ERITECH®

System 2000

Conventional Lightning Protection

GLOBAL LIGHTNING TECHNOLOGIES (M) SDN. BHD.

(Company No: 352683-V)
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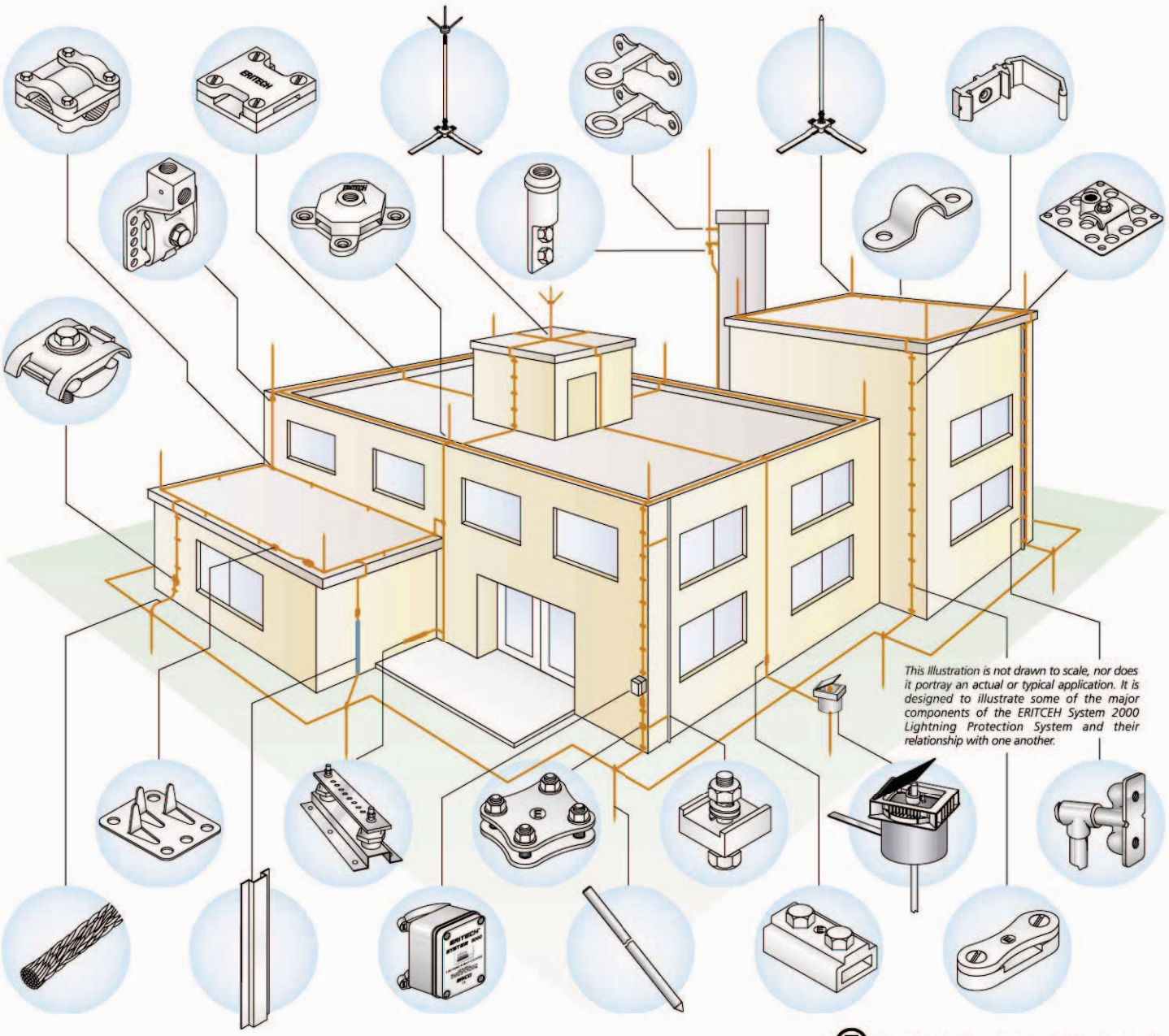


This Illustration is not drawn to scale, nor does it portray an actual or typical application. It is designed to illustrate some of the major components of the ERITCEH System 2000 Lightning Protection System and their relationship with one another.

Ⓔ Is a Product Marking of the ERITECH® product family.

ERITECH SYSTEM 2000

GLT offers the **System 2000™** series of air terminals, down-conductors and fittings in accordance with National and International Standards such as Australian-AS1768, British-BS6651, Singaporean-CP33, European-IEC and USA-NPFA 780.

Features

- Wide range of air terminals, bases, conductors, connectors and fasteners
- Air termination components and fittings are available in copper and copper and aluminium alloys
- Downconductors are available as smooth weave or stranded construction as well as copper, tinned copper and aluminium flat tapes
- Computer aided design optimises the location of air terminals providing the most effective lightning protection coverage.
- Based on conventional design principles rolling sphere, cone of protection and mesh method as found in AS1768, BS6651,IEC, CP33 and NFPA 780
- Precision manufacturing ensures easy assembly and installation
- UL Master Label System for NPFA components

During design, installation and commissioning, our Engineers can provide on site and telephone assistance to contractors to ensure that the recommended protection measures are implemented to best practice standards. This assures that your lightning protection installation will provide your facility with the optimum level of protection.

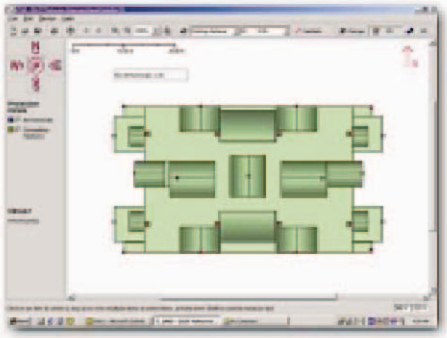
GLT have a collection of Application Notes that detail issues relating to Conventional type lightning protection systems. These notes cover the following topics -

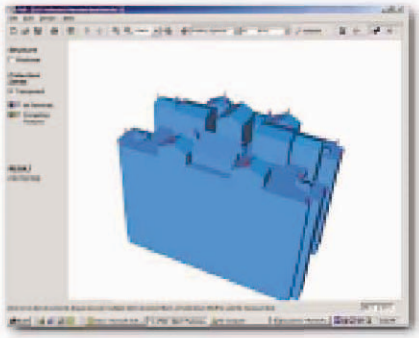
- Difference between various Downconductors,
- Benefits of Smooth Weave type of Downconductor,
- Benefits of using Adhesively fixed Air Terminal and Cable Fixings and
- Conventional Lightning Protection Designs with and without Air Terminals.

If you have any questions about the application of conventional downconductors please do not hesitate to contact your nearest GLT office.

ERITECH® SYSTEM 2000 - LPSD DESIGN

LPSD is ERICO's proprietary computer aided design package that is used to design custom protection for structures based on statistical parameters. It optimises the location of air terminals on a site-by-site basis to provide the most effective lightning protection coverage. A LPSD design can be applied to all facilities that require lightning protection benefit from obtaining a LPSD design customized to their particular building(s).



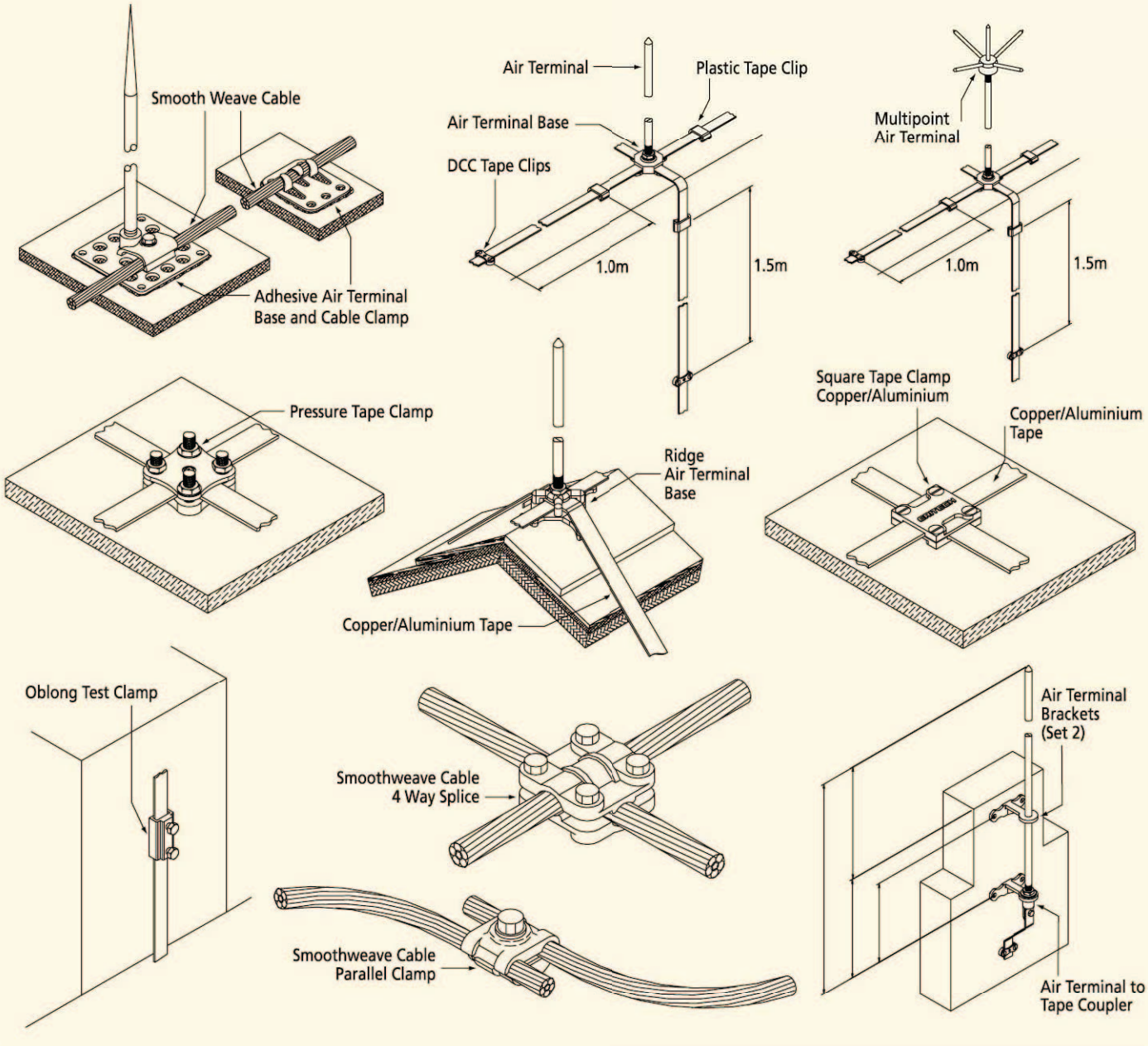


Features

- Customized design for each project
- Uses the Rolling Sphere, Cone of Protection and Mesh method for System 2000 designs
- Protection assured to a specified statistical level
- LPSD provides calculation results, plan and elevation drawings, typical installation drawings, specification and a bill of materials
- JPEG files of some design views available for inclusion into project documentation
- All designs performed by skilled designers

To ensure our designers have all the relevant data when they complete a design, please complete a design request form. This can be obtained from www.erico.com/product/Benji.asp or from your local ERICO representative.

Typical installation drawings from an ERICO designed Lightning Protection System

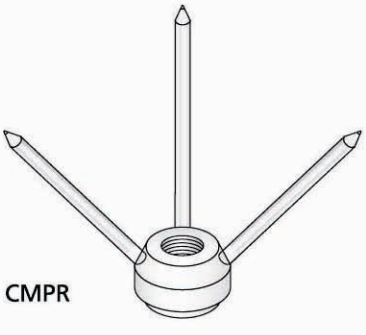


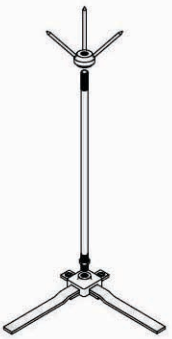
ERITECH® SYSTEM 2000 - LIGHTNING PROTECTION PREFERRED PRODUCT LIST

Franklin Rods

CAR -AAR

CMPR

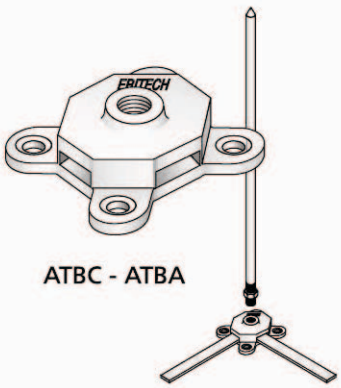




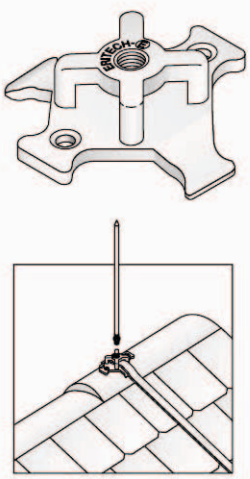
	Item	Description	Rod length Diameter	Rod Size	Pack	U/M	Unit Weight	Weight Units
COPPER	CAR0510	AIR TERMINAL,CU,10x500mm - 711080	500	10	1	EA	0.48	KG
	CAR0315	AIR TERMINAL, CU,15x300mm	300	15	1	EA	0.35	KG
	CAR0515	AIR TERMINAL,CU,15x500mm - 711090	500	15	1	EA	0.75	KG
	CAR1015	AIR TERMINAL,CU,15x1000mm - 711110	1000	15	1	EA	1.51	KG
	CAR2015	AIR TERMINAL,CU,15x2000mm - 711010	2000	15	1	EA	3	KG
	CMPR	AIR TERMINAL,CU,15x500mm, MULTIPLE POINT	500	15	1	EA	1.02	KG
ALUMINIUM	*The Aluminium products only stocked in ERICO Singapore warehouse.*							
	AAR0510	AIR TERMINAL,AL,10x500mm - 711050	500	10	1	EA	0.19	KG
	AAR0515	AIR TERMINAL,AL,15x500mm - 710020	500	15	1	EA	0.27	KG
	AAR1015	AIR TERMINAL,AL,15x1000mm - 711070	1000	15	1	EA	0.53	KG

Franklin Rod Bases/Brackets

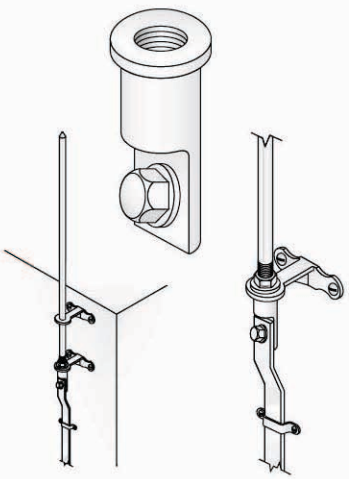
ATBC - ATBA



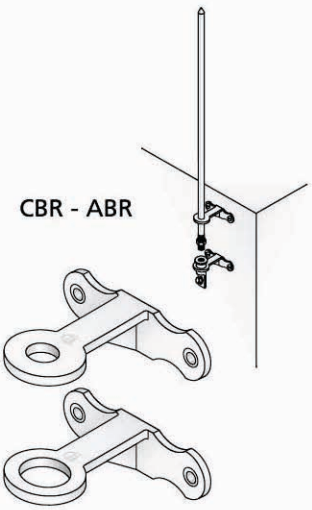
RSC



TTRC - TTRTA

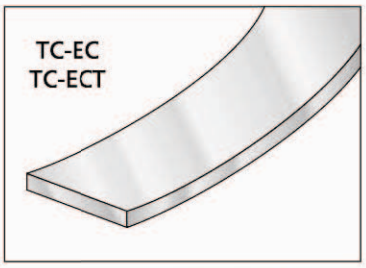


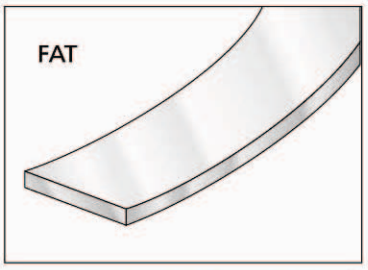
CBR - ABR



	Item	Description	Suit Rod Diameter	Pack Size	U/M	Unit Weight	Weight Units
COPPER	ATBC10	BASE,AIR TERMINAL,CU,10MM - 711150	10	1	EA	0.5	KG
	ATBC15	BASE,AIR TERMINAL,CU,15MM - 711160	15	1	EA	0.5	KG
	RSC115	BASE,AIR TERMINAL,CU,15MM, RIDGE - 711170	15	1	EA	1.07	KG
	TTRC16	COUPLER,AIR TERM,CU,15MM, THREAD ROD/TAPE	15	1	EA	0.23	KG
	CBR015	BRACKET,AIR TERM,GM,15MM, PAIR - 711190	15	set 2	EA	0.9	KG
ALUMINIUM	*The Aluminium products only stocked in ERICO Singapore warehouse.*						
	ATBA10	BASE,AIR TERMINAL,AL,10MM - 711130	10	1	EA	0.16	KG
	ATBA15	BASE,AIR TERMINAL,AL,15MM - 711140	15	1	EA	0.16	KG
	TTRA16	COUPLER,AIR TERM,AL,15MM, THREAD ROD/TAPE	15	1	EA	0.08	KG
	ABR015	BRACKET,AIR TERM,AL,15MM, PAIR - 711180	15	set 2	EA	0.28	KG

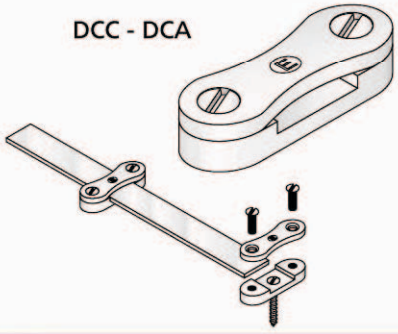
ERITECH® SYSTEM 2000 - LIGHTNING PROTECTION PREFERRED PRODUCT LIST





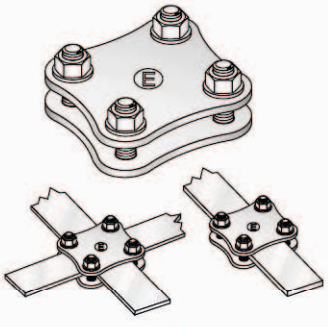
Downconductors

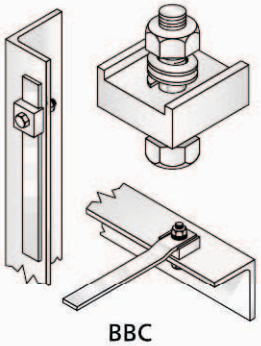
	Item	Description	Width	Thickness	Roll	U/M	Unit Weight	Weight Units
COPPER	TC-EC-253-25	TAPE,CU,25X3MM,ANNEALED, 50M ROLL	25	3	50	MT	34	KG
	TC-ECT-253	TAPE,CU,25X3MM,TINNED, 50M ROLL	25	3	50	MT	34	KG
	TC-EC-5060	TAPE,CU,50X6MM,ANNEALED, 30M ROLL	50	6	30	MT	80	KG
ALUMINIUM	*The Aluminium products only stocked in ERICO Singapore warehouse.*							
	FAT-253-50	TAPE,AL,25X3MM,BARE, 50M ROLL	25	3	50	MT	11	KG

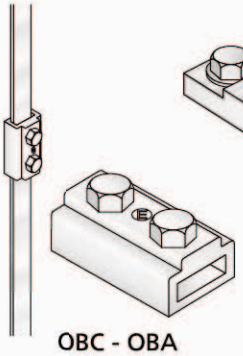


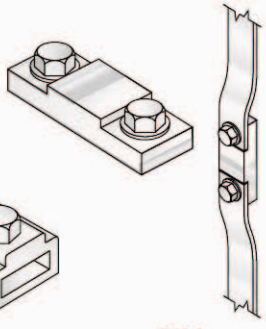
Downconductor Fixings

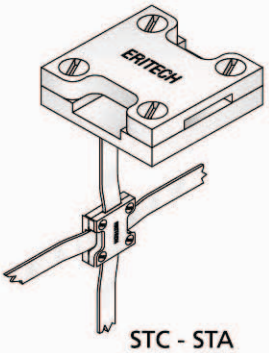
	Item	Description	Suit Tape Size	Pack Size	U/M	Unit Weight	Weight Units
CLIPS	DCC253	CLIP,TAPE,CU,25X3MM,DCC - 711220	25 x 3	50	EA	0.06	KG
	DCC506	CLIP,TAPE,CU,50X6MM,DCC - 711240	50 x 6	50	EA	0.16	KG
	DCA253	CLIP,TAPE,AL,25X3MM,DCC - 711730	25 x 3	50	EA	0.03	KG
	TAPC253	BARE TAPE CLIP,CU,25X3MM - 711570	25 x 3	25	EA	0.50	KG
	TAPC506	BARE TAPE CLIP,CU,50X6MM - 711590	50 x 6	25	EA	0.80	KG







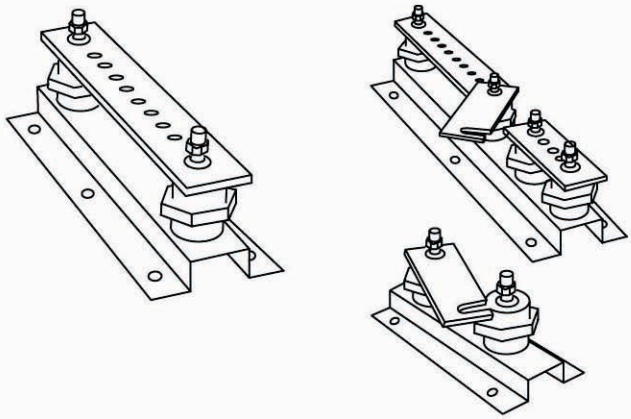




	Item	Description	Suit Tape Size	Pack Size	U/M	Unit Weight	Weight Units
CLAMPS	STC253	CLAMP,TAPE,CU,25X3MM, SQUARE - 711410	25 x 3	5	EA	0.2	KG
	STC506	CLAMP,TAPE,CU,50X6MM, SQUARE - 711425	50 x 6	5	EA	0.77	KG
	STA253	CLAMP,TAPE,AL,25X3MM, SQUARE - 711400	25 x 3	5	EA	0.1	KG
	OBC268	CLAMP,TAPE,CU,26X8MM, OBLONG - 711440	26 x 8	2	EA	0.29	KG
	OBA268	CLAMP,TAPE,AL,26X8MM, OBLONG - 711440	26 x 8	2	EA	0.29	KG
	PCT400	CLAMP,TAPE,CU,26X12MM, PLATE - 711450	26 x 12	1	EA	0.6	KG
	BIM700	CONNECTOR,TAPE,CU/AL, 25X3MM, BIMETALLIC	25 x 3	5	EA	0.19	KG
	BBBC	B-BOND,CU,26MM - 710260	26	25	EA	0.12	KG

ERITECH® SYSTEM 2000 - EQUIPOTENTIAL BARS & EARTH PLATES

EQUIPOTENTIAL BARS



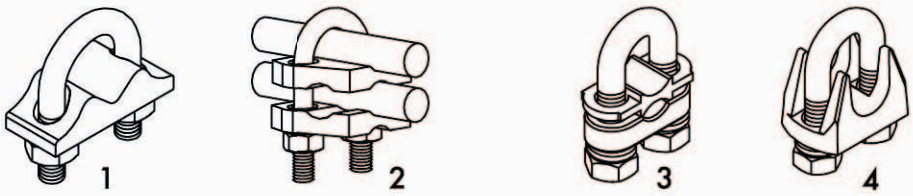
Feature:

- 50 mm Width x 5mm Thickness copper bar
- Disconnecting Link (options)
- Mounting on Galvanised Steel Profile for easy installation
- ERICO halogen-free (NFF 16101 F2) polyamide insulators (Conform to UL 94 Fire Rating)
- Mounted with screws and nuts manufactured of bichromated galvanised steel (golded aspect)

European Catalogue No.	Reference Code	No of Terminals	Disconnect Links	Dimensions (mm) L	W	H		Unit Weight (kg)
545000	DLUNI	-	1	125	100	94	1	0,7
545010	SEB-06	6	0	400	100	94	1	2,1
545020	SEB-06-DL	6	1	475	100	94	1	3,1
545030	SEB-10	10	0	600	100	94	1	2,6
545040	SEB-10-DL	10	1	675	100	94	1	3,6
545130	SEB-62-DL	6	2	550	100	94	1	3,2

ERITECH® SYSTEM 2000 - SADDLE AND ROD CLAMPS

SADDLE DISCONNECT CLAMPS



- Manufactured from LG2 Gunmetal with copper U-bolt section, LG2 BS1400
- High copper content bronze casting
- Stainless steel U-bolt, washers and nuts

European Cat alogue No	Search Code	Fig. No.	Nominal Rod (mm)	Conductor Range Area (mm2)	Diam (mm)		Unit Weight (kg)
710370	UB16	1	16			10	0,20
710380	UB20	1	20			10	0,20
710390	UB25	1	25			10	0,21
710400	GUV16070	2	16-20	16 - 70	5.1 - 10.7	5	0,25
710410	GUV70185	2	16-20	70 - 185	10.7 - 17.6	5	0,39
Asia/Aust	REC35120	3	13-16	35 - 120	7.6 - 14.2	5	0,16
Asia/Aust	REP16120	4	17-20	16 - 120	5.1 - 14.2	5	0,21

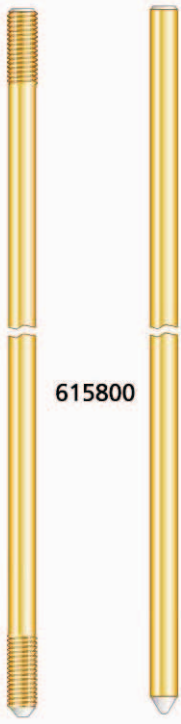
ERITECH® SYSTEM 2000 - LIGHTNING PROTECTION PREFERRED PRODUCT LIST

Grounding Products


PIT03

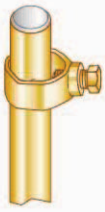

SC58

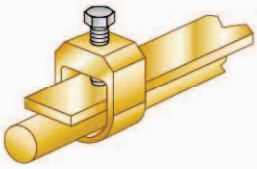

CC58


635860 615800

TYPE-C

TYPE-A


CP58


RTC1220


T416M


GEM25A

	Item	Description	Rod Length	Rod Diam	Pack Size	U/M	Unit Weight	Weight Units
CLAMPS & COUPLERS	CP58	CLAMP, ROD (12.5-15MM), CABLE (MAX 70MMSQ)-TYPE C			5	ea	0.9	kg
	RTC1220	CLAMP, ROD (25MM), TAPE (26X10MM)-TYPE A			5	ea	0.15	kg
	CC58	GROUND ROD, COUPLER 5/8" (THREADLESS)		5/8"	5	ea	0.134	kg
	SC58	GROUND ROD, COUPLER 5/8" (THREADED)		5/8"	25	ea	0.113	kg
GROUND RODS	635860	GROUND ROD, SECTIONAL 5/8IN X 6FT	5/8"	6"	100	ea	2.05	kg
	635800	GROUND ROD, SECTIONAL 5/8IN X 10FT	5/8"	10"	100	ea	3.88	kg
	615800	GROUND ROD, POINTED 5/8IN X 10FT	5/8"	10"	100	ea	3.83	kg
	615860	GROUND ROD, POINTED 5/8IN X 6FT	5/8"	6"	100	ea	2.31	kg
PITS & GEM	PIT03	EARTH PIT, PLASTIC (250X200X215MM)			1	ea	1.35	kg
	T416M	EARTH PIT, CONCRETE (345X345X210MM)			1	ea	30.0	kg
	GEM25A	GROUND ENHANCEMENT MATERIAL, 25LB BAG			1	ea	25	lb

GROUNDING DESIGN

The grounding system must have a low impedance to safely disperse the energy of the lightning strike. Because the lightning discharge consists of high frequency components, we are particularly concerned with the frequency dependent electrical parameter of a grounding system - impedance - as well as low resistance grounding.

Grounding systems are highly variable from site to site due to geographical considerations.

The grounding grid should minimise the ground voltage potential rise, and minimise the risk of injury to personnel or damage to equipment.

ERICO can supply design advice for lightning protection grounding systems. Each individual ground (lightning, electrical, telecommunications and equipment room) must be of high integrity, as well as being considered a component of an overall grounding system for the facility. Where separate grounds exist, they must be bonded together to form an equipotential ground plane in order to eliminate the possibility of earth loops and potential differences arising under transient conditions.

The graphic below shows a typical grounding system and details the range of components offered by ERICO.

The range includes:

- ERITECH® Ground Rods
- Mesh & Signal Reference Grids
- Ground Enhancing Materials
- Chemical Ground Rods
- Ground Testers
- CADWELD® Welded Electrical Connections

ERITECH® SYSTEM 2000 - PDCUC LIGHTNING PROTECTION UNIVERSAL DC CLIP

ERITECH®

Features

- Only one part to stock and install
- Secures both solid round and tape conductors
- No tools needed for assembly
- Single action secures conductor
- Ratchet locking offers forgiving installation
- Fits in tight spaces
- Ideal for extreme temperature installations**

One Clip Fits All

The PDCUC Lightning Protection Universal Downconductor Clip from ERICO® is designed for use with bare and insulated solid round and tape conductors. The clip features an inconspicuous clear body, allowing it to blend in with any color background and PVC insulation. Its unique design is ideal for tight spaces, such as in corners next to rectangular drain pipes, allowing this versatile clip to fit where other clips don't.

Fast and Easy to Use

- Installation is quick and easy
- No tools needed for assembly
- Ratchet locking offers forgiving, adjustable installation

Strong and Durable

- UL®/IEC rated for electrical equipment and outdoor applications
- 1,000 N pull-out load capability
- Offers a broad installation temperature range of -20°C to 120°C**

ERITECH®

Features

- Cost effective – long service life
- Annealed steel core for improved flexibility
- Copper-bonded coating will not crack or tear when the conductor is bent
- High resistance to corrosion and provides a low-resistance path to ground
- Available in out-side diameters, 8, 10 and 13 mm
- Meets the requirements of IEC 62305 and EN 62561-2 for lightning protection applications

The Copper Bonded Steel Conductor (CSC), part of the ERITECH® line of Facility Electrical Protection products from ERICO®, is comprised of an electrolytic coating of copper deposited over a layer of nickel. This process ensures a long-lasting, molecular bond between the copper layer and the steel core.

The conductor core consists of an annealed, low-carbon steel grade for improved flexibility in the field. The copper surface of the conductor provides high conductivity and corrosion-resistance properties.

Fusing Current I_{rms} (kA) - IEEE® 837 Annex C							
Conductor Type Copper-bonded, Steel Core, Rod$_a$		CBSC8	CBSC10	CBSC13	CBSC14	CBSC16	CBSC18
Conductor Cross Section in mm²	A	50.265	78.520	138.070	158.903	199.840	243.270
Initial Conductor Temperature in °C	T_a	40	40	40	40	40	40
Time of Current Flow in Seconds	t_a	2	2	2	2	2	2
Maximum Allowable Temperature in°C	T_a	1084	1084	1084	1084	1084	1084
Thermal Coefficient of Resistivity at Reference Temperature T_r	a_r	0.00378	0.00378	0.00378	0.00378	0.00378	0.00378
Resistivity of the Ground Conductor at Reference Temperature T_r in m &-cm	r_r	8.621	8.621	8.621	8.621	8.621	8.621
$1/a_0$ or $(1/a_r)-T_r$ in °C	K_0	245	245	245	245	245	245
Thermal Capacity Factor in Joules/cm 3/°C	TCAP	3.846	3.846	3.846	3.846	3.846	3.846
Material Conductivity (%)	%	20	20	20	20	20	20
Fusing Current Calculation	β	84.73	84.73	84.73	84.73	84.73	84.73
$\beta = \frac{\alpha_r \bullet \rho_r \bullet 10^4}{TCAP}$	I	4.79	7.48	13.16	15.15	19.05	23.19
$I = A\sqrt{\frac{\ln\left(\frac{K_0+T_m}{K_0+T_a}\right)}{\beta t_c}}$ in kA	$I_{90\%}$	4.31	6.74	11.84	13.63	17.14	20.87
	$I_{80\%}$	3.45	5.39	9.48	10.91	13.72	16.70

Applications:

The unique properties of the copper-bonded steel conductor make it ideal for both horizontal and vertical placement. Above-grade, the conductor is well-suited as a lightning-protection conductor when applied in accordance with the IEC 62305-3 Edition 2.0 standard, or as an earthing and bonding conductor where copper theft on-site may occur. The copper-bonded steel conductor is ideal for use in a variety of applications including power distribution earthing and bonding; substation earthing; commercial, industrial and railway earthing; and lightning protection.

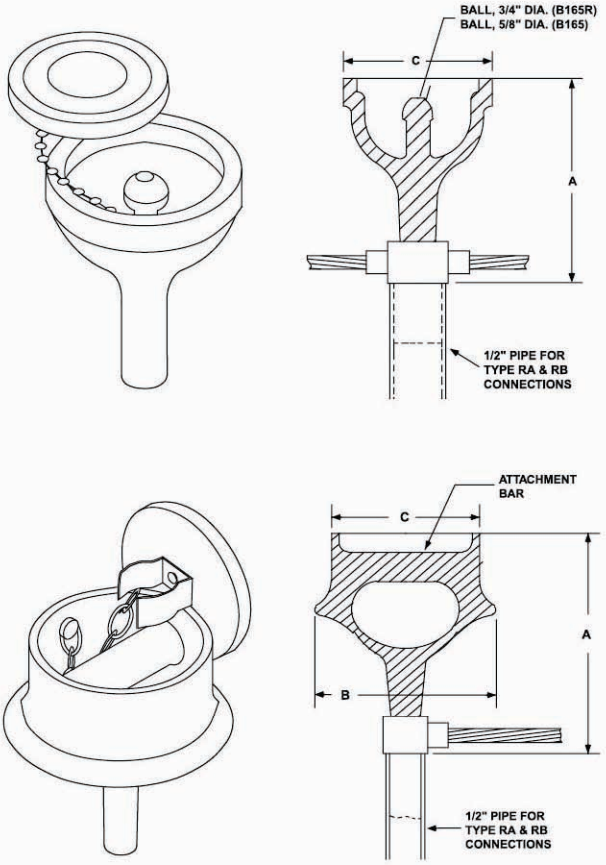
Aircraft Receptacles

ERITECH Aircraft Grounding Receptacles for CADWELD Process

- Copper alloy castings for use in static grounding systems of aircraft refueling areas
- Easily connected to grounding system conductor and/or ground rods
- Designed for simple installation with flush paved surfaces
- 3/4" cast ball, 3/4" removable ball, 3/4" cast bar or 1-1/2" bar attachment points available

B165	Depth A, from grade to level of support Diameter C at grade level Attachment Point	4-1/2" 2-3/4" Cast 3/4" ball
B165R	Depth A, from grade to level of support Diameter C at grade level Attachment Point	4-1/2" 2-3/4" Removable 3/4" ball
B166	Depth A, from grade to level of support Diameter B, maximum ring size Diameter C at grade level Attachment Bar	6-1/4" 4-3/4" 3-7/8" 3/4" diameter
B167	Depth A, from grade to level of support Diameter B, maximum ring size Diameter C at grade level Attachment Bar	7-1/4" 6-1/2" 4-3/4" 1-1/2" diameter

Notes:
1. Aircraft static grounding clamp B2617A can be used to connect to the B165, B165R and B166.
2. See Catalog A1A for CADWELD connections to aircraft grounding receptacles.



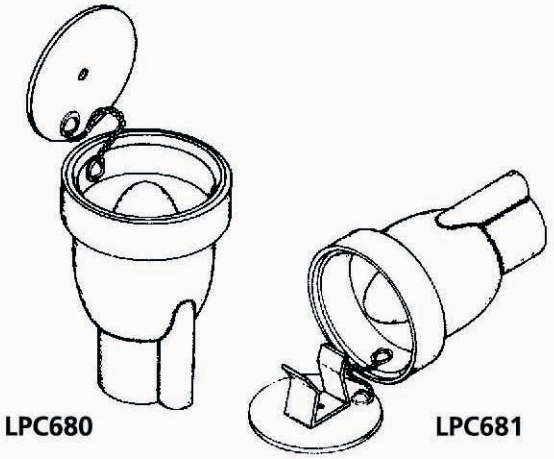
ERITECH Aircraft Grounding Receptacles for Sectional Ground Rods

LPC680

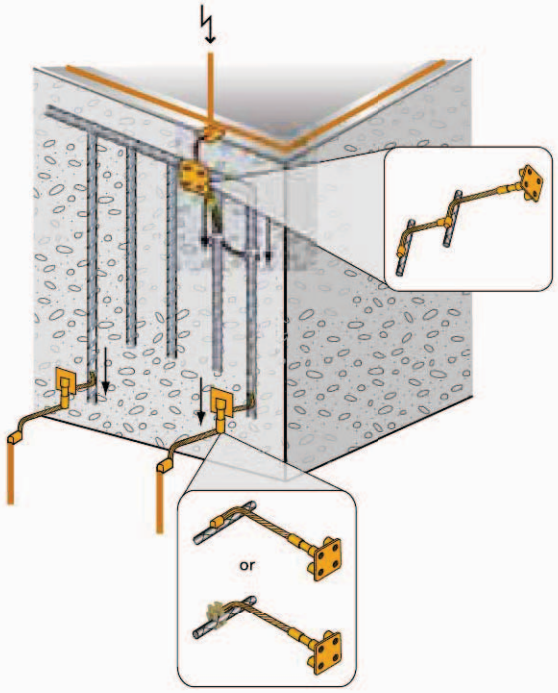
- Cast bronze aircraft receptacle
- Standard pin connection
- Chain retained cover plate
- Couple directly to 3/4" sectional rod or 3/4" extension rod
- Install flush with finish floor surface

LPC681

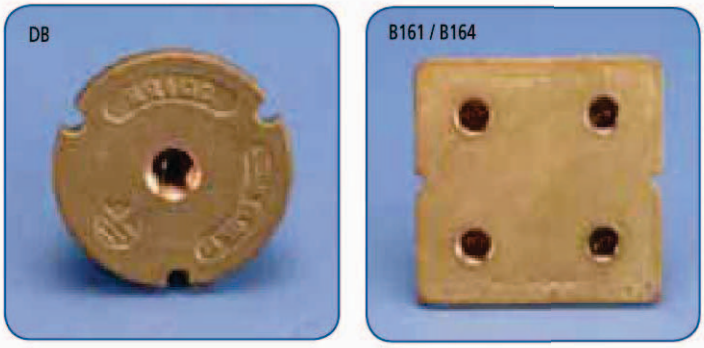
- Cast bronze aircraft receptacle
- Standard pin connection
- Chain retained cover plate
- Spring clip to secure cover plate
- Couple directly to 3/4" sectional rod or 3/4" extension rod
- Install flush with finish floor surface

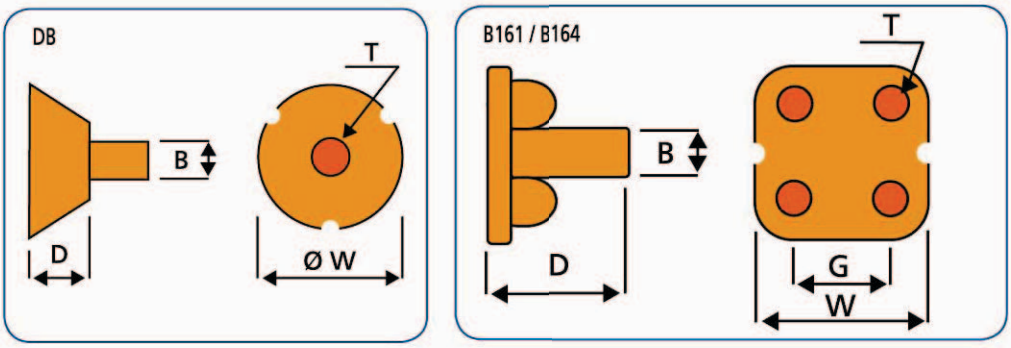


LPC680 LPC681



Earth Points



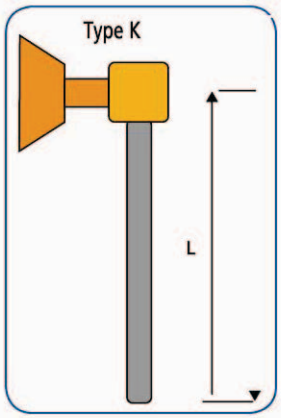


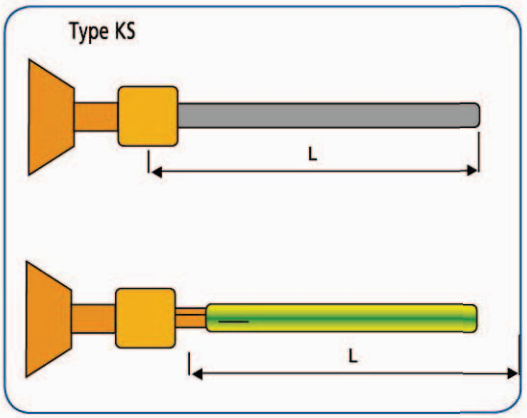
Earthpoints to be welded using CADWELD®

Type	Part No.	Reference	Width W	Depth D	Terminal Size T	No. of Terminals	Tail Size B	PU
DB	166120	DB-10A	50 mm	55 mm	M10	1	16 mm Ø	5
DB	166150	DB12A	50 mm	55 mm	M12	1	16 mm Ø	5
DB	166180	DB-16A	50 mm	55 mm	M16	1	16 mm Ø	5
B161	166030	B161-2Q	65 mm	75 mm	M10	4	10.7 mm Ø	1
B164	166060	B164-2Q	85 mm	75 mm	M12	4	10.7 mm Ø	1

Earth Points







Earthbridges welded using CADWELD® by ERICO specialists in our production plants (Prefabricated)

Type	Design	Part No.	Reference	Width W	Depth D	Terminal Size T	No. of Terminals	Conductor Material	Conductor Size	Conductor Length L	PU
DB	K	166130	DB-10K	50 mm	55 mm	M10	1	Bare Steel	16 mm Ø	500 mm	1
DB	KS	166140	DB10KS	50 mm	55 mm	M10	1	Bare Steel	16 mm Ø	500 mm	1
DB	KS	DB10KS12350	DB-10KS12350	50 mm	55 mm	M10	1	Bare Steel	12 mm Ø	350 mm	1
DB	C	166480	DB-10-C5005	50 mm	55 mm	M10	1	PVC Covered Copper Cable	50 mm²	500 mm	1
DB	C	166490	DB-10-C501	50 mm	55 mm	M10	1	PVC Covered Copper Cable	50 mm²	1000 mm	1
DB	C	166500	DB-10-C502	50 mm	55 mm	M10	1	PVC Covered Copper Cable	50 mm²	2000 mm	1
DB	C	DB10C70500	DB10C70500	50 mm	55 mm	M10	1	PVC Covered Copper Cable	70 mm²	500 mm	1
DB	C	DB10C701000	DB10C701000	50 mm	55 mm	M10	1	PVC Covered Copper Cable	70 mm²	1000 mm	1
DB	K	166160	DB-12K	50 mm	55 mm	M12	1	Bare Steel	16 mm Ø	500 mm	1
DB	KS	166170	DB-12KS	50 mm	55 mm	M12	1	Bare Steel	16 mm Ø	500 mm	1
DB	K	166190	DB-16K	50 mm	55 mm	M16	1	Bare Steel	16 mm Ø	500 mm	1
DB	KS	166200	DB-16KS	50 mm	55 mm	M16	1	Bare Steel	16 mm Ø	500 mm	1
B161	C	166510	B161-10-C5005	65 mm	30 mm	M10	4	PVC Covered Copper Cable	50 mm²	500 mm	1
B161	C	166520	B161-10-C501	65 mm	30 mm	M10	4	PVC Covered Copper Cable	50 mm²	1000 mm	1
B161	C	166530	B161-10-C502	65 mm	30 mm	M10	4	PVC Covered Copper Cable	50 mm²	2000 mm	1
B161	K	166040	B161-10KA	65 mm	30 mm	M10	4	Bare Steel	12 mm Ø	500 mm	1
B161	KS	166050	B161-10KM	65 mm	30 mm	M10	4	Bare Steel	12 mm Ø	500 mm	1
B164	K	166070	B164-12K	85 mm	75 mm	M12	4	Bare Steel	12 mm Ø	400 mm	1
B164	KS	166080	B164-12KS	85 mm	75 mm	M12	4	Bare Steel	12 mm Ø	400 mm	1

Important Notice:

For large projects, specific "Bulk Delivery" is recommended.
Please see below list of specific Part No. Please note that there is a MOQ (Minimum Order Quantity) of 50 pcs to consider.
Components and products performances remain unchanged.

Type DB	Part No.	Reference	Thread A	Diam. C	L	MOQ
90° angle	166130B	DB-10K16 BLK	M10	16 mm	500 mm	50
90° angle	166140B	DB-12K16 BLK	M12	16 mm	500 mm	50
Straight	166160B	DB-10KS16 BLK	M10	16 mm	500 mm	50
Straight	166170B	DB-12KS16 BLK	M12	16 mm	500 mm	50

Packaging Type: Loose in a cardboard box or wooden crate (upon quantity)
Packing Unit: Minimum Order Qty of 50 pcs

ERITECH®

Ground Enhancement Material (GEM) Now Conforms to IEC 62561-7 Standard

ERICO offers Ground Enhancement Material (GEM) – a superior conductive material that solves your toughest grounding problems. Third party testing has been completed to verify that GEM conforms to IEC 62561-7. This new standard introduces a benchmark for corrosion and electrical performance that has been absent from the industry to date.

GEM is a low-resistance, non-corrosive, carbon dust-based material that improves grounding effectiveness, especially in areas of poor conductivity. Its resistivity factor is less than 2 ohm-cm, which is less than 1% the resistivity value for bentonite clay.

GEM contains portland cement, which hardens when set, to become a conductive concrete that is permanent, maintenance-free and will never leach or wash away. GEM improves grounding effectiveness regardless of soil conditions. It is the ideal material to use in areas of poor conductivity, such as rocky ground, mountain tops and sandy soil.

- GEM is **effective**
- GEM is **permanent**
- GEM is **easy to use**

GEM is also the answer in situations where ground rods can't be driven or where limited land area makes adequate grounding difficult with conventional methods.

For vertical applications, GEM can be installed in slurry (wet) form or dry. GEM sets the standard for reducing earthing resistance, maintaining a permanent low resistance and for providing high conductivity for the life of the grounding system. In addition, GEM does not adversely affect soil and will not leach ions or contaminate ground water. It meets all EPA requirements for landfill (USA).

Part Number	Description
GEM25A	25-lb. (11.36 kg) bag with handle
GEM25ABKT	25-lb. (11.36 kg) plastic bucket with locking lid

GROUND ENHANCEMENT MATERIAL (GEM)

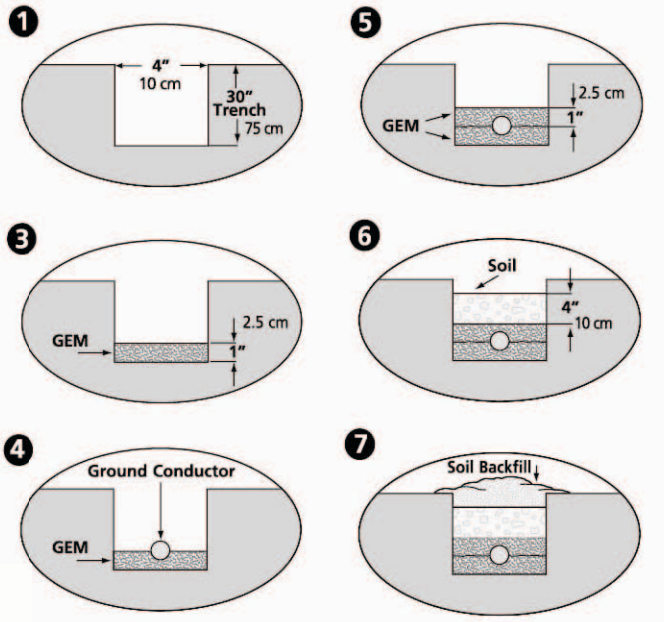
Complies to IEC 62561-7.
GEM Resistivity ≤ 2 Ohm-cm; 2-Electrode Method.

TRENCH INSTALLATION

1. Premix GEM into a slurry form. Use 1.5 to 2 gallons (5.7 to 7.6 liters) of clean potable water per pail of GEM.
2. To mix GEM into a slurry form, use a standard cement mixer or mix in the GEM pail, a mixing box, wheelbarrow, etc. Use 1.5 to 2 gallons (5.7 to 7.6 liters) of clean-potable water per pail of GEM. Do not mix GEM with salt water.
3. Spread out enough GEM to uniformly cover bottom of trench – about 1 inch (2.5 cm) deep. (See table)
4. Place conductor on top of GEM. (See Note 1)
5. Spread more GEM on top of conductor to completely cover conductor – about 1 inch (2.5 cm) deep. Allow GEM to harden. Wait 30 minutes to 1 hour before filling the trench with soil backfill.
6. Carefully cover the GEM with soil to a depth of about 4 inches (10 cm), making sure not to expose the conductor.
7. Tamp down the soil, then fill in the trench.

Note 1: Wait for the GEM to harden, about 15 to 20 minutes, before placing the conductor on top of the GEM. You must apply 4 inches (10 cm) of insulating material to the conductors and ground rods exiting the GEM, starting 2 inches (5 cm) inside the GEM.

Note 2: Excess standing water must be removed from trench.



Estimated linear feet of ground conductor covering with each pail of GEM.

Trench Width (inches / cm)		Total Thickness of GEM (inches / cm)							
		1"	2.5 cm	2"	5.0 cm	3"	7.5 cm	4"	10.0 cm
4"	10.0 cm	14.0′	4.27 m	7.0′	2.13 m	4.7′	1.43 m	3.5′	1.06 m
6"	15.2 cm	9.3′	2.83 m	4.7′	1.43 m	3.1′	0.94 m	2.3′	0.70 m
8"	20.3 cm	7.0′	2.13 m	3.5′	1.06 m	2.3′	0.70 m	1.8′	0.55 m
10"	25.4 cm	5.6′	1.70 m	2.8′	0.85 m	1.9′	0.57 m	1.4′	0.42 m
12"	30.5 cm	4.7′	1.43 m	2.3′	0.70 m	1.6′	0.48 m	1.2′	0.37 m

A 25-pound pail of GEM will cover 7 linear feet (2.1 m) of conductor length for a 4-inch-wide (10 cm), 2-inch-thick (5 cm) covering (1 inch (2.5 cm) below and 1 inch (2.5 cm) above conductor), based on a density of 63.5 lb/cu.ft.

WARNING

1. ERICO products shall be installed and used only as indicated in ERICO product instruction sheets and training materials. Instruction sheets are available at www.erico.com and from your ERICO customer service representative.
2. ERICO products must never be used for a purpose other than the purpose for which they were designed or in a manner that exceeds specified load ratings.
3. All instructions must be **completely** followed to ensure proper and safe installation and performance.
4. Improper installation, misuse, misapplication or other failure to completely follow ERICO's instructions and warnings may cause product malfunction, property damage, serious bodily injury and death.

SAFETY INSTRUCTIONS: All governing codes and regulations and those required by the job site must be observed. Always use appropriate safety equipment such as eye protection, hard hat, and gloves as appropriate to the application.

Ground Enhancement Material (GEM) contains hydraulic cements and should be handled with the same precautions as used with portland cement.

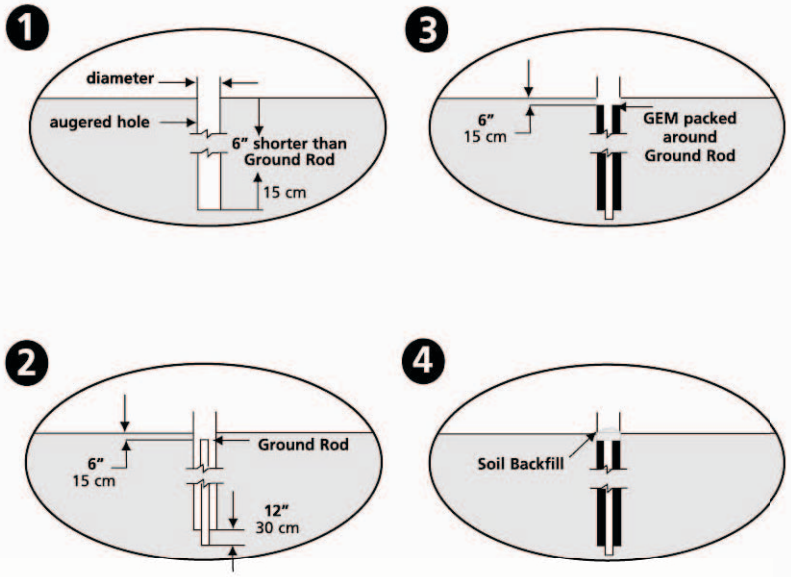
PLEASE OBSERVE THESE SAFETY PRECAUTIONS
KEEP OUT OF REACH OF CHILDREN

CAUTION

Contact with GEM is irritating to respiratory system and skin. Avoid contact, ingestion or breathing the product.

1. Risk of serious damage to eyes. Wear eye protection. If GEM gets into the eye, rinse immediately and repeatedly with water and seek prompt medical attention.
2. Do not breathe dust. Wear respiratory protection when exposed to GEM dust.
3. Protect skin with boots, gloves, clothing and eye/face protection.
4. Avoid prolonged contact of GEM with skin. Wash skin promptly after any contact with GEM.
5. If GEM is ingested, drink large quantities of water immediately and then induce vomiting. Get medical attention immediately.
6. Do not smoke when using GEM.
7. Do not expose GEM to open flame.

GROUND ROD BACKFILL INSTALLATION



1. Auger a 3-inch (7.5 cm) or larger diameter hole to a depth of 6 inches (15 cm) shorter than the length of the ground rod.
2. Place ground rod into augered hole and drive one foot (if possible) into bottom of the hole. The top of the ground rod will be approximately 6 inches (15 cm) below grade. At this time, make any connections to ground rod using CADWELD® connections. (See Note 1)
3. Premix GEM into a slurry form. Use 1.5 to 2 gallons (5.7 to 7.6 liters) of clean-potable water per pail of GEM. The installation of GEM in a dry state is acceptable for vertical ground rod applications.
4. Pour the appropriate amount of GEM (see table) around the ground rod. To ensure the GEM material completely fills the hole, tamp around the ground rod with a pole. Wait 30 minutes to 1 hour before filling the hole with soil backfill.
5. Fill remainder of augered hole with soil removed during augering. For various augered-hole diameters and depths, see the table below.

Note 1: 4 inches (10 cm) of insulating material should be applied to the conductors and ground rods exiting the GEM, starting 2 inches (5 cm) inside the GEM.

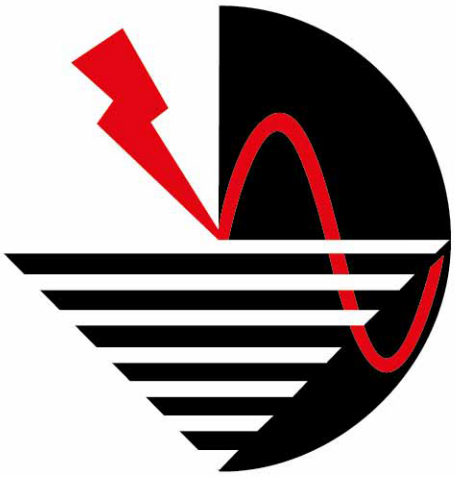
Note 2: Excess standing water must be removed from the hole.

Estimated pail of GEM for backfilling around ground rods to a density of 63.5 lb/cu ft³

Dia. of hole (inches / cm)		Depth of hole (feet)*						
		6′ 1.8 m	7′ 2.1 m	8′ 2.4 m	9′ 2.8 m	17′ 5.2 m	19′ 5.8 m	20′ 6.1 m
3	7.5	2	2	2	2	4	4	4
4	10.0	2	3	3	3	6	7	7
5	12.7	3	4	4	5	9	10	10
6	15.2	5	5	6	7	13	14	15
7	17.8	6	7	8	9	17	19	20
8	20.3	8	9	11	12	22	25	26
9	22.9	10	12	13	15	28	31	32
10	25.4	12	14	16	18	34	38	40

*** 8-foot (2.4 m) minimum rod length required to be in contact with the soil (or GEM), per NEC® 250-83-C.**

Note: To mix GEM into a slurry form, use a standard cement mixer or mix in the GEM pail, a mixing box, wheelbarrow, etc. Use 1.5 to 2 gallons (5.7 to 7.6 liters) of clean-potable water per pail of GEM. Do not mix GEM with salt water.



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