Date :6 Jun 2007
Project :Celex Catalogue(A4) - Cover and Back_Layout 14

29.7cm

Change for Excellence

CELEX

Lightning Protection & Earthing Solution

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Singapore 418944

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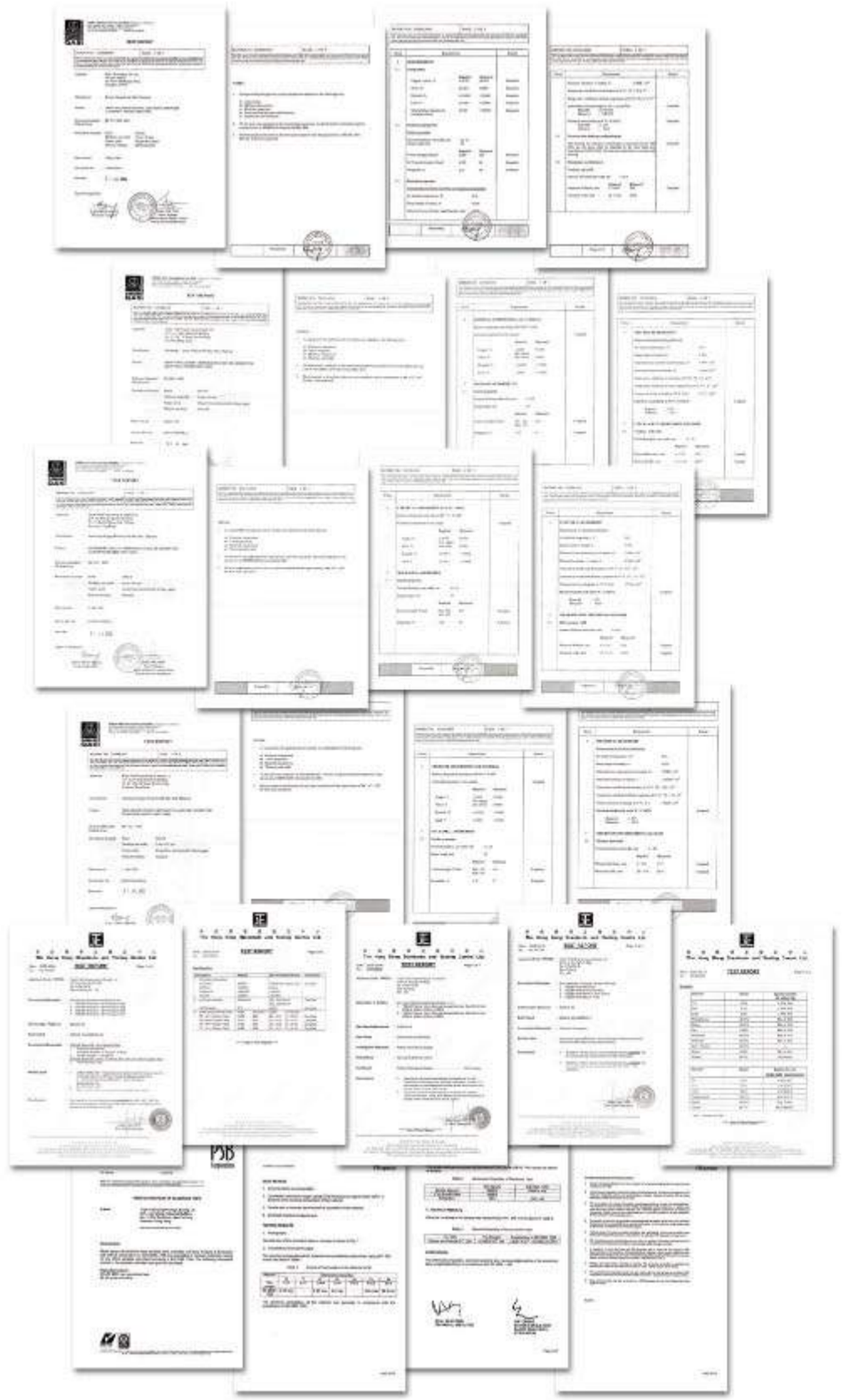
21cm



Contents

29.7cm

21cm

29.7cm

Lightning Protection & Earthing System

Product Selector

Lightning Protection & Earthing System

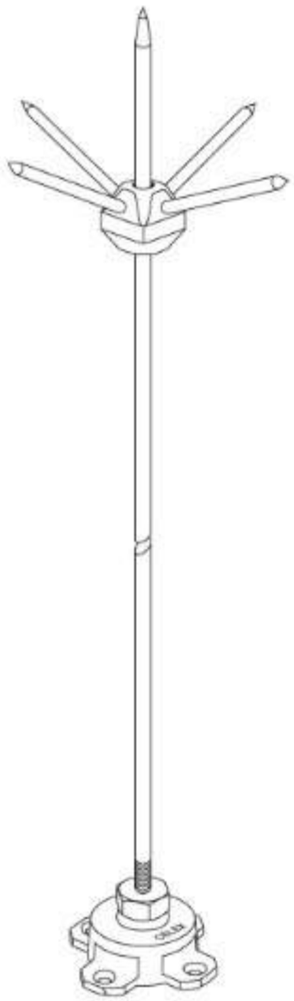
21cm

CELEX

Multi Point

Part No.	Diameter	Material
MTP1	15mm	Copper
MTP1-A	15mm	Aluminum

Air Terminal

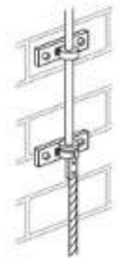


Part No.	Diameter	Length	Material
AT05	15mm	500mm	Copper
AT10	15mm	1000mm	Copper
AT15	15mm	1500mm	Copper
AT20	15mm	2000mm	Copper
AT05-A	15mm	500mm	Aluminum
AT10-A	15mm	1000mm	Aluminum
AT15-A	15mm	1500mm	Aluminum
AT20-A	15mm	2000mm	Aluminum

Air Terminal Base

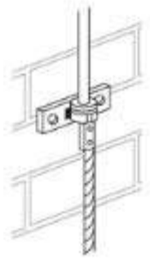
Part No.	Rod Diameter	Max. Conductor Width	Material
ATB1	15mm	25mm	Copper
ATB1-A	15mm	25mm	Aluminum

Air Terminal Brackets



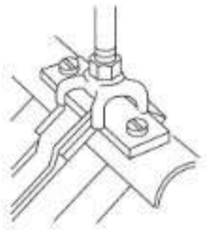
Part No.	Diameter	Material
TB1	15mm	Copper

Air Terminal to Cable Coupling



Part No.	Rod Diameter	Conductor Size	Material
TCC1	15mm	50 - 70mm²	Copper
TCC2	15mm	95mm²	Copper

Ridge Air Terminal Base

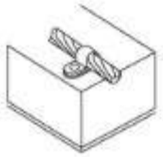


Part No.	Rod Diameter	Max. Conductor Width	Material
RATB1	15mm	31mm	Copper

29.7cm

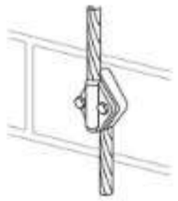
21cm

29.7cm



Cable Clip

Part No.	Size	Material
CC50	50mm²	Copper
CC70	70mm²	Copper
CC95	95mm²	Copper
CC120	120mm²	Copper
CC150	150mm²	Copper
CC185	185mm²	Copper



Test Clamp

Part No.	Size	Material
TTC50	50mm²	Copper
TTC70	70mm²	Copper
TTC95	95mm²	Copper

Cable Saddle

Part No.	Size	Material
CS50	50mm²	Copper
CS70	70mm²	Copper
CS95	95mm²	Copper
CS120	120mm²	Copper
CS150	150mm²	Copper
CS185	185mm²	Copper

Square Conductor Clamp

Part No.	Size	Material
SCC50	50mm²	Copper
SCC70	70mm²	Copper
SCC95	95mm²	Copper

Junction Square Clamp

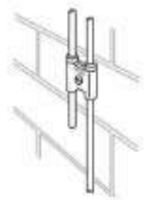
Part No.	Diameter	Material
JSC1	8mm	Copper
JSCA1	8mm	Aluminium

Tee Clamp

Part No.	Diameter	Material
TC1	8mm	Copper
TCA1	8mm	Aluminium

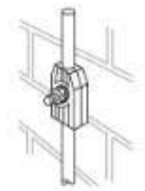
Jointing Clamp

Part No.	Diameter	Material
JC1	8mm	Copper
JCA1	8mm	Aluminium



Through Clamp

Part No.	Diameter	Material
THC1	8mm	Copper
THCA1	8mm	Aluminium



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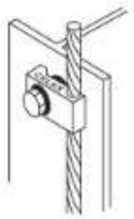
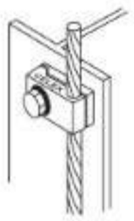
Straight Setscrew Socket

Part No.	Diameter	Material
SSS1	8mm	Copper
SSSA1	8mm	Aluminium



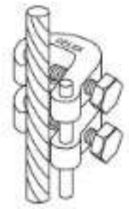
Circular Bond Clamp

Part No.	Diameter	Conductor Thickness	Bolt Size	Material
CBC1	8mm	10mm	M10	Copper
CBCA1	8mm	10mm	M10	Aluminium



Circular Bond Double Plate

Part No.	Min. Size	Max. Size	Bolt Size	Material
CBDP2	16mm²	70mm²	M10	Copper
CBDP3	70mm²	120mm²	M12	Copper
CBDPA2	16mm²	70mm²	M10	Aluminium
CBDPA3	70mm²	120mm²	M12	Aluminium

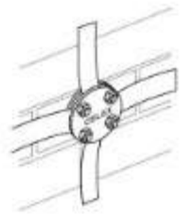


Re-bar Clamp

Part No.	Diameter	Pipe Diameter	Material
RBC1	8mm	8-18mm	Copper
RBC2	8mm	18-38mm	Copper

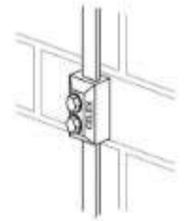
Plate Type Test Clamp

Part No.	Maximum Conductor Size	Conductor Material
PTTC	26 x 12mm	Copper



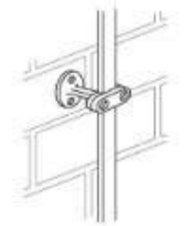
Oblong Test Clamp

Part No.	Size	Material
OTB253	25 x 3mm	Copper
OTT253	25 x 3mm	Copper
OTB386	38 x 6mm	Copper
OTT386	38 x 6mm	Copper
OTB506	50 x 6mm	Copper
OTT506	50 x 6mm	Copper



Back Plate Holdfast

Part no.	Stem Height	Material
BP78	78mm	Copper
BPA78	78mm	Aluminium



Bimetallic Connector

Part No.	Specification
BC1	25 x 3mm aluminium tape to 25 x 3mm copper tape

29.7cm

21cm

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Bare Copper Tape

Part No.	Conductor Size (a x b)	Standard Coil Size
CTB123	12 x 3mm	100m
CTB202	20 x 2mm	100m
CTB203	20 x 3mm	100m
CTB251	25 x 1.5mm	100m
CTB253	25 x 3mm	50m
CTB254	25 x 4mm	50m
CTB256	25 x 6mm	50m
CTB302	30 x 2mm	50m
CTB303	30 x 3mm	50m
CTB304	30 x 4mm	50m
CTB305	30 x 5mm	50m
CTB313	31 x 3mm	50m

Part No.	Conductor Size (a x b)	Standard Coil Size
CTB316	31 x 6mm	30m
CTB383	38 x 3mm	50m
CTB385	38 x 5mm	30m
CTB386	38 x 6 mm	30m
CTB403	40 x 3mm	50m
CTB404	40 x 4mm	50m
CTB405	40 x 5mm	30m
CTB406	40 x 6mm	30m
CTB503	50 x 3mm	50m
CTB504	50 x 4mm	30m
CTB505	50 x 5mm	30m
CTB506	50 x 6mm	30m

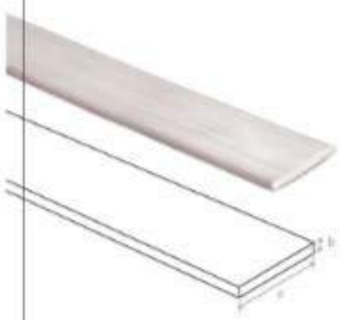
High conductivity copper tape conform to BS EN 13601, formerly BS 1432

Tinned Copper Tape

Part No.	Conductor Size (a x b)	Standard Coil Size
CTT123	12 x 3mm	100m
CTT202	20 x 2mm	100m
CTT203	20 x 3mm	100m
CTT251	25 x 1.5mm	100m
CTT253	25 x 3mm	50m
CTT254	25 x 4mm	50m
CTT256	25 x 6mm	50m
CTT302	30 x 2mm	50m
CTT303	30 x 3mm	50m
CTT304	30 x 4mm	50m
CTT305	30 x 5mm	50m
CTT313	31 x 3mm	50m

Part No.	Conductor Size (a x b)	Standard Coil Size
CTT316	31 x 6mm	30m
CTT383	38 x 3mm	50m
CTT385	38 x 5mm	30m
CTT386	38 x 6 mm	30m
CTT403	40 x 3mm	50m
CTT404	40 x 4mm	50m
CTT405	40 x 5mm	30m
CTT406	40 x 6mm	30m
CTT503	50 x 3mm	50m
CTT504	50 x 4mm	30m
CTT505	50 x 5mm	30m
CTT506	50 x 6mm	30m

High conductivity copper tape conform to BS EN 13601, formerly BS 1432



Aluminium Tape

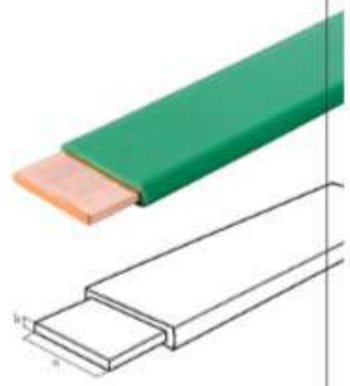
Part No.	Conductor Size (a x b)	Standard Coil Size
CTA253	25 x 3mm	40m

BS 2898 - 1350

PVC Covered Copper Tape

Conductor Size (a x b)	Standard Coil Size	Colour Range: Green*	Grey 00A07	White 10B15	Brown 06C39
25 x 3mm	50m	CTP253GN	CTP253GY	CTP253WE	CTP253BN
25 x 6mm	50m	CTP256GN	CTP256GY	CTP256WE	CTP256BN
50 x 6mm	20m	CTP506GN	CTP506GY	CTP506WE	CTP506BN

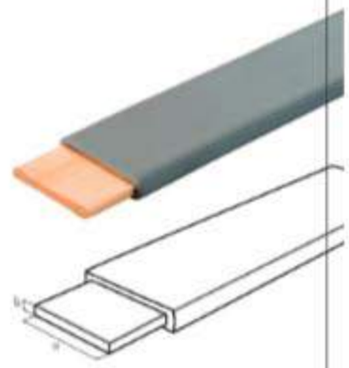
Celex high conductivity copper tapes conform to BS EN 13601, formerly BS 1432.
Other sizes and colours are available upon request. Colour variation may occur from time to time as with all plastics.



LSOH Covered Copper Tape

Conductor Size (a x b)	Standard Coil Size	Colour Range: Green*	Grey 00A07	White 10B15	Brown 06C39
25 x 3mm	50m	CTL253GN	CTL253GY	CTL253WE	CTL253BN
25 x 6mm	50m	CTL256GN	CTL256GY	CTL256WE	CTL256BN
50 x 6mm	20m	CTL506GN	CTL506GY	CTL506WE	CTL506BN

Celex high conductivity copper tapes conform to BS EN 13601, formerly BS 1432.
Other sizes and colours are available upon request. Colour variation may occur from time to time as with all plastics.



PVC and LSOH Conductor Colour Chart

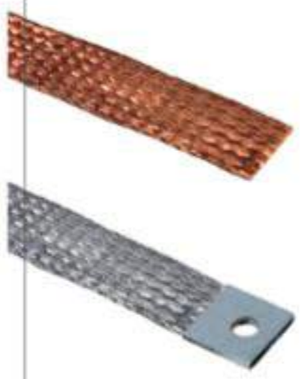
Black 18B29	*Green BS 6746C	Grey 00A07	Stone 08B23	White 10B15	Brown 06C39

PVC colours to BS 5252. *Green colour to BS 6746C.

29.7cm

21cm

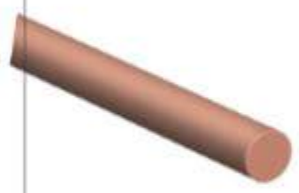
29.7cm



Flexible Copper Braid

Part No.	Nominal Size (a x b)	Area of Conductor
FCB6	9 x 1.2mm	6mm²
FCB10	15 x 1.8mm	10mm²
FCB16	18 x 3mm	16mm²
FCB25	20 x 3.4mm	25mm²
FCB35	25 x 3.7mm	35mm²
FCB50	28 x 5mm	50mm²
FCB70	32 x 6.4mm	70mm²
FCB95	35 x 7mm	95mm²

Tailor-made lengths with lugs are available; tinned braid can be provided upon request.



Bare Solid Copper Conductor

Part No.	Diameter
SD8	Ø8mm

Bare Stranded Copper Conductor

Part No.	Stranding no. / mm Ø	Cross-sectional Area
ST06	7/1.04	6mm²
ST16	7/1.70	16mm²
ST25	7/2.14	25mm²
ST35	7/2.52	35mm²
ST50	19/1.78	50mm²
ST70	19/2.14	70mm²
ST95	19/2.52	95mm²
ST120	37/2.03	120mm²
ST150	37/2.25	150mm²
ST185	37/2.52	185mm²
ST240	61/2.25	240mm²
ST300	61/2.52	300mm²

Bare DC Clip

Part No.	Conductor Size	Part No.	Conductor Size
DCB203	20 x 3mm	DCB383	38 x 3mm
DCB253	25 x 3mm	DCB385	38 x 5mm
DCB254	25 x 4mm	DCB386	38 x 6mm
DCB256	25 x 6mm	DCB404	40 x 4mm
DCB303	30 x 3mm	DCB406	40 x 6mm
DCB305	30 x 5mm	DCB503	50 x 3mm
DCB313	31 x 3mm	DCB504	50 x 4mm
DCB316	31 x 6mm	DCB506	50 x 6mm

Tinned DC Clip

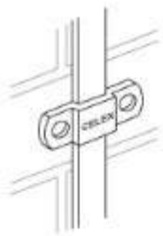
Part No.	Conductor Size	Part No.	Conductor Size
DCT203	20 x 3mm	DCT383	38 x 3mm
DCT253	25 x 3mm	DCT385	38 x 5mm
DCT254	25 x 4mm	DCT386	38 x 6mm
DCT256	25 x 6mm	DCT404	40 x 4mm
DCT303	30 x 3mm	DCT406	40 x 6mm
DCT305	30 x 5mm	DCT503	50 x 3mm
DCT313	31 x 3mm	DCT504	50 x 4mm
DCT316	31 x 6mm	DCT506	50 x 6mm

Aluminium DC Clip

Part No.	Conductor Size
DCA253	25 x 3mm

21cm

29.7cm



Tape Clip

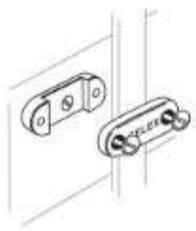
Part No.	Size	Specification
TCPB253	25 x 3mm	for Bare Copper Tape
TCPT253	25 x 3mm	for Tinned Copper Tape
TCPA253	25 x 3mm	for Aluminium Tape
TCPP253	25 x 3mm	for PVC Covered Copper Tape

PVC DC Clip

Part No.	Size	Colour
DCP253GN	25 x 3mm	Green
DCP253GY	25 x 3mm	Grey

Bare DC Clip For PVC / LSOH Covered Copper Tape

Part No.	Conductor Size
DCBP253	25 x 3mm
DCBP256	25 x 6mm
DCBP506	50 x 6mm



Tinned DC Clip For PVC / LSOH Covered Copper Tape

Part No.	Conductor Size
DCTP253	25 x 3mm
DCTP256	25 x 6mm
DCTP506	50 x 6mm

Bare Square Clamp

Part No.	Conductor Size
SCB203	20 x 3mm
SCB253	25 x 3mm
SCB254	25 x 4mm
SCB256	25 x 6mm
SCB303	30 x 3mm
SCB305	30 x 5mm
SCB313	31 x 3mm
SCB316	31 x 6mm

Part No.	Conductor Size
SCB383	38 x 3mm
SCB385	38 x 5mm
SCB386	38 x 6mm
SCB404	40 x 4mm
SCB406	40 x 6mm
SCB503	50 x 3mm
SCB504	50 x 4mm
SCB506	50 x 6mm

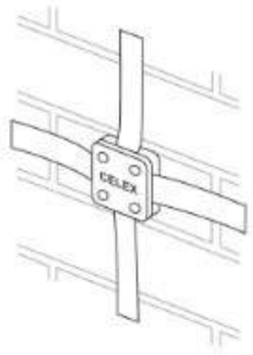
Tinned Square Clamp

Part No.	Conductor Size
SCT203	20 x 3mm
SCT253	25 x 3mm
SCT254	25 x 4mm
SCT256	25 x 6mm
SCT303	30 x 3mm
SCT305	30 x 5mm
SCT313	31 x 3mm
SCT316	31 x 6mm

Part No.	Conductor Size
SCT383	38 x 3mm
SCT385	38 x 5mm
SCT386	38 x 6mm
SCT404	40 x 4mm
SCT406	40 x 6mm
SCT503	50 x 3mm
SCT504	50 x 4mm
SCT506	50 x 6mm

Aluminium Square Clamp

Part No.	Conductor Size
SCA253	25 x 3mm



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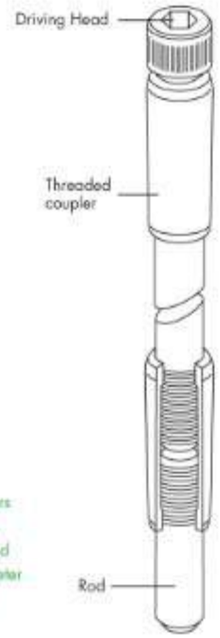


*Thread and shank diameters
The thread rolling process, raised the surface of the rod and therefore thread diameter (B) is greater than shank diameter (A).

Threaded Copperbond Earth Rods

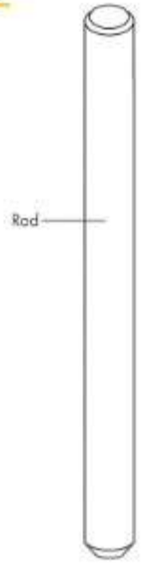
Part No.	Shank Diameter (A)	Thread Diameter (B)	Length	Nominal Diameter
ER412	12.7mm	9/16"	1200mm	9/16"
ER415	12.7mm	9/16"	1500mm	9/16"
ER418	12.7mm	9/16"	1800mm	9/16"
ER424	12.7mm	9/16"	2400mm	9/16"
ER612	14.2mm	5/8"	1200mm	5/8"
ER615	14.2mm	5/8"	1500mm	5/8"
ER618	14.2mm	5/8"	1800mm	5/8"
ER624	14.2mm	5/8"	2400mm	5/8"
ER630	14.2mm	5/8"	3000mm	5/8"
ER912	17.2mm	3/4"	1200mm	3/4"
ER915	17.2mm	3/4"	1500mm	3/4"
ER918	17.2mm	3/4"	1800mm	3/4"
ER924	17.2mm	3/4"	2400mm	3/4"
ER930	17.2mm	3/4"	3000mm	3/4"

BS 7430, BS 6651, UL467

Unthreaded Copperbond Earth Rods

Part No.	Length	Diameter
ER412-U	1200mm	12.5mm
ER415-U	1500mm	12.5mm
ER418-U	1800mm	12.5mm
ER424-U	2400mm	12.5mm
ER612-U	1200mm	14.2mm
ER615-U	1500mm	14.2mm
ER618-U	1800mm	14.2mm
ER624-U	2400mm	14.2mm
ER630-U	3000mm	14.2mm
ER912-U	1200mm	17.2mm
ER915-U	1500mm	17.2mm
ER918-U	1800mm	17.2mm
ER924-U	2400mm	17.2mm
ER930-U	3000mm	17.2mm

BS 7430, BS 6651, UL467



Coupler for Threaded Earth Rod

Part no.	Diameter
RP4	Ø14mm (9/16")
RP6	Ø16mm (5/8")
RP9	Ø19mm (3/4")

Driving Head

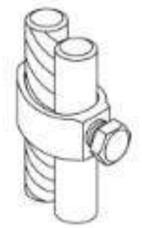
Part no.	Diameter
DH12	Ø14mm (9/16")
DH16	Ø16mm (5/8")
DH19	Ø19mm (3/4")

Rod to Tape Clamp

Part no.	Max. Rod Diameter	Max. Tape Size
RT1	Ø19mm	25 x 6mm
RT2	Ø16mm	50 x 6mm
RT3	Ø19mm	50 x 6mm

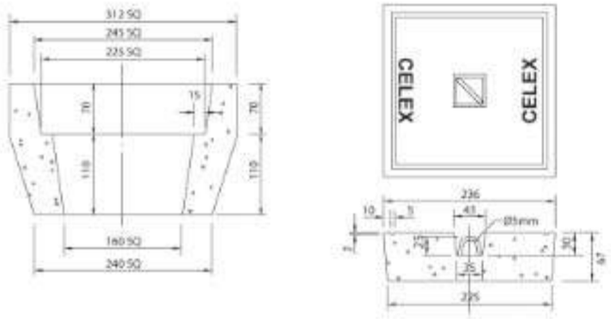
Rod to Cable Clamp

Part no.	Max. Rod Diameter	Max. Cable Size
RC1	Ø16mm	50mm²
RC2	Ø19mm	70mm²
RC3	Ø19mm	95mm²



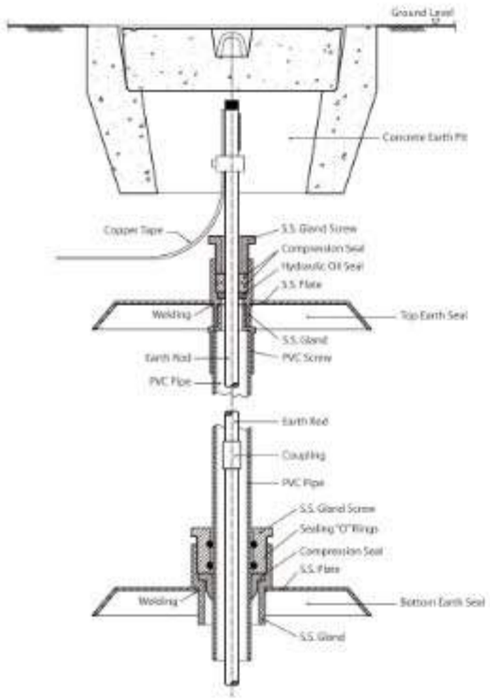
29.7cm

21cm



Concrete Earth Pit

Part No.	Dimension
CEP	312 x 312 x 180mm



High Pressure Seal - Top & Bottom

High Pressure Seal - Top

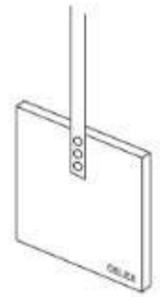
Part No.	Size
HPS-T	300 x 300mm

High Pressure Seal - Bottom

Part No.	Size
HPS-B	300 x 300mm

Copper Plate

Part No.	Size
CP61	600 x 600 x 1.5mm
CP91	900 x 900 x 1.5mm
CP121	1200 x 1200 x 1.5mm
CP63	600 x 600 x 3mm
CP93	900 x 900 x 3mm
CP123	1200 x 1200 x 3mm
CP66	600 x 600 x 6mm
CP96	900 x 900 x 6mm
CP126	1200 x 1200 x 6mm



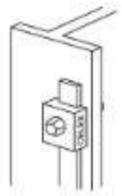
Copper Lattice

Part No.	Size
CL63	600 x 600 x 3mm
CL93	900 x 900 x 3mm
CL123	1200 x 1200 x 3mm

29.7cm

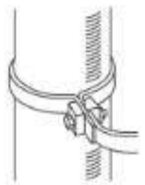
21cm

CELEX



Tape to Steel Structure Bond

Part No.	Max.Tape Width	Material
SB1	26mm	Copper
SBA1	26mm	Aluminium



Pipe Bond

Part No.	Max.Tape Width	Material
PB1	26mm	Copper
PBA1	26mm	Aluminium

Watermain Bond

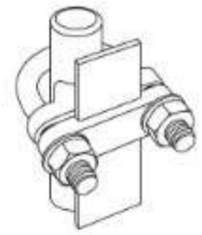
Part No.	Max. Tape Width	Conductor Material	Weight each
BN120	26mm	Copper	0.26kg

Tinned Bonding Clip

Part No.	Diameter of Pipe
TBC13	13mm
TBC20	20mm
TBC25	25mm
TBC38	38mm
TBC50	50mm
TBC75	75mm
TBC100	100mm
TBC150	150mm

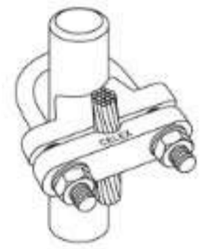
Cable to Tape U Clamp

Part No.	Max. Conductor Diameter	Tape Size
UT1	32mm	25 x 3mm
UT2	52mm	25 x 3mm



Cable to Rod U Clamp

Part No.	Rod Diameter	Conductor Range
UR1	16mm	50 - 95mm²
	19mm	50 - 70mm²
UR2	16mm	70 - 185mm²
	19mm	70 - 150mm²
UR3	16mm	150 - 300mm²
	19mm	150 - 300mm²



Multiple U Clamp

Part No.	Rod Diameter	No. of Conductor	Conductor Range
UM1	16mm	3	70 - 150mm²
UM2	16mm	2	70mm² / 25 x 3mm

Tailor-made U clamps are available upon request.

29.7cm

21cm

CELEX

Compression Connectors

Part No.	Conductor Range
CPS1	25 - 35mm²
CPS2	35 - 50mm²
CPS3	50 - 70mm²
CPS4	70 - 95mm²
CPS5	95 - 120mm²
CPS6	120 - 150mm²
CPS7	150 - 185mm²
CPS8	185 - 240mm²

They must be installed using the appropriate compression tools and dies.

Aircraft Earth Receptable

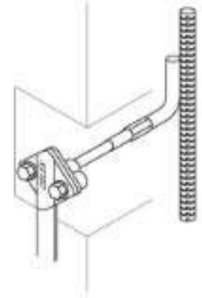
Part No.
AER1

Eyebolt

Part No.	Norminal Copperbond Rod Diameter
EB16	5/8"
EB19	3/4"

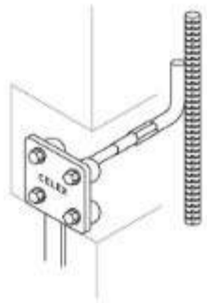
Two-Hole Earth Point

Part No.	Specification
EP2	Two-Hole Earth Point
EPC2	Two-Hole Earth Point Cover Plate



Four-Hole Earth Point

Part No.	Specification
EP4	Four-Hole Earth Point
EPC	Four-Hole Earth Point Cover Plate



Earth Point welded to Steel Rod

Part No.	Specification
EP10T	Earth Point welded to 10mm Mild Steel Rod; T-Joint
EP10S	Earth Point welded to 10mm Mild Steel Rod; Straight Joint
EP16T	Earth Point welded to 16mm Mild Steel Rod; T-Joint
EP16S	Earth Point welded to 16mm Mild Steel Rod; Straight Joint
EP20T	Earth Point welded to 20mm Mild Steel Rod; T-Joint
EP20S	Earth Point welded to 20mm Mild Steel Rod; Straight Joint
EP25T	Earth Point welded to 25mm Mild Steel Rod; T-Joint
EP25S	Earth Point welded to 25mm Mild Steel Rod; Straight Joint

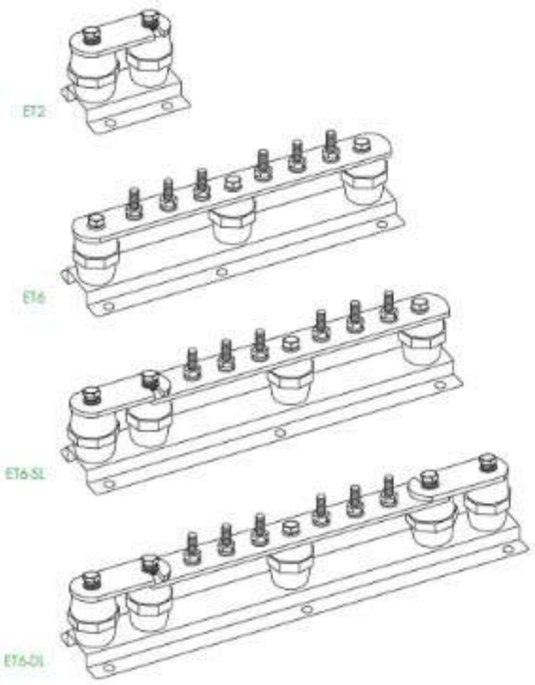
Earth Point welded to 16mm Mild Steel Rod; T-Joint

Earth Point welded to 16mm Mild Steel Rod; Straight Joint

29.7cm

21cm

CELEX



All the above products consist of 50 x 6mm copper bar.
Tailor-made specification can be provided upon request.

Earth Terminals

Part No.	Description	Length
ET4	4 way	300mm
ET6	6 way	450mm
ET8	8 way	580mm
ET10	10 way	735mm
ET12	12 way	845mm
ET14	14 way	1000mm
ET16	16 way	1110mm
ET18	18 way	1265mm
ET20	20 way	1375mm

Earth Terminals with Single Disconnecting Link

Part No.	Description	Length
ET4-SL	4 way	375mm
ET6-SL	6 way	525mm
ET8-SL	8 way	655mm
ET10-SL	10 way	810mm
ET12-SL	12 way	920mm
ET14-SL	14 way	1075mm
ET16-SL	16 way	1185mm
ET18-SL	18 way	1340mm
ET20-SL	20 way	1450mm

Earth Terminals with Double Disconnecting Links

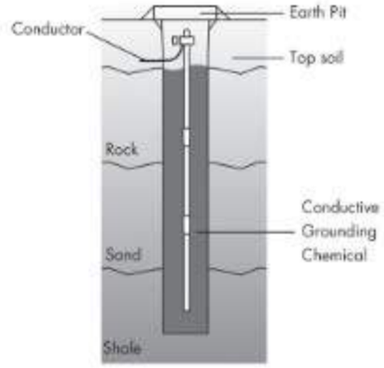
Part No.	Description	Length
ET4-DL	4 way	450mm
ET6-DL	6 way	600mm
ET8-DL	8 way	730mm
ET10-DL	10 way	885mm
ET12-DL	12 way	995mm
ET14-DL	14 way	1150mm
ET16-DL	16 way	1260mm
ET18-DL	18 way	1415mm
ET20-DL	20 way	1525mm

Conductive Grounding Chemical

Part No.	Specification
CGC025	25kg

Certain ground conditions, especially in areas of poor conductivity such as rocky ground, areas of moisture variation, and sandy soils, make it difficult to obtain a reliable earth resistance, whilst particular installations may require a very low resistance. In such cases, conductive grounding chemical provides a convenient and permanent solution.

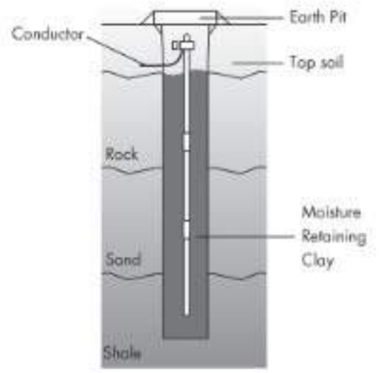
Conductive grounding chemical may be used to reduced the contact resistance and increase the effective size of earth electrodes, for example, as a backfill for earth rods installed in drilled holes or as a layer encapsulating horizontal earth conductors buried in a trench. In addition, the conductive grounding chemical may be used in other applications such as screening, conductive or anti-static flooring and in building foundations as a permanent electrode.



Moisture Retaining Clay

Part No.	Specification
MRC015	25kg

Bentonite has been used for many years as an earth electrode backfill to help reduce an earth electrodes' resistance to earth by retaining moisture in the immediate vicinity of the earth rod. The clay consists largely of sodium montmorillonite, which when mixed with water swells to many times its dry volume. Its main advantage as far as earthing is concerned, is that it has the ability to hold its moisture content for a considerable period of time and to absorb moisture from the surrounding soil, for example, from the rainfall. It also has the added advantage of making intimate contact with the electrode and the surrounding soil, and helps to protect the electrode from corrosion.



CELEX

Earth and Resistivity Tester C.A 6460

In its rugged and sealed case, C.A 6460 is easy to use, designed specifically for operation in the field. Wherever it is necessary to install and earth connection or characterise an existing earth point, it contributes to establishing an accurate, fast and easy diagnosis under optimum conditions of comfort and safety.

- 3 in 1 tester: resistivity, earth, coupling
- measurement range: 0.01 to 2000Ω (3 automatic ratings)
- change from 4 wire method to 3 wire method thanks to 1 removable captive bar between E - ES
- 3 fault presence indicators to validate measurement
- measurement frequency: 128Hz
- easy connection of stakes through identified colour terminals
- large digital display with 2000 backlit pts
- power supply: 8 x 1.5V batteries so that average controlled self-sufficiency is constantly 4500 measurements of 15s
- IP53 sealed case with folding cover and carrying handle
- electrical safety: IEC 61010 and IEC 61557
- dimensions: 273 x 247 x 127 mm - weight: 2.8kg

29.7cm

Earth Clamps and Loop Tester C.A 6415

The ideal measuring instrument for parallel earth networks, the C.A 6415 earth clamp is ultra-fast and safe; earth loops can be tested quickly by simply clamping earthed cables.

- resistance: 0.1Ω...1200Ω (7 cal.)
- clamping diameter: 32mm
- measuring frequency: 2400Hz
- power supply: 1 x 9V battery for a service life of 1,500 x 30-sec measurements
- battery charge level and remaining battery service life indication
- visual indication of anomalies such as significant parasitic current or incorrect closure of jaws
- measurements in compliance with NF EN 61010
- electrical safety: EN 61010 cat.III 150V
- dimensions: 235 x 100 x 55mm; weight: 1kg

CHAUVIN ARNOUX
CHAUVIN ARNOUX GROUP

Early Streamer Emission System

FRANKLIN FRANCE

Protection offered by FRANKLIN FRANCE Early Streamer Emission Lightning Conductors

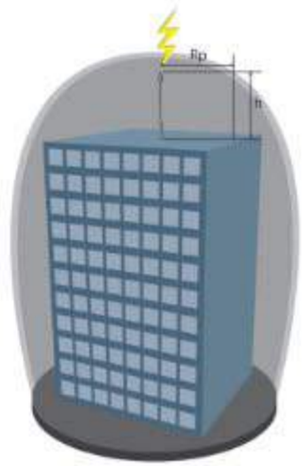
In Compliance with NFC17-102 Standard

Preferential capture

The ability to promote excitation at lower values of the electrostatic field (hence earlier) enhances the capture probability of lightning conductors. This capacity gives them greater efficiency in the role of "preferential capture points" compared to any other point of the building they protect. Therefore these lightning conductors offer superior guarantees during low intensity discharges (2 to 5 kA) compared with simple rod type lightning conductors, which can only intercept them over short distances.

Larger zone of protection

The zones of protection of lightning conductors are obtained theoretically by plotting the electrogeometric model, but are comparable in practice, for low heights, comparable to a cone of revolution whose excitation is the tip of the lightning conductor.

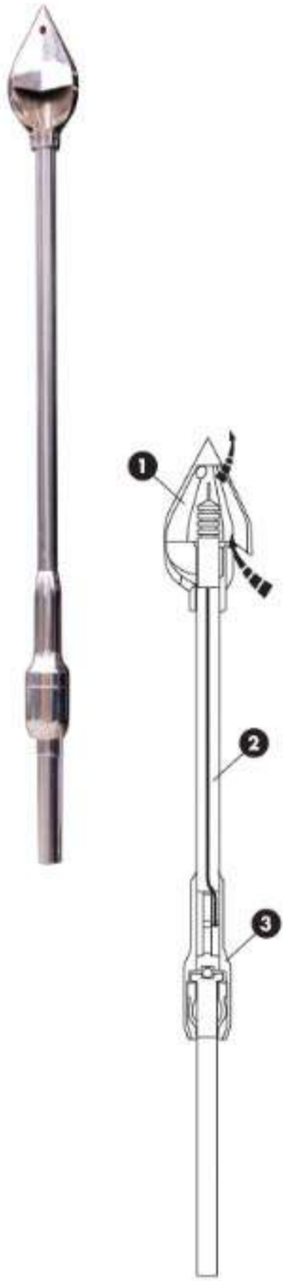


French standard NFC17-102 deals with Early Streamer Emission (ESE) lightning conductors, and takes into account the levels of protection Np depending on:
the excitation advance
the level of protection Np according to the degree of severity (I to III) determined previously by an assessment of the lightning risk, done with the calculus "Lightning Risk®" software developed by FRANKLIN FRANCE in compliance with the standard.
The excitation distance D considered according to the level of protection required D(I) = 20m, D(II) = 45m, D(III) = 60m.

21cm

Saint Elme® Lightning Conductor

In Compliance with NFC17-102 Standard



Principle

The basic principle of the Saint-Elme® lightning conductor is to create free charges (ionized particles and electrons) in the air surrounding the lightning conductor and to create, within a cloud-ground electric field, a channel of high relative conductivity constituting a preferential path for lightning.

Free charges are created by the corona effect by applying on the Saint-Elme® lightning conductor's ionized point(s) the voltage supplied by cells of piezo-electric ceramics (lead zirco-titanate); their feature is to produce a very high voltage by simply modifying the applied pressure.

The Saint - Elme® lightning conductor is therefore equipped with a mechanical device that transforms the stress resulting from the wind action on the lightning conductor into a pressure stress on the piezo-electric cells. The voltage therefore produced is applied, through the high voltage cable that runs inside the lightning conductor's support pole, on the ionized point(s) to create, by corona effect, free charges. Then, these charges are expulsed, by the Venturi system, from the lightning conductor's head, profiled on purpose.

The Saint-Elme® lightning conductor is designed for the protection of a site (building, manufacture, monument, open areas...) against the direct impact of lightning on important radii of protection.

Description

The Saint-Elme piezoelectric lightning conductor is mainly composed of the following:

1. Capture head

Profiled, inalterable and good conductor, structured to generate a forced air circulation at its tip and in its prolongation.

2. Support pole

Of treated copper (or stainless steel according to models) which upper part has one or more stainless steel ion emitter points, inserted in an insulating sleeve and subject to the potential supplied by the piezo-electric ceramic. The emitter points are protected from direct impact by lightning and from the weather by the capture head which, like the support pole, is permanently connected to the earth potential.

3. Transducer (piezoelectric stimulator)

Built into the lower part of the pole and consisting of piezoelectric ceramics stressed in an insulating container, combined with a simple, completely reliable and mechanical stimulation system. A high-voltage cable running inside the pole connects the simulator to the emitter point(s). The voltage created by the ceramic is applied to the emitter point through the high voltage cable.

The table hereunder gives the Model number and the Rp(m) values for the three levels of protection Np depending on the actual height h(m) of the lightning conductor in relation to the different planes considered.

Early Streamer Emission System

Early Streamer Emission System

Model number	AFB1006SE			AFB1009SE			AFB1012SE			AFB1015SE		
Rp(m)	SE6△L=15m			SE9△L=30m			SE12△L=45m			SE15△L=60m		
h(m) \ Np	I	II	III	I	II	III	I	II	III	I	II	III
2	13	18	20	19	25	28	25	32	36	31	39	43
4	25	36	41	38	51	57	51	65	72	63	78	85
6	32	46	52	48	64	72	63	81	90	79	97	107
8	33	47	54	49	65	73	64	82	91	79	98	108
10	34	49	56	49	66	75	64	83	92	79	99	109
20	35	55	63	50	71	81	65	86	97	80	102	113
30	35	58	69	50	73	85	65	89	101	80	104	116
60	35	60	75	50	75	90	65	90	105	80	105	120

Impact Controller

In Compliance with UTE C 17-106/2001

The impact controller or lightning counter is designed for detecting and counting lightning strikes received by the structures equipped with lightning conductors. It is installed in series on the path of the lightning strike induced discharge current and fitted in general to a down conductor.

The use of impact controller allows to accurately maintain and to secure lightning protection installations through inspections. It is totally autonomous and does not require any external power supply.

According to NFC 17-102, the impact counter is recommended to install at approximately 2 m from its base; mounting in serial on the down conductor, on a compulsory path of the lightning current.

Ordering code	AFV 0907 CF
Counting range	00 to 99
Counter threshold IEL 60-1 and 1180-1 (Minimal discharge current detected)	1 kA in 8/20 wave (no detection below 150 A)
Maximum discharge current detected in compliance with IEL 60-1 and 1180-1	100 kA in 8/20 wave (150 kA in 4/10 wave)
Permanent working current	None
Termiant capacity	Ø8mm (50mm²)
Necessary circuit breaker	No
Operating temperature range	-30°C / +80°C
Protection index	IP53
Dimensions	165 x 92 x 47mm
Weight	430g

29.7cm

21cm

CELEX

Saint Elme *Active* 2D® Lightning Conductor

In Compliance with NFC17-102 Standard

Principle

A first device, named <impulse device> stores the electrostatic energy present in the atmosphere at the approach of a stormy cloud and releases the excitation of the ascending discharge at the right time.

A second device, named <power device>, collects and stores the wind and / or the solar energy in several strong power capacitors. The Saint Elmo lightning conductor is in this way permanently pre-loaded of an important energy which enables him to support the propagation of the ascendant tracer.

Close to the storm activity, an integrated sensor measuring the surrounding electric field value, releases the impulse device like most of usual Early Streamer Emission systems. Those lightning conductors almost immediately reverse the polarity of their head, creating a sudden amplification of the electrical field.

The innovation of Saint Elme Active2D® lightning conductor comes from the use of a second integrated sensor which measures the intensity of the electric discharge current, which is formed on the lightning conductor's head.

When the downward leader enters in the protection area of the lightning conductor, the measured current strongly increases. As soon as this current is higher than the characteristic threshold, the power capacitors discharge and release the necessary energy for the propagation of the leader.

In this last device, the lightning conductor's head acts as a capture device. Therefore, the head is electrically insulated from the ground.

Characteristics

- Take in account the energetic information to choose the tracer which can become an ascending tracer.
- Maintain the propagation of the tracer by discharge of the power device.
- Source of energy autonomous and clean
  - **Solar (2)** or **wind (1)** energy for the "**power device**"
  - Atmospheric electrical field for the **"impulse device"(3)**
- Consider the cloud polarity
- Radius of curve of the head optimize to reduce the corona effect and guarantee the excitation device.
- Protection of the electrical part against the rain with a **dimensioned flange (4)**.
- High quality materials, esthetical.
- Use of stainless steel to resist against corrosion.

Early Streamer Emission System

Early Streamer Emission System

Remote Control Tester - AFV 0100 TT

The Saint-Elme Active 2D lightning conductor can be tested on site, with its remote control tester (initial checking, periodic checking in compliance with NFC 17-102 and decrees in force, maintenance,...)

Simple and fast, the test does not require any particular operation of dismounting of the lightning conductor and can be done safety from the ground.

Model number	AFB 1030 2D / AFB 1032 2D			AFB 1060 2D / AFB 1062 2D		
Rp(m)	SE2D30, ΔT=30ps			SE2D60, ΔT=60ps		
h(m) \ Np	I	II	III	I	II	III
2	19	25	28	31	39	43
4	38	51	57	63	78	85
6	48	64	72	79	97	107
8	49	65	73	79	98	108
10	49	66	75	79	99	109
20	50	71	81	80	102	113
30	50	73	85	80	104	116
60	50	75	90	80	105	120

Elevation Rods & Fixings

Franklin elevation rods, consisting of 2 m elements, nest into each other, avoiding bolting and water infiltration that can cause premature corrosion. These heavy-duty rods require no guying. They are delivered with conductor connecting clamps.

"Offset" fixing brackets are designed for mounting the lightning conductors on the wall. They can be fixed by stud gun, bolting and taping. Both galvanized steel and stainless steel are available.

Three-feet saddle are designed for fixing the lightning conductors and elevation rods in the terrace or on the ground. Made of galvanized steel, it can be used for every lightning conductors and elevation rods with a diameter of Ø50 cm.

29.7cm

21cm

Surge Protector

In Compliance with the IEC61312-3 standard

Surge protection - a topic that has become increasingly important in recent years. Costly electronic equipment, which is sensitive to voltage peaks on the supply, is no longer found only in offices and factories, but in our homes as well.

Nowadays, highly-sensitive data processing, telecommunications and computer networks form the backbone of worldwide communications structures without which no company or public body can survive. Machines and production lines are monitored and controlled by electronic programmers. And even many creative services are no longer conceivable without the aid of computers.

The range of Celex's surge protection systems extends from basic mains protection to precision protection, from data line and measurement and control system protection to isolating spark gaps, installed either centrally or decentralized.

Surge protection of 120/208V and 230/400V Electric networks – Level I , II and III Applications

These plug-in devices make maintenance of networks (isolation tests or else) very easy and in total security while insuring continuous servicing. They are pre-assembled in 2,3, and 4 poles with a single remote monitoring terminal (RM) making their installation straightforward.

Standards applications: Main boards of main and secondary buildings (sites with medium risk levels). Distribution boards: second protection level (sites protected against direct lightning or with a very high risk level). Mounting on symmetrical I DIN rail foot (EN50022).

ASS3312T1

For use on phases networks	Single, Three phase
Nominal voltage	230V
Response time	<25ns
Operating temperature	-40/+80°C
Protection mode	TT, TNS, TNC
Max. operating voltage	335V
Nominal discharge current	25kA
Max. discharge current	100kA
Protection level	2kV
Short circuit withstand	25kA
IP value	Ip20
Standard complied	IEC61312-3

Early Streamer Emission System

Early Streamer Emission System

ASS1106L1

For use on phases networks	Single, Three phase
Nominal voltage	400V
Response time	<25ns
Operating temperature	-40/+80°C
Protection mode	IT, TNS, TNC
Max. operating voltage	440V
Nominal discharge current	40kA
Max. discharge current	80kA
Protection level	2.4kV
Short circuit withstand	25kA
IP value	Ip20
Standard complied	IEC61312-3

Surge Protection of Data, CCTV & Telecommunications

The surge protective devices for the data transmission and Coaxstops are designed for protecting against overvoltages of atmospheric origin the equipments connected to any nearby network.

The induced current is diverted to the earth before it can reach the equipment connected to the network while the overvoltage is kept to a harmless level and the equipment running. These devices do not alter in any significant way the characteristics of the lines.

ASX7480TV

Connectors	TV
Type of connections	M/F
Impedance	75Ω
Operating temperature	-30/+80°C
Penetration mode	NO
Bandwith (GHz)	0-0.3
Attenuation	<0.5
VSWR	<1.5
Reflection coefficient	>14
Flow capacity 8/20 wave	20kA 10times
Maximum power	20W
Protection index enclosure	N/A

Other models for various specification or application are available. Please contact the sales office for further information.

29.7cm

21cm

CELEX

thermOweld® process

The thermOweld® electrical connection process is a simple, efficient method of welding copper to copper or copper to steel. No outside source of power is required when using the thermOweld®. The thermOweld® connections use the high temperature of reaction of powdered copper oxide and aluminium. The reaction takes place in a semipermanent graphite mold (thermOweld®) that lasts for fifty or more welds if properly cared for. The thermOweld® reaction takes place in a very few seconds, therefore the total amount of heat (calories or BTU's) applied to the conductors or surfaces is considerably less than that employed in brazing or soldering. This is an important consideration when welding to insulated cable or thin wall pipe.

The thermOweld® is ideal for field use, since it is light and portable and requires no outside power source. It requires very little time or skill to obtain an efficient, maintenance free electrical connection when using the thermOweld®.

thermOweld® connection

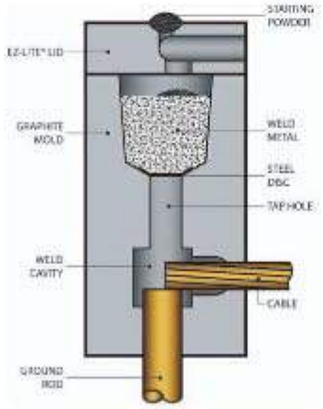
The thermOweld® connection is a molecular weld. The weld metal has same melting point as copper. Because of these factors along with the increased cross section of the connection, thermOweld® connections:

1. thermOweld® connections will not be affected by a high current surge. Tests have shown that the electrical conductor will melt before the thermOweld® connection when subjected to high short-circuit current.Consult I.E.E.E. Standard 80-1989
2. thermOweld® connections will not loosen or corrode at the point of weld. There are no contact surfaces or mechanical pressures involved. A thermOweld® connection becomes an integral part of the conductors.
3. thermOweld® connections have a current-carrying capacity equal to or greater than that of the conductors.

thermOweld® equipment has been used to weld materials other than copper for electrical purposes.
Materials welded have included:

Stainless	Monel	Copper Clad Steel	Steel Rail	Brass
SteelCopperweld	Plain steel	Bronze	Chromax	Nichrome
Nichrome V	Everdur	Galvanized Steel	Wrought Iron	Cast Iron
Kama	Cor - Ten	Silcone Bronze	Columbium	Niobium

Make a thermoweld® Connection



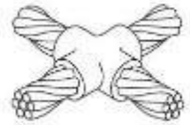
thermOweld®

thermOweld®

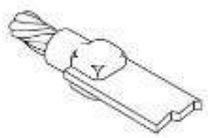
Cable to Cable


CC-1


CC-2


CC-4

Cable to Lug or Bus Bar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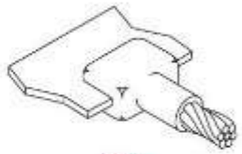
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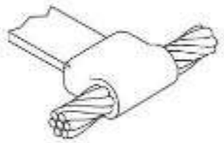
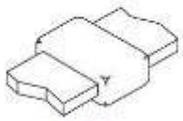
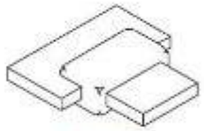

CB-5

Bus Bar to Bus Bar


BB-7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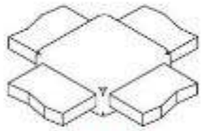
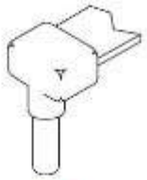

BB-40

Bus Bar to Ground Rod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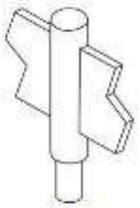
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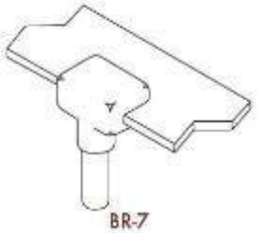
BR-7

Please contact the sales office for other weld types not listed.

29.7cm

21cm

Index

29.7cm

21cm