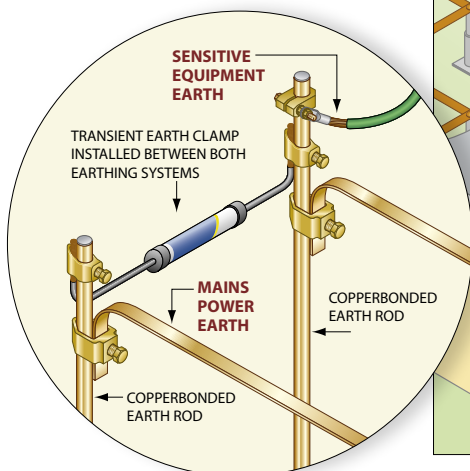
LPI's Transient Earth Clamp (TEC) prevents earth potential differences by operating only under transient conditions to effectively clamp all connected earths together.

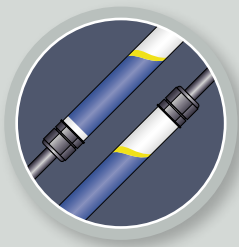
Under normal condition the TEC presents an effective open circuit, once the earth potential difference exceeds the breakdown voltage of the TEC, conduction immediately occurs and the earth potentials are equalised. The TEC is a self-restoring device and has a life of over ten thousand operations.

LPI Transient Earth Clamp: LPI TEC100

Technical Data

Application:	Prevents earth potential differences
Ordering Code:	TEC100
Rated DC Sparkover Voltage (100V/s):	350V
Tolerance:	+/- 20%
Impulse sparkover voltage (1kV/μs):	1000V
Arc Voltage:	> 80V
Insulation Resistance (at 100 Vdc)	> 1 G Ohms
Capacitance @ 1MHz:	10pF
AC discharge current (50Hz; 1s; 5 times):	100A
Rated Impulse discharge current (8/20μs):	100kA
Max. Discharge current (8/20μs; 1 time):	150kA
Max. Discharge current (10/350μs; 1 time):	60kA
Dimensions:	175mm (L) x 25mm (D) Cable Leads: 300mm on each end





Insulated Joint Protector

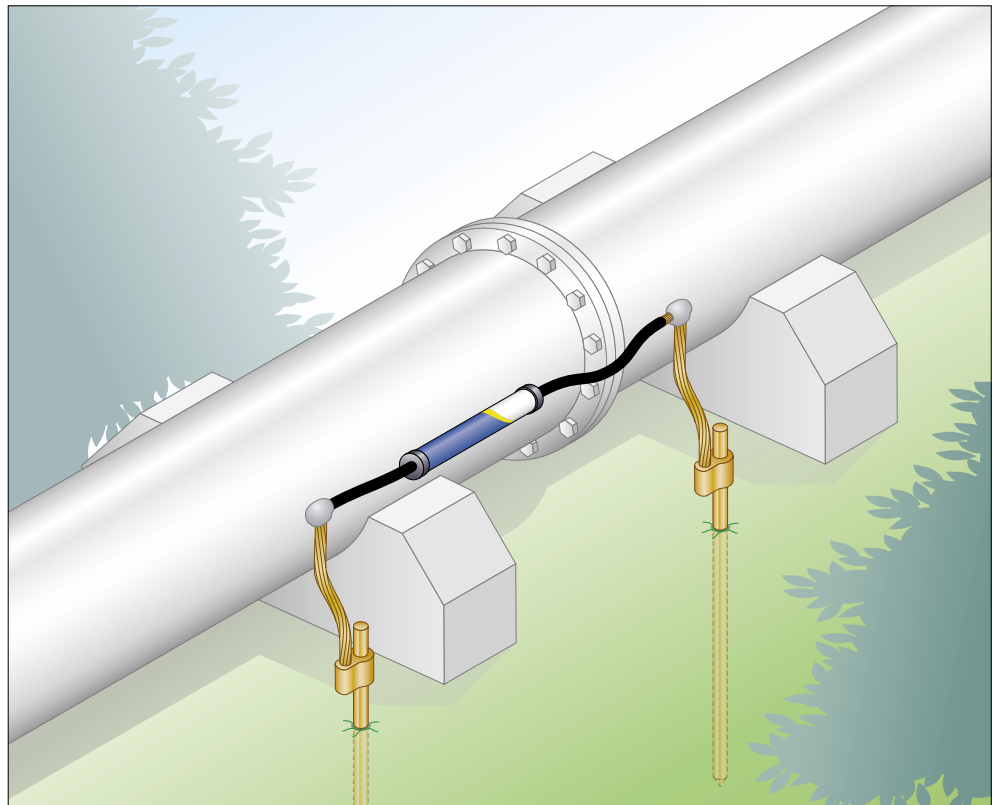
LPI's Insulated Joint Protector (IJP-100) is designed for protection of insulated joints in oil or gas pipelines. With long lengths of insulated pipeline, induced voltages in the pipes caused by local lightning or power line fault activity can be in the order of tens of kilovolts.

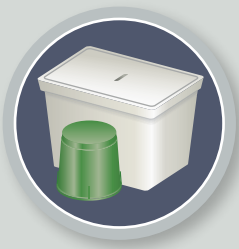
For protection against insulated joint break down, LPI developed the IJP-100 which is connected directly across the insulated joint. In its inactive state the IJP presents an effective open circuit ($10^{10}\Omega$) across the joint. Should the insulated joint voltage exceed the breakdown voltage of 350V, the IJP will immediately conduct to safely pass the surge current to ground. After conducting, the IJP will automatically reset to its inactive state.

LPI Insulated Joint Protector: LPI IJP-100

Technical Data

Application:	Protection of insulated joints in oil or gas pipelines
Ordering code:	IJP-100
Rated DC Sparkover Voltage (100V/s):	350V
Tolerance:	+ / - 20%
Impulse sparkover voltage (1kV/ μ s):	1000V
Arc Voltage:	> 80V
Insulation resistance (at 100 Vdc):	> 1 G Ohms
Capacitance (@ 1 MHz):	10pF
AC discharge current (50Hz; 1s; 5 times):	100A
Rated impulse discharge current (8/20 μ s):	100kA
Max. Discharge current (8/20 μ s; 1 time):	150kA
Max. Discharge current (10/350 μ s; 1 time):	60kA
Environmental Rating:	IP 55
Housing:	Metal enclosure with epoxy compound filled
Dimensions & Cable Leads:	175mm (L) x 25mm (D) & 16mm ² marine grade double insulated 300mm cable on each end



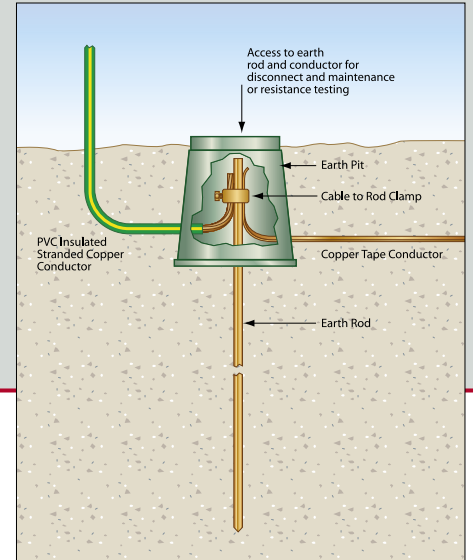


Earth Pits

Earth pits provide a secure and user friendly access point for maintenance purposes and the periodical measuring of electrical resistance of a buried earthing system.

In order to complete routine measurements of electrical resistance simply remove the lid from the installed earth pit and connect a lead from the resistance meter to the earthing conductor.

LPI offers a range of earth pits which are suitable for remote locations through to areas high in vehicle and pedestrian traffic.



Light Weight Earth Pit

- Suitable for isolated areas with minimal vehicle and pedestrian traffic.

Light Weight Earth Pits					- EPIT-L
Dimensions mm	Construction	Weight Kg	Colour	Withstand	Ordering Code
235 Top x 355 Base x 255 Deep	Polymer	1.4	Green	1 Tonne	EPIT-L



Heavy Duty Earth Pit

- Suitable for locations with light vehicle access and regular pedestrian traffic.

Heavy Duty Earth Pits					- EPIT-H
Dimensions mm	Construction	Weight Kg	Colour	Withstand	Ordering Code
435 Top x 300 Base x 200 Deep	Polymer	3.0	Green	1 Tonne	EPIT-H



Concrete Earth Pit

- Suitable for all load applications from pedestrian to highway traffic.
- Glass fibre reinforced concrete.

Concrete Earth Pits					- EPIT-C
Dimensions mm	Construction	Weight Kg	Colour	Withstand	Ordering Code
320 Length x 320 Width x 200 Deep	Glass Fibre Reinforced Concrete	32.0	Grey	5 + Tonnes	EPIT-C



Earth Bond Inspection Pit

- Multi purpose earth pit and bonding point
- Suitable for internal or external installation

- Six way earth bar mounted internally
- Ideal for use at roadside telecommunication base stations

Light Weight Earth Pits					- EBOND	
Dimensions mm	Construction	Weight Kg	Colour	Earth Bar Connection Point	Withstand	Ordering Code
435 Top x 300 Base x 200 Deep	Polymer	5.0	Green	6	1 Tonne	EBOND-INSPIIT-A



Earth Enhancing Compounds

Due to varying soil conditions from one site to the next the installation of earthing conductors alone are typically insufficient in achieving a low resistance earth. The application of earth enhancing compounds around the conductors in an earthing system aids significantly in achieving the desired low level resistivity levels required for an effective earthing system.

- Significantly reduces earth resistance
- Long lasting treatment with no maintenance required
- Effective under varying soil conditions
- Cost effective in comparison to conventional methods
- Minimal seasonal changes in resistance values in comparison to conventional methods
- Easy to handle and install
- Does not adversely affect soil



- Ordering Code – RESLO-10
- RESLO-10 will not dissolve or leach away with time
- Maintains constant resistance for the life of the earthing system
- Effective in all soil conditions
- No maintenance required
- Supplied in easy to handle 10Kg Bags
- Independently tested by Australian University

LPI RESLO-10

LPI RESLO-10 is a low resistance, non corrosive earth enhancing compound which is supplied in easy to handle 10Kg bags. Designed for use in standard soil conditions RESLO-10 is comprised of specifically selected compounds which possess excellent electrical conductivity.

When RESLO-10 is mixed with water and poured on the earthing system and surrounding soil, the powder and water react to form a hardened mass within the earthing system. RESLO-10 will not wash away under seasonal conditions and therefore provides a permanent presence in working to improve and maintain the integrity of your earthing system.

Recommended Bags of RESLO-10 required for backfilling typical trench installation

Width of Trench (mm)	Length of Trench - 2.5m	Length of Trench - 5m
300	1	2

Recommended Bags of RESLO-10 required for backfilling Earth Rod installation

Diameter of Hole (mm)	Depth of Hole - 1800 mm	Depth of Hole - 2400 mm	Depth of Hole - 3000 mm
75	1	1	1
125	2	2	3
175	3	4	5



- Ordering Code – GRIP-10 and GRIP-40
- Premium enhancing compound specifically designed for use in difficult sites which contain excessive sand or rocky ground
- Available in 10Kg or 40Kg Kits
- Does not wash away
- Hydroscopic by nature
- Not affected by seasonal rains or floods
- Non corrosive
- Safe and easy to handle

LPI GRIP

LPI GRIP (Ground Resistance Improvement Powder) is a premium product designed to dramatically reduce soil resistivity in the poorest soil conditions.

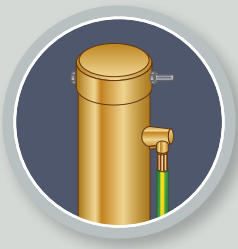
When GRIP is mixed with water and poured onto the earthing system and surrounding soil the powder and water react to form a gelatinous mass which will not reduce, contract or separate from the surrounding earthing system.

Recommended 10Kg Kits of GRIP required for backfilling typical trench installation

Width of Trench (mm)	Length of Trench - 30m in Good Soil Conditions	Length of Trench - 30m in Poor Soil Conditions
300	1	4

Recommended 10Kg Kits of GRIP required for backfilling Earth Rod installation

Diameter of Hole (mm)	Depth of Hole - 1800 mm	Depth of Hole - 2400 mm	Depth of Hole - 3000 mm
75	1	1	1
125	1	1	2
175	2	3	3

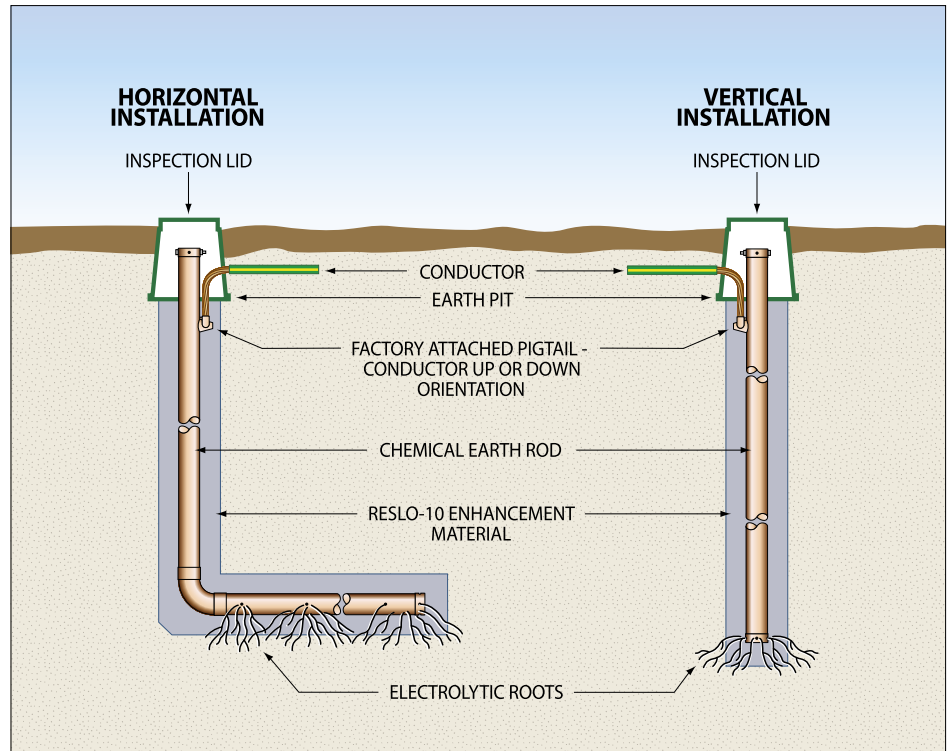
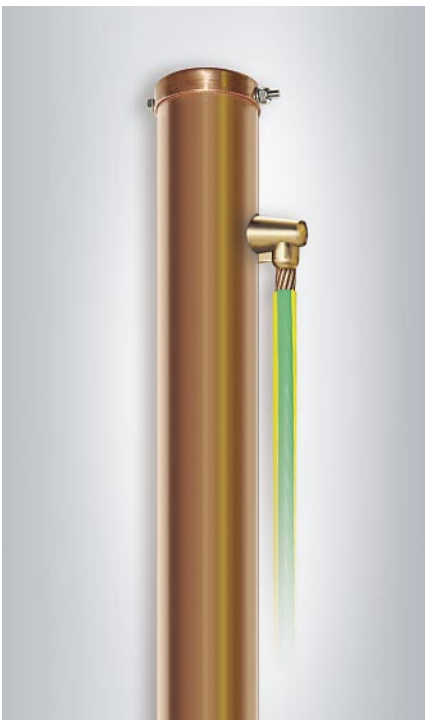


Chemical Earth Rods

LPI's Chemical Earth Rods provide a low impedance earth to effectively dissipate lightning and electrical fault currents. The chemical earth rod is ideal for installation in locations where space restrictions exist.

The Chemical Earth Rod is combined with LPI's RESLO-10 and mineral salts to provide a low maintenance earthing installation which is robust in design to provide years of reliable service.

- Low impedance to effectively dissipate lightning and electrical fault currents
- UL467 and AS1432 compliance
- Utilizes natural electrolytic salts which leach into the surrounding soil to increase conductivity
- Easy connection to conductors via pigtail
- Available in a variety of lengths and configurations
- Ideal where space limitations apply
- Suitable for use in poor / dry soil conditions
- Long service life



Chemical Earth Rod - CHEMROD	
Product Description	Ordering Code
Chemical Earth Rod – 2m with 70mm Pigtail, Mineral Salts & RESLO-10	CHEMROD2M
Horizontal Chemical Earth Rod – 2m with 70mm Pigtail, Mineral Salts & RESLO-10	CHEMROD2MHORIZ
Chemical Earth Rod – 3m with 70mm Pigtail, Mineral Salts & RESLO-10	CHEMROD3M
Horizontal Chemical Earth Rod – 3m with 70mm Pigtail, Mineral Salts & RESLO-10	CHEMROD3MHORIZ



LIGHTNING PROTECTION INTERNATIONAL PTY LTD AUSTRALIA

Earthing Applications



EARTH BAR

- Earth Bars with single or multi-connection
- Earth Bars with disconnect links



GRIP & RESLO

- **GRIP™**
 - 2 part compound
 - Long life
 - Highly conductive - ideal for rocky & sandy soil conditions
- **RESLO™**
 - Easy handling 10Kg bag
 - Increases surface contact around conductor
 - cost effective



CHEM RODS

- AS1432 and UL compliant
- Increases soil conductivity
- Low impedance earth



TEC (Transient Earth Clamp)

- Equipotential bonding under transient conditions only
 - Robust and designed for outdoor use
 - 100kA 8/20 μ s
 - Self Restoring type



LPI® EXOWELD®

- Exothermic Welding
- Permanent connection
- Highly conductive



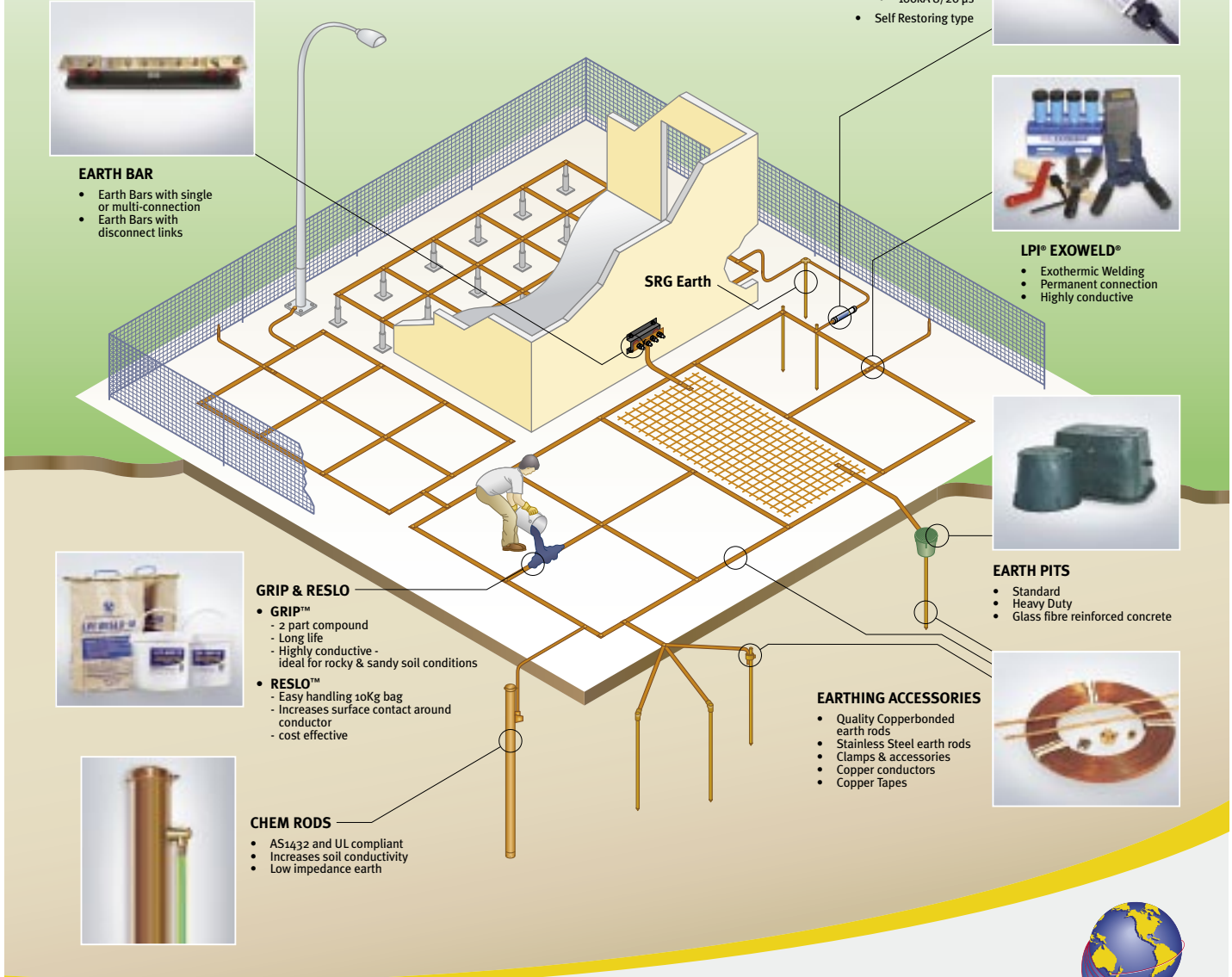
EARTH PITS

- Standard
- Heavy Duty
- Glass fibre reinforced concrete



EARTHING ACCESSORIES

- Quality Copperbonded earth rods
- Stainless Steel earth rods
- Clamps & accessories
- Copper conductors
- Copper Tapes



LIGHTNING PROTECTION INTERNATIONAL PTY LTD



AIRPORTS



SUBSTATIONS



INDUSTRIAL

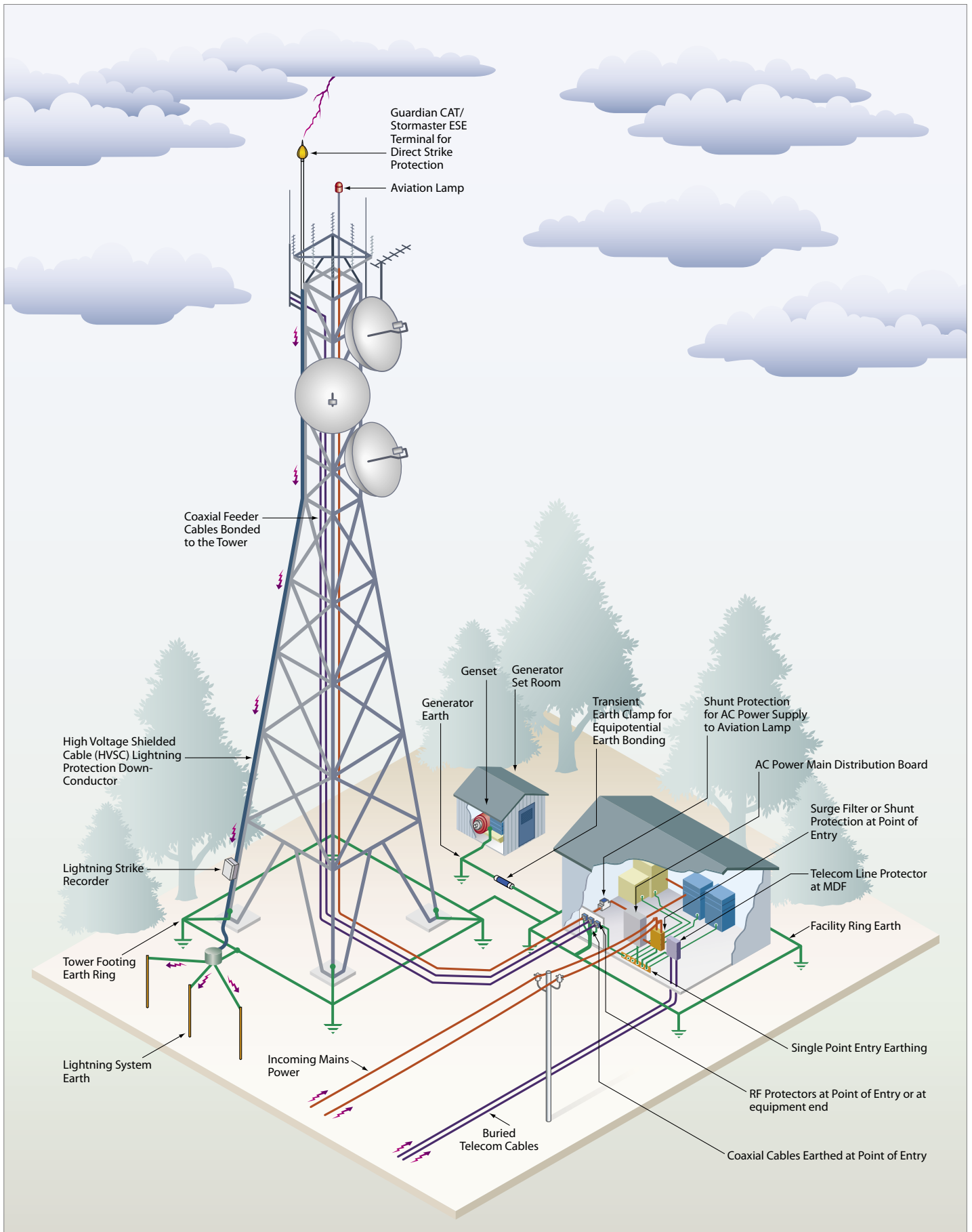


OIL & GAS



TELECOMMUNICATIONS

LPI's 4 Step Approach to Lightning Protection - Telecommunications Application



Research and Development

Lightning Protection International Pty Ltd maintains a strong commitment to research and development in order to better understand the lightning process which ultimately enhances the design and manufacture of all products.



LPI has conducted extensive high voltage testing of products with independently accredited high voltage laboratories.

- Stormmaster ESE range of lightning terminals tested in compliance to NF C 17-102
- Guardian System 5 lightning protection system (CAT terminals, HVSC downconductor, LSR1) tested in compliance to IEC test standard: IEC 60-1:1989
- Within our Australian based manufacturing facility LPI maintains a high impulse current generator used for testing manufactured products in compliance with world standards
- Ongoing working relationship with Australian based University encompassing product testing and field trials



LPI Consultancy Services

LPI personnel have many years of experience in servicing customers throughout the world on many types of projects in some of its most lightning prone areas. LPI's team of engineers offer comprehensive technical and risk / benefit consultancy services covering direct strike protection, surge and transient protection and earthing solutions. Using LPI's 4 Step Approach to Lightning Protection philosophy, our engineers work together with the client and contractor to survey the site, identify risks and recommend improvements required to minimize risks presented by lightning.

- Consultancy – Risk Management
- System Design
- Training
- Certification
- Installation and Commissioning



Additional Literature

Together with the earthing products and systems shown in this catalogue, **LPI** also has available a number of publications and CD-ROM covering their entire range of Lightning Protection and Surge and Transient Protection products and systems. If you would like further information on any of these products, please contact Lightning Protection International Pty Ltd direct, or your nearest LPI Distributor, or visit: www.lpi.com.au



Disclaimer

- LPI maintains a policy of on-going product development, specifications are subject to change without notice.
- Application detail, illustrations and schematic drawings are representative only and should be used as guides.
- It should be noted that 100% (100 percent) protection level for direct strike lightning and surge and transient protection equipment is not possible and cannot be provided due to the lightning discharge process being a natural atmospheric event.

LIGHTNING PROTECTION INTERNATIONAL PTY. LTD.

ABN 11 099 190 897



16 Mertonvale Circuit, Kingston
Tasmania, Australia 7050.

Telephone: + 61 3 6227 1955

Facsimile: + 61 3 6229 1900

Email: info@lpi.com.au

Web: www.lpi.com.au



LPI Customers | *LPI proudly services customers from the following countries:*

- Australia
- Bahrain
- Bangladesh
- Burundi
- Cambodia
- Chile
- Ecuador
- Haiti
- Hong Kong
- India
- Indonesia
- Iran
- Japan
- Kuwait
- Laos
- Mainland China
- Malaysia
- Maldives
- Mauritius
- New Zealand
- Nigeria
- Oman
- Papua New Guinea
- Peru
- Philippines
- Qatar
- Saudi Arabia
- Singapore
- South Korea
- Sri Lanka
- Taiwan
- Thailand
- UAE
- USA
- United Kingdom
- Venezuela
- Vietnam

Distributed by:

