PROTART

LIGHTNING PROTECTION AND EARTHING SYSTEMS

ESE LIGHTNING RODS

PROTART

PRODUCT CATALOGUE

www.protart.com.tr

PROTART

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COMPANY PROFILE

PROTART was founded in 2008 with a purpose to serve the needs and wants of the clients looking for quality and cost effective solutions in the global market. Since the day PROTART was founded, it kept growing in the areas served and widened product ranges. With its strong R&D, manufacturing experience and solid background, PROTART progressed in the international lightning protection market with speed and agility.

As PROTART, we committed to meeting the needs of all domestic and foreign institutions and organizations in the lightning protection and grounding industry in accordance with national and international standards. We continue to offer optimum solutions to customer needs with our range of products for the industry and distributorship of leading global brands. We do our best to be a company that always follows the developments in its industry and technology closely, keeps the bar high without compromising team spirit, develops its quality understanding at all times, and makes a commitment to its customers regarding the continuity of its quality.

Protart provides the safest solutions for lightning protection.

PROTART

EXTERNAL LIGHTNING PROTECTION SYSTEMS

TECHNICAL INFORMATION

E.S.E Air Terminal

In E.S.E Air Terminal system, protection is enabled by means of an electrostatic lightning rod, the tip of which is refined and sharpened in both lightning rod systems, and lightning rods are placed on the highest spot of the construction to be protected. E.S.E Air Terminal are connected with the ground along the shortest route. The protection area they provide varies depending on the location of the installation and height of such location compared to the surrounding constructions. E.S.E Air Terminal suitable for ion devices also follow the same rules, however warning distance is further improved (about 1.5-3 times), because arc delay is reduced. Their advantage is the increase in efficiency, especially in the case of low-density lightning strikes, and a decrease in the lengths of lightning rods for some situations with very hard applicability.

Protection Radius of E.S.E Air Terminal

The role of ground connection is significant in the effective operation of an E.S.E. Air Terminal (active) lightning rod system, and it must be installed carefully. NF C 17-100 and NF C 17-102 standards state that the cage and lightning rods for each down lightning must have an independent-separate grounding. Electrical grounding or the available arch are connected to these lightnings to provide equipotentiality. Lastly, it is required to keep the lightning grounding as far away from any underground metal electric power transmission pipes as possible (3-5m), and the ohmic value with low wave impedance must not be above 10 Ohm according to NF C 17-102.

Simple Rod / Air Terminal

Known as Franklin rod or air terminal systems, this method is a lightning protection method consisting of a basic metal tip, down conductor, and grounding sections.A metallic air terminal is placed on top of the construction to be protected, and ground connection is established. It provides a protection cone thanks to the α apex angle. In this method, an area specified with a fixed protection angle can be protected.

Places Where the Simple Rod Method Can Be Applied:

- Tower type constructions with small floors
- Mosque minarets, light houses, guard boxes, etc.
- Special spot protection in constructions with Faraday cages
- Chimney breasts, devices on flat roofs especially, elevator towers

Faraday “Meshed Cage” System

This is performed by combining the conductors that are placed at suitable distances from a cage on top of the building depending on the protection level, and providing connection with the ground. This provides a protection angle thanks to the rolling sphere method. Air terminals called strike points (0.50-2m) are mounted on each important point (chimney, roof bodywork, etc.) around the roof.
The building to be protected with the Meshed Cage method will be covered so that there is a continuous and uninterrupted conductor route from the top points of the building, including the secondary parts, to the ground. This cage has many attractors formed by conductors completed by horizontal connections and is connected to a grounding system. All metal extensions on the roof that is connected to the grounding system on purpose or incidentally must be connected to the air terminal system, and consist a part of the system. If the height of some parts of the construction varies significantly, the lower air terminal or air terminal system must be connected to the down conductors of high parts in addition to its own down conductor.

Stretch Wire

The protection area in the stretch wire method is defined with the combination of volume protected by the apparent rods on the wire. Stretch wire is bonded from the height that will protect the building between the poles erected on two or more sides. Poles must provide electrical continuity between the grounding of the stretch wire and poles, and the stretch wire must have a section (min 50 mm^2) that can bear the stretch wire lightning current. This method is not preferred on high buildings due to the difficulty of installing it and the unpleasant appearance it creates on the building.

E.S.E Air Terminal General Technical Specifications

1. APPLICABLE STANDARDS AND REGULATIONS

Installations shall be designed in accordance with the following regulations and standards.
—NFC 17–102 / 2011: “Protection of structures and open areas against lightning by an Active Lightning Rod”
—UNE 21–186: “Protection of structures and open areas against lightning by an Active Lightning Rod”
—TS 13709: “Protection against Lightning - Active Lightning Rods” (May 2016)
—IEC 62561–1: “Lightning Protection System Components (LPSC) Part 1: Requirements for connection components” (June 2017)
—IEC 62561–2: “Lightning Protection System Components (LPSC) Part 2: Requirements for conductors and earth electrodes” (June 2018)

2. PROPERTIES OF ESE AIR TERMINAL

The ESE Air Terminal shall have the following properties.
—It shall be made of stainless steel with high resistance against corrosion.
—It shall include the original test device manufactured for the ESE Air Terminal to test on the site of actual installation.
—ΔT advance time shall comply with TS 13709 and NFC 17–102.
—It shall be subjected to 100 kA lightning test current provided in article 6.3 of IEC 62561-1 and certified for smooth operation after exposure to this current.
—The manufacturer or the distributor shall be certified by ISO 9001,10002, and IEC 62561-1 and IEC 62561-2.

3. LIGHTNING ROD POLE

The Lightning Rod pole shall have the following properties.
—It shall be resistant and solid against all kinds of weather conditions and external factors.
—It shall be installed onto the possible highest point of the structure.
—If higher than 6 meters, it shall be fixed with wires at three points in minimum.
—The fixing clamps of ridgepole shall be of adequate thickness in line with the type of ridgepole.
—The lightning rod head shall be connected to the pole with an appropriate connection unit.
—The pole height shall not drop below the minimum pole height value set out in TS 13709 and NFC 17-102.

4. DOWN CONDUCTOR

The down conductor shall have the following properties.
—A minimum of 2 down conductors should be available for structures with a height up to 60 meters and 4 down conductors for structures higher than 60 meters.
—It shall be made of electrolytic copper or galvanized material.
—All of the metal installations (guard rail bar, antenna pole, etc.) next to the down conductor shall be fastened to the lightning rod down conductor. Connectors shall be made of the same material as the down conductor.
—The down conductor shall be lowered to the ground through the shortest path possible, and sharp bends to the down conductor shall be avoided.
—The down conductor shall be fixed to the surface with 3 down conductor clamps at 100 cm spaces installed.

5. LIGHTNING STRIKE COUNTER

The lightning strike counter shall have the following properties.
—It shall be manufactured in accordance with IP65 protection rating.
—The down conductor shall be connectable without disruption.
—The test clamp shall be connected above 10 cm.

SPECIFICATIONS

6. TEST CLAMP

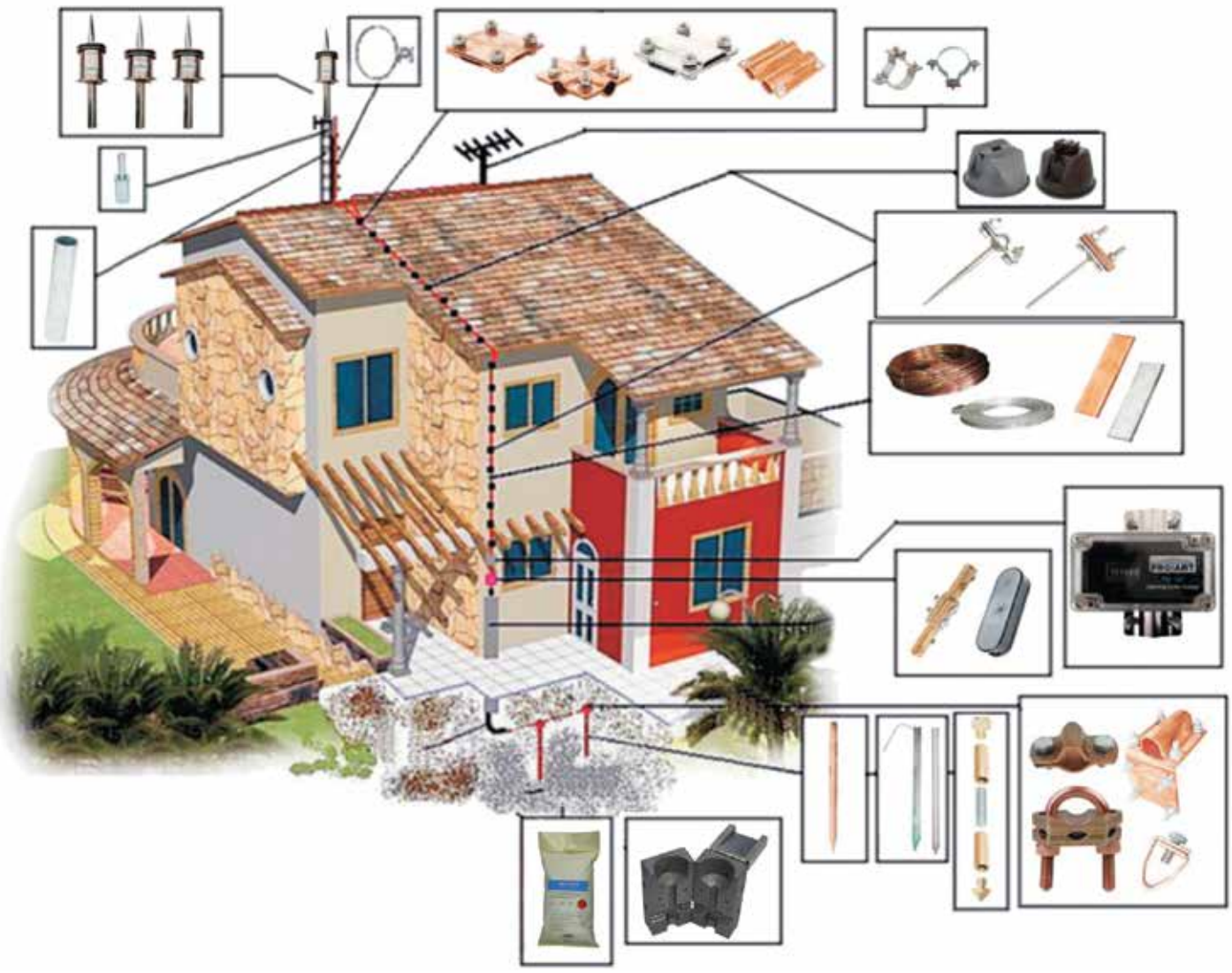
The test clamp shall have the following properties.
—The test clamp shall be made of copper, brass, galvanized, causing no corrosion with down conductors.
—It shall be located just above the protective pole.
—All bolts, nuts and washers shall be made of non-corrosive material.

7. PROTECTIVE POLE

The protective pole shall have the following properties.
—It shall be made of internally insulated galvanized pole to protect the down conductor against physical impacts at the point of its descent to ground.
—It shall be 3 meters in length with its 250 cm part to be used above ground and 50 cm part to be used below ground.

8 . INSTALLATION CONDITIONS

The certificates and qualifications which should be possessed by the installation company shall be as indicated below.
—When performing installation and detachment, weather conditions shall be taken into account in terms of occupational health and safety, and no work shall be performed under discharge weather conditions.
—The materials to be used for the outer part of the lightning rod head shall be manufactured in accordance with IEC 62561–1 (Lightning Protection System Components: Part 1: / June 2017) and IEC 62561-2 (Lightning Protection System Components: Part 2 / June 2018).
—The installation company shall be certified by ISO 9001 Quality Management System and ISO 14001 Environmental Management System.



E.S.E. AIR TERMINALS

Protart E.S.E. Air Terminal (Lightning Conductor) is manufactured from high quality stainless steel which makes it durable against the toughest weather conditions.

When there is change in the electro magnetic field in the atmosphere, the ion generator inside the Protart E.S.E. Air Terminal starts to release positive ions in to the atmosphere which attracts the lightning emissions on to the Protart E.S.E. Air Terminal. Standart product does not come with an adaptor. Our product is certified from Middle Eastern Technical University and Ostim Technical University according to NFC 17.102 Annex C.

Protart E.S.E. Air Terminal are effective electrostatic field lightning conductors. Three different options are available based on the triggering time.

Protart E.S.E. Air Terminal are produced of stainless steel to avoid chemical corrosion and have qualified section to resist high values of lightning currents. As the atmospheric electric field increases during lightining storm, generator becomes active and ionizes surrounding air. To increase the yield even more, supportive atmospheric electrodes are used during product desing. By these electrodes it has been advantageous to enhance ionization time.

PROTART-30 E.S.E. AIR TERMINAL

Product Code	*Material*	*Packing Dimension (Cms)*	*Weight (kg)*
PRO 30	Stainless Steel	37x22x12	2,110

PROTART-45 ESE AIR TERMINAL

Product Code	*Material*	*Packing Dimension (Cms)*	*Weight (kg)*
PRO 45	Stainless Steel	37x22x12	2,120

E.S.E. AIR TERMINALS

PROTART-60 E.S.E. AIR TERMINAL

Product Code	*Material*	*Packing Dimension (Cms)*	*Weight (kg)*
PRO 60	Stainless Steel	37x22x12	2,250

PROTECTION RADIUS TABLE

Rp (m)	*PRO 30 ΔL:30 m ΔT:30 µs*				*PRO 45 ΔL:45 m ΔT:45 µs*				*PRO 60 ΔL:60 m ΔT:60 µs*			
h (m)	**Level I**	**Level II**	**Level III**	**Level IV**	**Level I**	**Level II**	**Level III**	**Level IV**	**Level I**	**Level II**	**Level III**	**Level IV**
2	19	22	25	28	25	28	32	36	31	35	39	43
4	38	44	51	57	51	57	64	72	63	69	78	85
5	48	55	63	71	63	71	81	89	79	86	97	107
6	48	55	64	72	63	71	81	90	79	87	97	107
8	49	56	65	73	64	72	82	91	79	87	98	108
10	49	57	66	75	64	72	83	92	79	88	99	109
20	50	59	71	81	65	74	86	97	80	89	102	113
30	50	60	73	85	65	75	89	101	80	90	104	116
60	50	60	75	90	65	75	90	105	80	90	105	120

LIGHTNING CONDUCTOR TESTERS

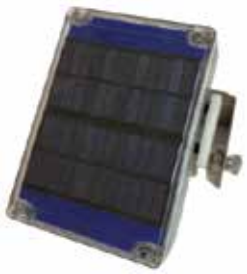
PRO LSC works based on the inductive field principle of the lightning strike, when a lightning strike occurs and as the current flows through the down conductor; it operates the transformer device which advances the analog counter by a digit which is visible on the facade of the product.

LIGHTNING CONDUCTOR TESTER

Product Code	*Weight (kg)*
PRO T	0,152

REMOTE LIGHTNING CONDUCTOR TESTER

Product Code	*Box Content*	*Weight (kg)*	*Weight of Box (kg)*
PRO T-RS	Solar Panel, Solar Panel Cable, Remote Tester, Power Adapter	0,085	2,171



Lightning Conductor Testers requires a 9V battery.

LIGHTNING STRIKE COUNTERS

DIGITAL LIGHTNING STRIKE COUNTER

Product Code	*Dimension*	*Rated*	*Weight (kg)*
PRO LSC-D	11.5 x 6.5 x 5.5	IP67	0,460

ANALOGUE LIGHTNING STRIKE COUNTER

Product Code	*Dimension*	*Rated*	*Weight (kg)*
PRO LSC-A	11.5 x 6.5 x 5.5	IP68	0,460

POLES

LIGHTNING ROD POLE

Product Code	Material	Outside Diameter (mm)	Thickness (mm)	Nominal Diameter (Inch)	Weight (kg/m)
LP 20102G	Galvanized Steel	60,30	3,60	2	5,100
LP 201025G	Galvanized Steel	75,90	3,60	2,50	6,450
LP 20103G	Galvanized Steel	88,75	4,00	3	8,360
LP 20104G	Galvanized Steel	114,00	4,50	4	12,200

PROTECTIVE ROUND TUBE

Product Code	Material	Outside Diameter (mm)	Thickness (mm)	Nominal Diameter (Inch)	Weight (kg/m)
LP 20101G	Galvanized Steel	33.75	3,20	1	2,410
LP 2010125G	Galvanized Steel	42.45	3,20	1.25	3,100
LP 2010150G	Galvanized Steel	48.30	3,20	1.50	3,560

PROTECTIVE RECTANGULAR TUBE

Product Code	Material	Dimension (mm)	Wall Thikness (mm)	Weight (kg/m)
LP 2023010G	Galvanized Steel	30 x 10	1.20	0,720
LP 2024020G	Galvanized Steel	40 x 20	2.00	1,690

- *All poles are shipped as 3 or 6 meter length. For different sizes, please give us detail at the time of ordering.*
- *Stainless steel poles available upon request.*

POLE COUPLERS

POLE COUPLER

Product Code	Material	Pole Diameter (Inch)	Weight (kg)
LP 20322G	Galvanized Steel	2 - 2	1,090
LP 203225G	Galvanized Steel	2 - 2.5	1,970
LP 20323G	Galvanized Steel	2 - 3	3,490
LP 2032525G	Galvanized Steel	2,5 - 2,5	1,050
LP 203253G	Galvanized Steel	2,5 - 3	3,110
LP 20333G	Galvanized Steel	3 - 3	3,600

INSULATING TYPE POLE COUPLER

Product Code	Material	Pole Diameter (Inch)	Weight (kg)
LP 20322P	Plastic	2 - 2	4,000

UNIT ADAPTER

Product Code	Material	Pole Diameter (Inch)	Weight (kg)
LP 20402B	Galvanized Steel	2	2,260

POLE SUPPORTS

FLAT TYPE POLE SUPPORT

Product Code	Material	Pole Diameter (Inch)	Mounting Hole Diameter (mm)	Weight (kg)
LPS 20302GS	Galvanized Steel	2	M10	0,420
LPS 203025GS	Galvanized Steel	2.5	M10	0,500
LPS 20303GS	Galvanized Steel	3	M10	0,520

WALL TYPE POLE SUPPORT

Product Code	Material	Pole Diameter (Inch)	Mounting Hole Diameter (mm)	Weight (kg)
LPS 20302GW	Galvanized Steel	2	M10	1,560
LPS 203025GW	Galvanized Steel	2.5	M10	1,600

PYLON TYPE POLE SUPPORT

Product Code	Material	Pole Diameter (Inch)	Weight (kg)
LPS 20302GP	Galvanized Steel	2	0,830
LPS 203025GP	Galvanized Steel	2.5	0,830
LPS 20303GP	Galvanized Steel	3	0,830

Stainless steel supports available upon request.

POLE SUPPORTS

U TYPE POLE SUPPORT

Product Code	Material	Pole Diameter (Inch)	Bolt Diameter (mm)	Weight (kg)
LPS 203025GU	Galvanized Steel	2,5	M12	0,416

FOOT TYPE POLE SUPPORT

Product Code	Material	Pole Diameter (Inch)	Mounting Hole Diameter (mm)	Weight (kg)
LPS 20302GF	Galvanized Steel	2	M10	1,130
LPS 203025GF	Galvanized Steel	2.5	M10	1,200
LPS 20303GF	Galvanized Steel	3	M10	1,700

PROTECTION TUBE SUPPORT

Product Code	Material	Pole Diameter (Inch)	Mounting Hole Diameter (mm)	Weight (kg)
LPS 20401GP	Galvanized Steel	1	M8	0,500
LPS 2040125GP	Galvanized Steel	1.25	M8	0,970
LPS 20403010GP	Stainless Steel	30 X 10 (mm)	M6	0,020

INSULATING TYPE TUBE SUPPORT

Product Code	Material	Pole Diameter (Inch)	Mounting Hole Diameter (mm)	Weight (kg)
LPS 20301GI	Galvanized Steel	1	M8	0,130
LPS 2030125GI	Galvanized Steel	1.25	M8	0,150

Stainless steel supports available upon request.

POLE BASES

FLAT TYPE WALL BASE

Product Code	Material	Pole Diameter (Inch)	Mounting Hole Diameter (mm)	Weight (kg)
LPB 20602GF	Galvanized Steel	2	M10	0,470
LPB 206025GF	Galvanized Steel	2.5	M10	0,550
LPB 20603GF	Galvanized Steel	3	M10	0,570

BORDER TYPE BASE

Product Code	Material	Pole Diameter (Inch)	Mounting Hole Diameter (mm)	Weight (kg)
LPB 20602GB	Galvanized Steel	2	M10	3,410
LPB 206025GB	Galvanized Steel	2.5	M10	4,280
LPB 20603GB	Galvanized Steel	3	M10	7,000

MIDDLE TYPE BASE

Product Code	Material	Pole Diameter (Inch)	Mounting Hole Diameter (mm)	Weight (kg)
LPB 20602GM	Galvanized Steel	2	M10	4,400
LPB 206025GM	Galvanized Steel	2.5	M10	4,840
LPB 20603GM	Galvanized Steel	3	M10	7,560

PIVOTING TYPE BASE

Product Code	*Material*	*Pole Diameter (Inch)*	*Mounting Hole Diameter (mm)*	*Weight (kg)*
LPB 20602GP	Galvanized Steel	2	M12	14,000
LPB 206025GP	Galvanized Steel	2.5	M12	15,000
LPB 20603GP	Galvanized Steel	3	M12	16,000

- *Provides easy montage - lightning protection system can be installed in the horizontal position and uprighted easily.*
- *Provides easy maintenance - maintenance and tests can be done by tilting the lightning protection system without uninstallation.*

CORNER TYPE BASE

Product Code	*Material*	*Pole Diameter (Inch)*	*Mounting Hole Diameter (mm)*	*Weight (kg)*
LPB 20602GC	Galvanized Steel	2	M12	3,410
LPB 206025GC	Galvanized Steel	2.5	M12	4,280
LPB 20603GC	Galvanized Steel	3	M12	7,000

POLE STRETCHING COMPONENTS

PVC INSULATED STRETCH WIRE

Product Code	Material	Conductor Diameter (mm)	Weight (kg/m)
PSC 20806	Galvanized Steel	6	0,020

STRETCH WIRE VICE

Product Code	Material	Conductor Diameter (mm)	Weight (kg)
PSC 20818	Galvanized Steel	8	0,120

STRETCH WIRE CLAMP

Product Code	Material	Conductor Diameter (mm)	Weight (kg)
PSC 20828	Galvanized Steel	8	0,070

STRETCH WIRE CLIP

Product Code	Material	Pole Diameter (Inch)	Weight (kg)
PSC 20832	Galvanized Steel	2	0,840

POLE STRETCHING COMPONENTS

STRETCH WIRE FIXING BASE

Product Code	Material	Mounting Hole Diameter (mm)	Weight (kg)
PSC 20848	Galvanized Steel	M8	0,350

STRETCH WIRE PILE

Product Code	Material	Dimension (mm)	Weight (kg)
PSC 20854040	Galvanized Steel	40 x 40 x 1000	2,450

PVC INSULATED STRETCH WIRE

Product Code	Material	Diameter (mm)	Weight (kg/m)
PSC 20866	Hot Dip Galvanized	6	0,110
PSC 20868	Hot Dip Galvanized	8	0,150

AIR TERMINALS

SELF STANDING MAST

Product Code	*Material*	*Height (m)*	*Number of Base*	*Weight (kg)*
ATSM 210104	Body: Galvanized Base: Concrete	4	3	143
ATSM 210105		5	4	178
ATSM 210108		8	4	199

- *Wall thickness is 2". Different dimessions can be produced upon request.*
- *Produced to withstand the wind speed of 150 km/h that is used in lightning protection systems according to EN 62305 standard.*

THREE POINT AIR TERMINAL

Product Code	Material	Weight (kg)
ATMP 213C	Copper	0,310
ATMP 213B	Brass	0,290

- *It is mounted with a threaded copper or brass rod.*

FOUR POINT AIR TERMINAL

Product Code	Material	Weight (kg)
ATMP 214C	Copper	0,440
ATMP 214G	Aluminum	0,136

- *Rod of the multipoint air terminal is produced as threading to the standard air terminal rod and trimming upper body. Top of the rod is Ø 12*

COPPER AIR TERMINAL

Product Code	Material	Diameter - Length (mm)	Weight (kg)
AT 210166C	Copper	Ø 16 - 600	1,020
AT 210168C	Copper	Ø 16 - 800	1,380
AT 2101610C	Copper	Ø 16 - 1000	1,740
AT 210206C	Copper	Ø 20 - 600	1,590
AT 210208C	Copper	Ø 20 - 800	2,150
AT 2102010C	Copper	Ø 20 - 1000	2,710

BRASS AIR TERMINAL

Product Code	Material	Diameter - Length (mm)	Weight (kg)
AT 210166B	Brass	Ø 16 - 600	0,980
AT 210168B	Brass	Ø 16 - 800	1,270
AT 2101610B	Brass	Ø 16 - 1000	1,620
AT 210206B	Brass	Ø 20 - 600	1,550
AT 210208B	Brass	Ø 20 - 800	2,070
AT 2102010B	Brass	Ø 20-1000	2,590

- *Standard air terminal thread diameter is 3/8"- Ø16 mm*

AIR TERMINALS

STAINLESS STEEL AIR TERMINAL

Product Code	Material	Diameter - Length (mm)	Weight (kg)
AT 210166S	Stainless Steel	Ø 16 - 600	0,930
AT 210168S	Stainless Steel	Ø 16 - 800	1,250
AT 2101610S	Stainless Steel	Ø 16 - 1000	1,560
AT 210206S	Stainless Steel	Ø 20 - 600	1,485
AT 210208S	Stainless Steel	Ø 20 - 800	1,985
AT 2102010S	Stainless Steel	Ø 20 - 1000	2,480

ALUMINIUM AIR TERMINAL

Product Code	Material	Diameter - Length (mm)	Weight (kg)
AT 210166A	Aluminium	Ø 16 - 600	0,310
AT 210168A	Aluminium	Ø 16 - 800	0,420
AT 2101610A	Aluminium	Ø 16 - 1000	0,530
AT 210206A	Aluminium	Ø 20 - 600	0,480
AT 210208A	Aluminium	Ø 20 - 800	0,650
AT 2102010A	Aluminium	Ø 20 - 1000	0,820

GALVANIZED STEEL AIR TERMINAL

Product Code	Material	Coating Thickness (µm)	Diameter - Length (mm)	Weight (kg)
AT 210166G	Galvanized Steel	50	Ø 16 - 600	0,965
AT 210168G	Galvanized Steel	50	Ø 16 - 800	1,290
AT 2101610G	Galvanized Steel	50	Ø 16 - 1000	1,610
AT 210206G	Galvanized Steel	50	Ø 20 - 600	1,560
AT 210208G	Galvanized Steel	50	Ø 20 - 800	2,010
AT 2102010G	Galvanized Steel	50	Ø 20 - 1000	2,600

- *70 µm coating thickness available upon request.*
- *Standard air terminal thread diameter is 3/8"- Ø16 mm*

AIR TERMINAL BASES

ROUND TYPE FIXING BASE

Product Code	Material	Conductor (mm^2)	Mounting Hole Diameter (mm)	Weight (kg)
ATB 21150G	Galvanized Steel	50	M6	0,310
ATB 21150C	Copper	50	M6	0,280

ISOLATED TYPE FIXING BASE

Product Code	Material	Mounting Hole Diameter (mm)	Weight (kg)
ATB 2126PG	Plastic / Galvanized Steel	M6	1,200

CROSS TYPE FIXING BASE

Product Code	Material	Conductor (mm)	Bolt	Weight (kg)
ATB 2138B	Brass	Ø 8	M6	0,300

A TYPE FIXING BASES

Product Code	Material (Holder)	Material (Base)	Conductor (mm^2)	Mounting Hole Diameter (mm)	Weight (kg)
ATB 21450G	Galvanized Steel	Galvanized Steel	50	M6	0,270
ATB 21450C	Copper	Galvanized Steel	50	M6	0,340

AIR TERMINAL BASES

PIVOTING TYPE FIXING BASE

Product Code	Material (Base)	Material (Holder)	Conductor (mm^2)	Mounting Hole Diameter (mm)	Weight (kg)
ATB 21550G	Galvanized Steel	Copper	50	M6	0,340
ATB 21550C	Copper / Brass	Copper	50	M6	0,390

CONCRETE TYPE FIXING BASE

Product Code	Material	Height / Diameter (cm)	Weight (kg)
ATB 216925C	Concrete	9 / 25	11,000

ROUND TYPE FIXING BASE

Product Code	Material	Conductor (mm)	Bolt	Mounting Hole Diameter (mm)	Weight (kg)
ATB 21708B	Brass	Ø 8	M6	M6	0,480

ROUND TYPE FIXING BASE

Product Code	Material	Conductor (mm)	Bolt	Mounting Hole Diameter (mm)	Weight (kg)
ATB 21808A	Aluminium	Ø 8	M8	M6	0,160
ATB 21808B	Brass	Ø 8	M8	M6	0,460

FLAT TYPE FIXING BASE

Product Code	Material	Conductor	Mounting Hole Diameter (mm)	Weight (kg)
ATB 21925303B	Brass	25 x 3 - 30 x 3	M6	0,640
ATB 219253B	Bronze	25 x 3	M6	0,380

FLAT TYPE FIXING BASE

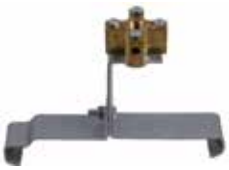
Product Code	Material (Base)	Material (Base Support)	Conductor	Bolt	Mounting Hole Diameter	Weight (kg)
ATB 220253303G	Galvanized Steel	Galvanized Steel	25 x 3 - 30 x 3	M8	M6	0,660
ATB 220253303C	Copper	Galvanized Steel	25 x 3 - 30 x 3	M8	M6	0,660
ATB 220253303T	Tinned Copper	Stainless Steel	25 x 3 - 30 x 3	M8	M6	0,654

POLE TYPE FIXING BASE

Product Code	Material	Thread Diameter (mm)	Pole Diameter (Inch)	Weight (kg)
ATB 22116S	Steel	M16	2	0,690

AIR TERMINAL BASES

TILE TYPE FIXING BASE



Product Code	Material	Support Length (cm)	Conductor Diameter (mm)	Weight (kg)
ATB 2222333	Brass / Galvanized Steel	23 - 33	8	0,870

RIDGE TYPE FIXING BASE

Product Code	Material	Conductor Size (mm)	Mounting Hole Diameter (mm)	Weight (kg)
ATB 22308	Brass / Galvanized Steel	Ø 8	M8	0,800
ATB 223303B	Bronze	30 x 3	M6	0,920
ATB 223303A	Aluminium	30 x 3	M6	0,150

WALL TYPE FIXING BASE

Product Code	Material	Thread Diameter (mm)	Mounting Hole Diameter (mm)	Weight (kg)
ATB 22416S	Steel	M16	16	0,380

SIDE MOUNTED ROD BRACKETS

Product Code	Material	Thread Diameter (mm)	Mounting Hole Diameter (mm)	Weight (kg)
ATB 22516B	Bronze	M16	M6	0,410
ATB 22516A	Aluminum	M16	M6	0,130

ROD TO CONDUCTOR COUPLING

Product Code	Material	Thread Diameter (mm)	Conductor Size (mm)	Weight (kg)
ATB 226253B	Bronze	M16	25 x 3	0,135
ATB 226253A	Aluminum	M16	25 x 3	0,045
ATB 22608B	Bronze	M16	Ø 8	0,150

PROTART

DOWN CONDUCTOR ACCESSORIES

CONDUCTOR FIXING CLAMPS

POLE CLAMP

Product Code	Material (Holder)	Material (Support)	Pole Diameter - Conductor (inch - mm / mm^2)	Weight (kg)
CFP 2250C	Copper	Galvanized Steel	2,00 - 2 x 50	0,160
CFP 25250C	Copper	Galvanized Steel	2,50 - 2 x 50	0,170
CFP 3250C	Copper	Galvanized Steel	3,00 - 2 x 50	0,180
CFP 2253C	Copper	Galvanized Steel	2,00 - 25 x 3	0,160
CFP 2303C	Copper	Galvanized Steel	2,00 - 30 x 3	0,170
CFP 25253C	Copper	Galvanized Steel	2,50 - 25 x 3	0,180
CFP 25303C	Copper	Galvanized Steel	2,50 - 30 x 3	0,300
CFP 3253C	Copper	Galvanized Steel	3,00 - 25 x 3	0,210
CFP 2250P	Plastic	Plastic	2,00 - 2 x 50	0,100
CFP 2525P	Plastic	Plastic	2,50 - 2 x 50	0,110
CFP 2150G	Galvanized Steel	Galvanized Steel	2,00 - 1 x 50	0,160
CFP 2170G	Galvanized Steel	Galvanized Steel	2,00 - 1 x 70	0,160
CFP 2195G	Galvanized Steel	Galvanized Steel	2,00 - 1 x 95	0,160
CFP 2250G	Galvanized Steel	Galvanized Steel	2,00 - 2 x 50	0,160
CFP 2525G	Galvanized Steel	Galvanized Steel	2,50 - 2 x 50	0,190
CFP 2303G	Galvanized Steel	Galvanized Steel	2,00 - 30 x 3	0,160
CFP 2150S	Stainless Steel	Stainless Steel	2,00 - 1 x 50	0,160
CFP 2170S	Stainless Steel	Stainless Steel	2,00 - 1 x 70	0,160
CFP 2195S	Stainless Steel	Stainless Steel	2,00 - 1 x 95	0,160
CFP 2250S	Stainless Steel	Stainless Steel	2,00 - 2 x 50	0,160
CFP 2525S	Stainless Steel	Stainless Steel	2,50 - 2 x 50	0,190
CFP 2303S	Stainless Steel	Stainless Steel	2,00 - 30 x 3	0,160

TILE CLAMP

Product Code	Material (Holder)	Material (Support)	Support Length (cm)	Conductor Size (mm / mm^2)	Weight (kg)
CFT 2333150C	Copper	Galvanized Steel	23 - 33	1 x 50	0,170
CFT 2333250C	Copper	Galvanized Steel	23 - 33	2 x 50	0,170
CFT 2333253C	Copper	Galvanized Steel	23 - 33	25 x 3	0,170
CFT 2333303C	Copper	Galvanized Steel	23 - 33	30 x 3	0,170
CFT 2333150G	Galvanized Steel	Galvanized Steel	23 - 33	1 x 50	0,170
CFT 2333250G	Galvanized Steel	Galvanized Steel	23 - 33	2 x 50	0,170
CFT 2333253G	Galvanized Steel	Galvanized Steel	23 - 33	25 x 3	0,170
CFT 2333303G	Galvanized Steel	Galvanized Steel	23 - 33	30 x 3	0,170

Dimensions of tile must be given before order.

CONDUCTOR FIXING CLAMPS

RIDGE CLAMP

Product Code	Material (Holder)	Material (Support)	Conductor Size (mm / mm²)	Weight (kg)
CFR 150C	Copper	Galvanized Steel	1 x 50	0,220
CFR 250C	Copper	Galvanized Steel	2 x 50	0,220
CFR 253C	Copper	Galvanized Steel	25 x 3	0,220
CFR 303C	Copper	Galvanized Steel	30 x 3	0,220
CFR 150G	Galvanized Steel	Galvanized Steel	1 x 50	0,210
CFR 250G	Galvanized Steel	Galvanized Steel	2 x 50	0,220
CFR 253G	Galvanized Steel	Galvanized Steel	25 x 3	0,220
CFR 303G	Galvanized Steel	Galvanized Steel	30 x 3	0,220

ISOLATED GROUND CLAMP

Product Code	Material	Conductor Size (mm²)	EmplyWeight (kg)	Concrete Filled Weight (kg)
CFI 150P	Plastic	1 x 50	0,08	0,078

Concrete filled upon request.

ISOLATED GROUND CLAMP COMPONENT

Product Code	Material	Conductor Size (mm / mm²)	Weight (kg)
CFIC 250P	Plastic	2 x 50	0,010
CFIC 253P	Plastic	25 x 3	0,007
CFIC 303P	Plastic	30 x 3	0,008
CFIC 404P	Plastic	40 x 4	0,010
CFIC 170P	Plastic	1 x 70	0,010

ADHESIVE

Product Code	Material	Heat Resistance	Weight (kg)
CFIA 200	Chemical Paste	- 40˚C - +90˚C	0,500

CONDUCTOR FIXING CLAMPS

FLAT CONDUCTOR CLAMP

Product Code	Material	Conductor Size (mm)	Mounting Hole Diameter (mm)	Weight (kg)
CFF 253C	Copper	25 x 3	M6	0,010
CFF 303C	Copper	30 x 3	M6	0,020
CFF 403C	Copper	40 x 3	M6	0,030
CFF 303G	Galvanized Steel	30 x 3	M6	0,010
CFF 404G	Galvanized Steel	40 x 4	M6	0,030
CFF 253B	Brass	25 x 3	M6	0,010
CFF 303B	Brass	30 x 3	M6	0,020

CONDUCTOR CLAMP

Product Code	Material	Conductor Size (mm / mm^2)	Mounting Hole Diameter (mm)	Weight (kg)
CFD 253-2	Brass	25 x 3	M6	0,095
CFD 303-2	Brass	30 x 3	M6	0,100
CFD 506-2	Brass	50 x 6	M6	0,135
CFD 50-2	Brass	50	M6	0,095
CFD 70-2	Brass	70	M6	0,100
CFD 95-2	Brass	95	M6	0,105

DC WALL CLAMP

Product Code	Material	Conductor Size (mm / mm^2)	Mounting Hole Diameter (mm)	Weight (kg)
CFD 253303-1	Bronze	25 x 3 - 30 x 3	M6	0,060
CFD 253303-A	Aluminium	25 x 3 - 30 x 3	M6	0,020

CONDUCTOR FIXING CLAMPS

PLASTIC WALL CLAMP

Product Code	Material	Conductor Size (mm)	Height (mm)	Mounting Hole Diameter (mm)	Weight (kg)
CFW 253303P	PVC	25 x 3 - 30 x 3	10	M6	0,030
CFW 810P	PVC	Ø 8 -10	20	M8	0,020
CFW 810P	PVC	Ø 8 -10	30	M8	0,023
CFW 810P	PVC	Ø 8 -10	55	M8	0,028

STICKY PAD

Product Code	Material	Stem Diameter (mm)	Mounting Hole Diameter (mm)	Weight (kg)
CFW 201	PVC	M8	M6	0,005

SNAIL CLIP

Product Code	Material	Conductor Size (mm^2)	Mounting Hole Diameter (mm)	Weight (kg)
CFS 116C	Copper	1 x 16	M6	0,006
CFS 125C	Copper	1 x 25	M6	0,007
CFS 135C	Copper	1 x 35	M6	0,008
CFS 150C	Copper	1 x 50	M6	0,009
CFS 170C	Copper	1 x 70	M6	0,010
CFS 195C	Copper	1 x 95	M6	0,010
CFS 1120C	Copper	1 x 120	M6	0,010
CFS 150G	Galvanized Steel	1 x 50	M6	0,008
CFS 170G	Galvanized Steel	1 x 70	M6	0,009
CFS 195G	Galvanized Steel	1 x 95	M6	0,010

ONE HOLE CLIP

Product Code	Material	Conductor Size (mm^2)	Mounting Hole Diameter (mm)	Weight (kg)
CFO 170G	Galvanized Steel	1 x 70	M6	0,020
CFO 195G	Galvanized Steel	1 x 95	M6	0,020
CFO 1120G	Galvanized Steel	1 x 120	M6	0,025
CFO 170C	Copper	1 x 70	M6	0,020
CFO 195C	Copper	1 x 95	M6	0,020
CFO 1120C	Copper	1 x 120	M6	0,025

CONDUCTOR FIXING CLAMPS

L TYPE CLAMP

Product Code	Material	Conductor (mm)	Mounting Hole Diameter (mm)	Weight (kg)
CFL 203C	Copper	20 x 3	M6	0,100
CFL 253C	Copper	25 x 3	M6	0,100
CFL 303C	Copper	30 x 3	M6	0,110
CFL 303G	Galvanized Steel	30 x 3	M6	0,100
CFL 404G	Galvanized Steel	40 x 4	M6	0,110
CFL 405G	Galvanized Steel	40 x 5	M6	0,120

U TYPE CLAMP

Product Code	Material	Conductor Size (mm / mm²)	Mounting Hole Diameter (mm)	Weight (kg)
CFU 135C	Copper	1 x 35	M6	0,060
CFU 150C	Copper	1 x 50	M6	0,060
CFU 170C	Copper	1 x 70	M6	0,060
CFU 195C	Copper	1 x 95	M6	0,070
CFU 1120C	Copper	1 x 120	M6	0,070
CFU 235C	Copper	2 x 35	M6	0,060
CFU 250C	Copper	2 x 50	M6	0,060
CFU 270C	Copper	2 x 70	M6	0,070
CFU 253C	Copper	25 x 3	M6	0,050
CFU 303C	Copper	30 x 3	M6	0,050
CFU 305C	Copper	30 x 5	M6	0,050
CFU 404C	Copper	40 x 4	M6	0,080
CFU 150G	Galvanized Steel	1 x 50	M6	0,050
CFU 170G	Galvanized Steel	1 x 70	M6	0,050
CFU 195G	Galvanized Steel	1 x 95	M6	0,060
CFU 235G	Galvanized Steel	2 x 35	M6	0,050
CFU 250G	Galvanized Steel	2 x 50	M6	0,060
CFU 270G	Galvanized Steel	2 x 70	M6	0,060
CFU 253G	Galvanized Steel	25 x 3	M6	0,050
CFU 303G	Galvanized Steel	30 x 3	M6	0,050
CFU 404G	Galvanized Steel	40 x 4	M6	0,070

CONDUCTOR FIXING CLAMPS

STEEL SCREWED CLAMP

Product Code	Material	Conductor Size (mm / mm²)	Fixing Plug Diameter (mm)	Weight (kg)
CFSS 203C	Copper	20 x 3	8	0,090
CFSS 253C	Copper	25 x 3	8	0,100
CFSS 303C	Copper	30 x 3	8	0,110
CFSS 405C	Copper	40 x 5	8	0,130
CFSS 135C	Copper	1 x 35	8	0,050
CFSS 150 6-10	Copper (6-10 cm)	1 x 50	8	0,050
CFSS 150C 12-15	Copper (12-15cm)	1 x 50	8	0,070
CFSS 170C	Copper	1 x 70	8	0,060
CFSS 195C	Copper	1 x 95	8	0,060
CFSS 1120C	Copper	1 x 120	8	0,070
CFSS 250C 6-10	Copper (6-10 cm)	2 x 50	8	0,080
CFSS 250C 12-15	Copper (12-15cm)	2 x 50	8	0,110
CFSS 150G	Galvanized Steel	1 x 50	8	0,050
CFSS 170G	Galvanized Steel	1 x 70	8	0,050
CFSS 250G	Galvanized Steel	2 x 50	8	0,070
CFSS 270G	Galvanized Steel	2 x 70	8	0,090
CFSS 303G	Galvanized Steel	30 x 3	8	0,080
CFSS 404G	Galvanized Steel	40 x 4	8	0,120
CFSS 505G	Galvanized Steel	50 x 5	8	0,140

Standard screw size is 10 cm.

BRASS SCREWED CLAMP

Product Code	Material	Conductor Size (mm / mm²)	Fixing Plug Diameter (mm)	Weight (kg)
CFSB 203C	Copper	20 x 3	8	0,080
CFSB 253C	Copper	25 x 3	8	0,080
CFSB 303C	Copper	30 x 3	8	0,090
CFSB 150C	Copper	1 x 50	8	0,080
CFSB 170C	Copper	1 x 70	8	0,080
CFSB 195C	Copper	1 x 95	8	0,090
CFSB 1120C	Copper	1 x 120	8	0,090
CFSB 250C	Copper	2 x 50	8	0,090

CONDUCTOR FIXING CLAMPS

Z TYPE CLAMP

Product Code	Material (Holder)	Material (Support)	Conductor Size (mm^2)	Mounting Hole Diameter (mm)	Weight (kg)
CFZ 150C	Copper	Galvanized Steel	1 x 50	M6	0,080
CFZ 250C	Copper	Galvanized Steel	2 x 50	M6	0,100
CFZ 150G	Galvanized Steel	Galvanized Steel	1 x 50	M6	0,080
CFZ 250G	Galvanized Steel	Galvanized Steel	2 x 50	M6	0,100

PYLON TYPE CLAMP

Product Code	Material (Holder)	Material (Support)	Conductor Size (mm / mm^2)	Weight (kg)
CFPY 150C	Copper	Galvanized Steel	1 x 50	0,170
CFPY 195C	Copper	Galvanized Steel	1 x 95	0,170
CFPY 250C	Copper	Galvanized Steel	2 x 50	0,190
CFPY 253C	Copper	Galvanized Steel	25 x 3	0,210
CFPY 303C	Copper	Galvanized Steel	30 x 3	0,210
CFPY 150G	Galvanized Steel	Galvanized Steel	1 x 50	0,170
CFPY 170G	Galvanized Steel	Galvanized Steel	1 x 70	0,170
CFPY 250G	Galvanized Steel	Galvanized Steel	2 x 50	0,180
CFPY 270G	Galvanized Steel	Galvanized Steel	2 x 70	0,190
CFPY 303G	Galvanized Steel	Galvanized Steel	30 x 3	0,210
CFPY 404G	Galvanized Steel	Galvanized Steel	40 x 4	0,220

ISOLATED CLAMP

Product Code	Material	Conductor Size (mm^2)	Mounting Hole Diameter (mm)	Weight (kg)
CFIS 250C	Copper	2 x 50	M6	0,150
CFIS 250G	Galvanized Steel	2 x 50	M6	0,150

TEST CLAMP WITH PLASTIC BOX

Product Code	Material	Conductor Size (mm / mm²)	Weight (kg)
DCTC 250C	Copper	2 x 50	0,380
DCTC 203C	Copper	20 x 3	0,280
DCTC 253C	Copper	25 x 3	0,280
DCTC 303C	Copper	30 x 3	0,280
DCTC P35C	Copper	PROCON 35	0,280
DCTC 253250C	Copper	25 x 3 / 2 x 50	0,350
DCTC 250A	Aluminium	2 x 50	0,280
DCTC 303A	Aluminium	30 x 3	0,240
DCTC 250G	Galvanized Steel	2 x 50	0,370
DCTC 303G	Galvanized Steel	30 x 3	0,260

TEST CLAMP

Product Code	Material	Conductor Size (mm / mm²)	Weight (kg)
DCTC 150 R	Brass	1 x 50	0,150
DCTC 303 F	Bronze	30 x 3	0,230

DISCONNECTING LINK

Product Code	Material	Sizes (mm)	Weight (kg)
DCOL 32305	Copper	30 x 5 x 100	0,240

PROTART

DOWN CONDUCTORS AND GROUNDING CABLES

Foundation Grounding

Foundation grounding is one of the most important grounding methods known ever. Foundation grounding of buildings must be started at the beginning of construction (at foundation stage). This is performed by laying a galvanized conductor between reinforcing bars. This conductor is connected to reinforcing bars at certain distances. The ends of this conductor are taken out from some specified points and left as the "connection bud". Once these buds are connected to the equipotential grounding busbars, the grounding is completed by connecting all systems to be grounded to these buses. Foundation grounding (embedded conductor) must be designed in the form of a closed ring, and placed in the foundation of the external walls of the building, or the foundation platform. Connection must be established with reinforcing bars every few meters..

Measurement of Ground Resistivity

In order to measure the ground resistivity to predetermine the ground dispersion resistance or grounding impedance, the "Four Probe Method" (e.g. Wenner Method), which enables determination of this resistance for various depths, must be used. Regulation Annex-N 2.2.1 can be referred to for the distances between probes. Special devices have been designed to implement this method.

Equipotential Grounding

The safest system in grounding is the equipotential system. In this system all groundings and metal sections are connected to each other by means of equipotential busbars. The voltage difference that might occur at any two points in the installation is prevented, and equipotential is provided at all points. While connecting the lightning protection system with the equipotential system it is required to take precautions against overvoltages that might occur. For this purpose, an "internal lightning conductor" (overvoltage impact protection) must be included in this system. Otherwise, electric-electronic systems and equipment are at huge risk. While connecting different grounding to each other, the connection must be established through the potential equalizers.

Earth Conductivity Material (PRO-Earth)

Ions enable electrical flow in the ground. The grounding system and its surroundings must be able to regulate rapid ion flow. If the movement of ions in the ground is low, the resistance will be high and the current will not flow easily. In an ideal grounding system, grounding resistance must be as low as possible in order for the electrical current to easily flow through the ground. However, it is not always possible to reach the desired grounding resistance. Earth Conductivity Material (Pro-Earth) is a material that increases conductivity, and serves to reduce the grounding resistance in all types of ground (rocky, sandy). It is the ideal material for ground with weak conductivity.

Pro-Earth

Maintains the resistance obtained throughout the life of the system.
Doesn't dissolve or decompose over time.
No need for periodical checks.
Only one person is needed to prepare and apply it.
Doesn't have a harmful effect on the ground or pollute underground water.

Advantages of PRO-Earth Compared to Coal and Salt

When two different metals are side by side, a potential difference occurs between them due to the difference of ion numbers between metals. This difference causes the metals to act like a battery and ion flow to form. This is called "galvanic corrosion". Due to the electrochemical potential between coal and copper, coal gains copper's ions. The number of ions decreases over time in the copper, and this causes the copper to lose its characteristics. The electrolyte formed when salt combines with water leads to corrosion in the copper and decomposes it. The amount of salt contained in the underground water is decreased and wastes away over time.

Grounding Electrode

The grounding electrode shall have the following properties. One or several of vertical, horizontal or mesh type copper grounding electrodes shall be used. If the vertical grounding electrode is to be used, the distance between grounding electrodes shall be at least two times of the electrode length. In case of failure to provide the necessary transient grounding resistance, the required resistance value shall be achieved by using additional electrodes and grounding resistance enhancement materials. The upper end of conductors and electrodes shall be installed such that they remain at least 50 cm below ground.

EARTHING & DOWN CONDUCTORS

MONO COPPER CONDUCTOR

Product Code	Material	Conductor Size (mm^2)	Weight (kg/m)
DC 40104C	Copper	4	0,036
DC 40106C	Copper	6	0,054
DC 40110C	Copper	10	0,089
DC 40116C	Copper	16	0,143
DC 40125C	Copper	25	0,223
DC 40135C	Copper	35	0,312
DC 40150C	Copper	50	0,446
DC 40170C	Copper	70	0,624

STRANDED COPPER CONDUCTOR

Product Code	Material	Conductor Size (mm^2)	Number Of Wires	One Wire Diameter	Weight (kg/m)
DC 40210C	Copper	10	7	1,32	0,087
DC 40216C	Copper	16	7	1,70	0,144
DC 40225C	Copper	25	7	2,12	0,224
DC 40235C	Copper	35	7	2,50	0,311
DC 40250C	Copper	50	7	3,00	0,448
DC 40270C	Copper	70	19	2,12	0,611
DC 40295C	Copper	95	19	2,50	0,849
DC 402120C	Copper	120	19	2,80	1,065
DC 402150C	Copper	150	37	2,24	1,297
DC 402185C	Copper	185	37	2,50	1,616
DC 402240C	Copper	240	61	2,24	2,138
DC 402300C	Copper	300	61	2,50	2,715

CCA CONDUCTOR

Product Code	Material	Coating Thickness (µm)	Conductor Size (mm^2)	Weight (kg/m)
DC 401050CCA	Copper Clad Aluminum	150	50	0,160

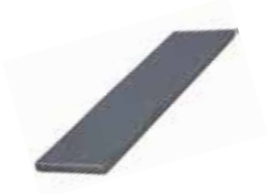
EARTHING & DOWN CONDUCTORS

COPPER TAPE CONDUCTOR

Product Code	Material	Conductor Size (mm)	Weight (kg/m)
DC 403202C	Copper	20 x 2	0,357
DC 403203C	Copper	20 x 3	0,535
DC 403205C	Copper	20 x 5	0,892
DC 403253C	Copper	25 x 3	0,669
DC 403255C	Copper	25 x 5	1,115
DC 403302C	Copper	30 x 2	0,535
DC 403303C	Copper	30 x 3	0,803
DC 403305C	Copper	30 x 5	1,338
DC 4033010C	Copper	30 x 10	2,676
DC 403403C	Copper	40 x 3	1,070
DC 403404C	Copper	40 x 4	1,427
DC 403405C	Copper	40 x 5	1,784
DC 4034010C	Copper	40 x 10	3,568
DC 403505C	Copper	50 x 5	2,230
DC 403506C	Copper	50 x 6	2,676
DC 4035010C	Copper	50 x 10	4,460
DC 403605C	Copper	60 x 5	2,676
DC 4036010C	Copper	60 x 10	5,352
DC 403805C	Copper	80 x 5	3,568
DC 4038010C	Copper	80 x 10	7,136
DC 40310010C	Copper	100 x 10	8,920
DC 40310020C	Copper	100 x 20	17,840

Tın plated copper available upon request.

GALVANIZED STEEL TAPE CONDUCTOR (HOT DIPPED)



Product Code	Material	Coating Thickness (µm)	Conductor Size (mm)	Weight (kg/m)
DC 403303G	Galvanized Steel	50	30 x 3	0,740
DC 403403G	Galvanized Steel	50	40 x 3	0,960
DC 403404G	Galvanized Steel	50	40 x 4	1,300
DC 4033035G	Galvanized Steel	50	30 x 3,5	0,850
DC 403505G	Galvanized Steel	50	50 x 5	2,000

70 µm coating thickness available upon request.

EARTHING & DOWN CONDUCTORS

PVC COVERED COPPER TAPE

Product Code	Colour	Conductor Size (mm)	Coil Length (m)	Weight (kg/m)
DC 404253B	Black	25 x 3	10 / 15	0,770
DC 404253YG	Yellow/Green	25 x 3	10 / 15	0,770
DC 404303B	Black	30 x 3	10 / 15	0,900

MONO ALUMINIUM CONDUCTOR

Product Code	Material	Conductor Size (mm)	Weight (kg/m)
DC 40108A	Aluminium	Ø 8	0,140
DC 40110A	Aluminium	Ø 10	0,200

MONO GALVANIZED STEEL CONDUCTOR

Product Code	Material	Coating Thickness (µm)	Conductor Size (mm)	Weight (kg/m)
DC 40108G	Galvanized Steel	50	Ø 8	0,420
DC 40110G	Galvanized Steel	50	Ø 10	0,640

70 µm coating thickness available upon request.

STRANDED GALVANIZED STEEL CONDUCTOR

Product Code	Material	Coating Thickness (µm)	Conductor Size (mm)	Weight (kg/m)
DC 40270G	Galvanized Steel	50	70	0,520
DC 40295G	Galvanized Steel	50	95	0,760

70 µm coating thickness available upon request.

EARTHING & DOWN CONDUCTORS

NYAF (H07V-K) CONDUCTOR

Product Code	Material	Conductor Size (mm^2)	Weight (kg/m)
DC 40410NYAF	Copper	10	0,110
DC 40416NYAF	Copper	16	0,170
DC 40425NYAF	Copper	25	0,260
DC 40435NYAF	Copper	35	0,350
DC 40450NYAF	Copper	50	0,500
DC 40470NYAF	Copper	70	0,690
DC 40495NYAF	Copper	95	0,920
DC404120NYAF	Copper	120	1,170
DC 404150NYAF	Copper	150	1,460
DC 404185NYAF	Copper	185	1,790

NYA (H07V-R) CONDUCTOR

Product Code	Material	Conductor Size (mm^2)	Weight (kg/m)
DC 40401NYA	Copper	1	0,010
DC 404015NYA	Copper	1,5	0,020
DC 404025NYA	Copper	2,5	0,030
DC 40404NYA	Copper	4	0,040
DC 40406NYA	Copper	6	0,070
DC 404010NYA	Copper	10	0,110
DC 404016NYA	Copper	16	0,160
DC 404025NYA	Copper	25	0,260
DC 404035NYA	Copper	35	0,350
DC 404050NYA	Copper	50	0,480
DC 404070NYA	Copper	70	0,670
DC 404095NYA	Copper	95	0,930
DC 4040120NYA	Copper	120	1,160
DC 4040150NYA	Copper	150	1,430

NYY (YVV) CONDUCTOR

Product Code	Material	Conductor Size (mm²)	Weight (kg/m)
DC 404116NYY	Copper	1 x 16	0,220
DC 404125NYY	Copper	1 x 25	0,320
DC 404135NYY	Copper	1 x 35	0,420
DC 404150NYY	Copper	1 x 50	0,560
DC 404170NYY	Copper	1 x 70	0,770
DC 404195NYY	Copper	1 x 95	1,060
DC 4041120NYY	Copper	1 x 120	1,290
DC 4041150NYY	Copper	1 x 150	1,590
DC 4041240NYY	Copper	1 x 240	2,570
DC 404215NYY	Copper	2 x 1.5	0,190
DC 404225NYY	Copper	2 x 2.5	0,230
DC 40424NYY	Copper	2 x 4	0,310
DC 40426NYY	Copper	2 x 6	0,370
DC 404325NYY	Copper	3 x 2.5	0,270
DC 404415NYY	Copper	4 x 1.5	0,250
DC 404315NYY	Copper	3 x 1.5	0,230

CABLE TIE

Product Code	Material	Size (mm)	Weight (kg)
DC 405135	Plastic	135 x 2,5	0,010
DC 405150	Plastic	150 x 3,5	0,010
DC 405280	Plastic	280 x 3,5	0,012
DC 405430	Plastic	430 x 4,5	0,015
DC 405360	Plastic	360 x 4,5	0,015

Inox tie is available upon request.

ISOLATED DOWN *CONDUCTOR* SYSTEMS

PROTART ISOLATED LIGHTNING DOWN CONDUCTOR

Product Code	*Material*	*Conductor Type*	*Conductor Size (mm²)*	*Weight (kg/m)*
PROCON-50	Copper	Round	50	0,810

LIGHTNING ROD CONNECTION LUG

Product Code	*Material*	*Conductor Type*	*Weight (kg)*
PROCON-50CL	Tinned Copper	Procon 50	0,020

POLE CLAMP

Product Code	*Material (Holder)*	*Material (Support)*	*Conductor Type*	*Pole Diameter (inch)*	*Weight (kg)*
PROCON-50PCG	Plastic	Galvanized Steel	Procon 50	2,00	0,170
PROCON-50PCS	Plastic	Stainless Steel	Procon 50	2,00	0,170

SCREWED TYPE CLAMP

Product Code	*Material (Holder)*	*Material (Screw)*	*Conductor Type*	*Weight (kg)*
PROCON-50SCG	Plastic	Galvanized Steel	Procon 50	0,080
PROCON-50SCS	Plastic	Stainless Steel	Procon 50	0,080

ISOLATED DOWN *CONDUCTOR* SYSTEMS

TRAPEZ TYPE CLAMP

Product Code	*Material (Holder)*	*Material (Support)*	*Conductor Type*	*Weight (kg)*
PROCON-50TCG	Plastic	Galvanized Steel	Procon 50	0,080
PROCON-50TCS	Plastic	Stainless Steel	Procon 50	0,080

Z TYPE CLAMP

Product Code	*Material (Holder)*	*Material (Support)*	*Conductor Type*	*Weight (kg)*
PROCON-50ZCG	Plastic	Galvanized Steel	Procon 50	0,080
PROCON-50ZCS	Plastic	Stainless Steel	Procon 50	0,080

COUPLING

Product Code	*Material*	*Conductor Type*	*Weight (kg)*
PROCON-50CG	Galvanized Steel	Procon 50	0,150
PROCON-50CS	Stainless Steel	Procon 50	0,150

ECO TYPE WALL CLAMP

Product Code	*Material*	*Conductor Type*	*Weight (kg)*
PROCON-50EWC 1	PVC	Procon 50	0,007
PROCON-50EWC 2	PVC	Procon 50	0,030

EARTH POINTS

EARTHING POINT (SINGLE HOLE)

Product Code	Material	Shank Diameter-Length	Screw Sizes (mm)	Weight (kg)
EPT 4212B	Brass	Ø 12 - 44,13 mm	M8 x 15	0,260

EARTHING POINT (DOUBLE HOLE)

Product Code	Material	Shank Diameter-Length	Screw Sizes (mm)	Weight (kg)
EPT 4312B	Brass	Ø 12 - 80,02 mm	M8 x 15	0,360

EARTHING POINT (FOUR HOLE)

Product Code	Material	Shank Diameter-Length	Screw Sizes (mm)	Weight (kg)
EPT 4416B	Brass	Ø 16 - 29,71 mm	M8 x 15	0,450

EARTH BOSS

Product Code	Material	Shank Diameter-Length	Size (mm)	Weight (kg)
EPT 4516G	Galvanized Steel	M16 - 39,07 mm	50 x 50	0,770
EPT 4516S	Stainless Steel	M16 - 39,07 mm	50 x 50	0,780

EARTHING POINT WITH TAPE CONNECTOR

Product Code	Material	Shank Diameter-Length	Screw Sizes (mm)	Weight (kg)
EPT 4608B	Brass	Ø 8 - 80,00 mm	M8 x 15	0,390

EARTHING POINT WITH TAPE CONNECTOR (CABLE WELDED)

Product Code	Material	Shank Diameter-Length	Screw Sizes (mm)	Cable Diameter-Length (mm-mm^2)	Weight (kg)
EPT 4712B	Brass	Ø 12 - 79,06 mm	M8 x 15	500-70	0,760

EARTHING POINT BOX

Product Code	Material	Shank Diameter-Length	Weight (kg)
EPT 4816B	Brass	Ø 16 - 42,00 mm	0,660

EARTHING TERMINAL

Product Code	Material	Stud Diameter	Length (mm)	Weight (kg)
EPT 4910S	304 Stainless Steel	Ø 10	200	0,290

Cable lug hole is M10

CONCRETE WALL FLANGES

Product Code	Material	Stud Diameter	Length (mm)	Weight (kg)
EPT 5010S	304 Stainless Steel	Ø 10	750	0,810

CONDUCTOR CONNECTION ELEMENTS

FLEXIBLE STRANDED COPPER CONDUCTOR

Product Code	Material	Cross Section (mm^2)	Length (mm)	Weight (kg/m)
FGC 6500S	Copper	6	500	0,540
FGC 10500S	Copper	10	500	0,090
FGC 16500S	Copper	16	500	0,140
FGC 25500S	Copper	25	500	0,220
FGC 35500S	Copper	35	500	0,310
FGC 50500S	Copper	50	500	0,450
FGC 95500S	Copper	95	500	0,850

FLEXIBLE TAPE COPPER CONDUCTOR

Product Code	Material	Cross Section (mm^2)	Length (mm)	Weight (kg/m)
FGC 305500T	Copper	30 x 5	500	0,670
FGC 203500T	Copper	20 x 3	500	0,270
FGC 253500T	Copper	25 x 3	500	0,340
FGC 303500T	Copper	30 x 3	500	0,400
FGC 255500T	Copper	25 x 5	500	0,560

DILATATION CLAMP

Product Code	Material	Dimensions (mm)	Weight (kg)
CCD 303300G	Galvanized Steel	30 x 3 x 300	0,250
CCD 404300G	Galvanized Steel	40 x 4 x 300	0,460
CCD 303300C	Copper	30 x 3 x 300	0,260

- *Tinned copper available upon request.*
- *Other sizes and hole diameters available upon request.*

SQUARE CLAMP (TAPE TO TAPE)

Product Code	Material	Conductor Size (mm - mm)	Weight (kg)
SC 50253-2	Brass	25 x 3 - 25 x 3	0,950
SC 50303-2	Brass	30 x 3 - 30 x 3	0,155

SQUARE CLAMP (ROUND TO ROUND)

Product Code	Material	Conductor Size (mm^2 - mm^2)	Weight (kg)
SC 515050-2	Brass	50 - 50	0,145
SC 517070-2	Brass	70 - 70	0,150
SC 519595-2	Brass	95 - 95	0,160

SQUARE CLAMP (TAPE TO ROUND)

Product Code	Material	Conductor Size (mm - mm^2)	Weight (kg)
SC 5225350-2	Brass	25 x 3 - 50	0,225
SC 5225370-2	Brass	25 x 3 - 70	0,250
SC 5225395-2	Brass	25 x 3 - 95	0,300

CONDUCTOR CONNECTION ELEMENTS

SQUARE CONNECTOR (TAPE TO ROUND)

Product Code	Material	Conductor Size (mm - mm²)	Dimensions (mm) A	- B	Weight (kg)
SC 151550C	Copper	15 x 1,5 – 50	6	5	0,210
SC 151570C	Copper	15 x 1,5 – 70	6	5	0,210
SC 25325C	Copper	25 x 3 – 25	7	6	0,210
SC 25335C	Copper	25 x 3 – 35	7	6	0,210
SC 25350C	Copper	25 x 3 – 50	7	6	0,210
SC 25370C	Copper	25 x 3 – 70	7	6	0,210
SC 25395C	Copper	25 x 3 – 95	7	6	0,210
SC 253120C	Copper	25 x 3 – 120	7	6	0,220
SC 30250C	Copper	30 x 2 – 50	7	6	0,210
SC 30350C	Copper	30 x 3 – 50	7	6	0,210
SC 30370C	Copper	30 x 3 – 70	7	6	0,210
SC 30395C	Copper	30 x 3 – 95	7	6	0,220
SC 303120C	Copper	30 x 3 – 120	7	6	0,220
SC 40570C	Copper	40 x 5 - 70	8	8	0,390
SC 40595C	Copper	40 x 5 - 95	8	8	0,400
SC 405120C	Copper	40 x 5 - 120	8	8	0,400
SC 50570C	Copper	50 x 5 – 70	9	9	0,420
SC 50595C	Copper	50 x 5 – 95	9	9	0,420
SC 505120C	Copper	50 x 5 – 120	9	9	0,480
SC 50670C	Copper	50 x 6 – 70	9	9	0,420
SC 50695C	Copper	50 x 6 – 95	9	9	0,420
SC 506120C	Copper	50 x 6 – 120	9	9	0,460
SC 30350G	Galvanized Steel	30 x 3 – 50	7	6	0,190
SC 30370G	Galvanized Steel	30 x 3 – 70	7	6	0,190
SC 30395G	Galvanized Steel	30 x 3 – 95	7	6	0,190
SC 40450G	Galvanized Steel	40 x 4 – 50	8	8	0,360
SC 40470G	Galvanized Steel	40 x 4 – 70	8	8	0,360
SC 40495G	Galvanized Steel	40 x 4 - 95	8	8	0,360
SC 50550G	Galvanized Steel	50 x 5 - 50	9	8	0,430
SC 50570G	Galvanized Steel	50 x 5 – 70	9	8	0,450
SC 50595G	Galvanized Steel	50 x 5 – 95	9	8	0,480

SQUARE CONNECTOR (TAPE TO RE-BAR)

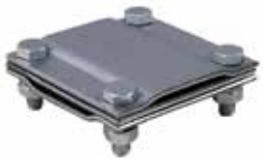
Product Code	Material	Conductor Size (mm - mm²)	Dimensions (mm) A	B	Weight (kg)
SC 30308G	Galvanized Steel	30 x 3 – Ø 8	7	6	0,200
SC 303010G	Galvanized Steel	30 x 3 – Ø 10	7	6	0,200
SC 303012G	Galvanized Steel	30 x 3 – Ø 12	7	6	0,200
SC 303014G	Galvanized Steel	30 x 3 – Ø 14	7	6	0,210
SC 303016G	Galvanized Steel	30 x 3 – Ø 16	7	6	0,210
SC 303018G	Galvanized Steel	30 x 3 – Ø 18	7	6	0,210
SC 303020G	Galvanized Steel	30 x 3 – Ø 20	7	6	0,210
SC 303022G	Galvanized Steel	30 x 3 – Ø 22	7	6	0,220
SC 303024G	Galvanized Steel	30 x 3 – Ø 24	7	6	0,320
SC 303026G	Galvanized Steel	30 x 3 – Ø 26	7	7	0,320
SC 303028G	Galvanized Steel	30 x 3 – Ø 28	7	7	0,320
SC 303030G	Galvanized Steel	30 x 3 – Ø 30	7	7	0,330
SC 303032G	Galvanized Steel	30 x 3 – Ø 32	7	7	0,340
SC 404010G	Galvanized Steel	40 x 4 – Ø 10	8	8	0,340
SC 404012G	Galvanized Steel	40 x 4 – Ø 12	8	8	0,342
SC 404014G	Galvanized Steel	40 x 4 – Ø 14	8	8	0,344
SC 404016G	Galvanized Steel	40 x 4 – Ø 16	8	8	0,360
SC 404018G	Galvanized Steel	40 x 4 – Ø 18	8	8	0,370
SC 404020G	Galvanized Steel	40 x 4 – Ø 20	8	8	0,370
SC 404022G	Galvanized Steel	40 x 4 – Ø 22	8	8	0,380
SC 404024G	Galvanized Steel	40 x 4 – Ø 24	8	8	0,400
SC 404026G	Galvanized Steel	40 x 4 – Ø 26	8	8	0,400
SC 404028G	Galvanized Steel	40 x 4 – Ø 28	8	8	0,400
SC 404030G	Galvanized Steel	40 x 4 – Ø 30	8	8	0,410
SC 404032G	Galvanized Steel	40 x 4 – Ø 32	8	8	0,410
SC 505010G	Galvanized Steel	50 x 5 – Ø 10	9	9	0,420
SC 505012G	Galvanized Steel	50 x 5 – Ø 12	9	9	0,420
SC 505014G	Galvanized Steel	50 x 5 – Ø 14	9	9	0,422
SC 505016G	Galvanized Steel	50 x 5 – Ø 16	9	9	0,422
SC 505018G	Galvanized Steel	50 x 5 – Ø 18	9	9	0,422
SC 505020G	Galvanized Steel	50 x 5 – Ø 20	9	9	0,425
SC 505022G	Galvanized Steel	50 x 5 – Ø 22	9	9	0,470
SC 505024G	Galvanized Steel	50 x 5 – Ø 24	9	9	0,450
SC 505026G	Galvanized Steel	50 x 5 – Ø 26	9	9	0,450
SC 505028G	Galvanized Steel	50 x 5 – Ø 28	9	9	0,480
SC 505030G	Galvanized Steel	50 x 5 – Ø 30	9	9	0,480
SC 505032G	Galvanized Steel	50 x 5 – Ø 32	9	9	0,480

CONDUCTOR CONNECTION ELEMENTS

SQUARE CONNECTOR (TAPE TO ROUND) (BIMETALLIC)

Product Code	Material	Conductor Size (mm - mm^2)	Weight (kg)
SC 30350	Galvanized / Copper	30 x 3 – 50	0,260
SC 30370	Galvanized / Copper	30 x 3 – 70	0,260
SC 30395	Galvanized / Copper	30 x 3 – 95	0,270
SC 303120	Galvanized / Copper	30 x 3 – 120	0,270
SC 40450	Galvanized / Copper	40 x 4 – 50	0,370
SC 40470	Galvanized / Copper	40 x 4 – 70	0,370
SC 40495	Galvanized / Copper	40 x 4 – 95	0,380
SC 404120	Galvanized / Copper	40 x 4 – 120	0,380
SC 50550	Galvanized / Copper	50 x 5 – 50	0,420
SC 50570	Galvanized / Copper	50 x 5 – 70	0,420
SC 50595	Galvanized / Copper	50 x 5 – 95	0,430
SC 505120	Galvanized / Copper	50 x 5 – 120	0,450

SQUARE CONNECTOR (TAPE TO TAPE)



Product Code	Material	Conductor Size (mm - mm)	Dimensions (mm) A - B		Weight (kg)
SC 15151515C	Copper	15 x 1,5 - 15 x 1,5	50	50	0,060
SC 203203C	Copper	20 x 3 – 20 x 3	60	60	0,150
SC 253253C	Copper	25 x 3 – 25 x 3	60	60	0,200
SC 253303C	Copper	25 x 3 – 30 x 3	60	60	0,200
SC 302302C	Copper	30 x 2 – 30 x 2	60	60	0,200
SC 303303C	Copper	30 x 3 – 30 x 3	60	60	0,200
SC 405405C	Copper	40 x 5 – 40 x 5	80	80	0,370
SC 505505C	Copper	50 x 5- 50 x 5	90	90	0,450
SC 506506C	Copper	50 x 6 – 50 x 6	90	90	0,450
SC 303303G	Galvanized Steel	30 x 3 – 30 x 3	70	70	0,190
SC 30353035G	Galvanized Steel	30 x 3,5 – 30 x 3,5	70	70	0,190
SC 303404G	Galvanized Steel	30 x 3 – 40 x 4	80	80	0,350
SC 303505G	Galvanized Steel	30 x 3 – 50 x 5	70	70	0,450
SC 305305G	Galvanized Steel	30 x 5 – 30 x 5	70	70	0,190
SC 305404G	Galvanized Steel	30 x 5 - 40 x 4	80	80	0,350
SC 305505G	Galvanized Steel	30 x 5 - 50 x 5	90	90	0,450
SC 404404G	Galvanized Steel	40 x 4 – 40 x 4	80	80	0,350
SC 505505G	Galvanized Steel	50 x 5 – 50 x 5	90	90	0,450

Standard bolt-nut is galvanized steel. Copper one available upon request.

SQUARE CONNECTOR (ROUND TO ROUND)

Product Code	Material	Conductor Size (mm^2)	Dimensions (cm) A	B	Weight (kg)
SC 1616C	Copper	16 – 16	6	5	0,210
SC 2516C	Copper	25 – 16	6	5	0,210
SC 2525C	Copper	25 – 25	6	5	0,210
SC 3516C	Copper	35 – 16	6	5	0,210
SC 3525C	Copper	35 – 25	6	5	0,210
SC 3535C	Copper	35 – 35	6	5	0,210
SC 5025C	Copper	50 – 25	6	5	0,212
SC 5035C	Copper	50 – 35	6	5	0,212
SC 5050C	Copper	50 – 50	6	5	0,215
SC 7025C	Copper	70 – 25	6	5	0,215
SC 7035C	Copper	70 – 35	6	5	0,215
SC 7050C	Copper	70 – 50	6	5	0,215
SC 7070C	Copper	70 – 70	6	5	0,215
SC 9535C	Copper	95 – 35	6	5	0,220
SC 9550C	Copper	95 – 50	6	5	0,220
SC 9570C	Copper	95 – 70	6	5	0,220
SC 9595C	Copper	95 – 95	6	5	0,220
SC 12035C	Copper	120 - 35	6	5	0,220
SC 12050C	Copper	120 – 50	6	5	0,220
SC 12070C	Copper	120 – 70	6	5	0,220
SC 12095C	Copper	120 - 95	6	5	0,220
SC 120120C	Copper	120 - 120	6	5	0,220
SC 15050C	Copper	150 - 50	6	5	0,240
SC 15070C	Copper	150 - 70	6	5	0,240
SC 15095C	Copper	150 - 95	6	5	0,240
SC 150120C	Copper	150 - 120	6	5	0,240
SC 150150C	Copper	150 - 150	6	5	0,240
SC 185185C	Copper	185 - 185	6	5	0,260
SC 240240C	Copper	240 - 240	6	5	0,265
SC 300300C	Copper	300 - 300	6	5	0,280
SC 5050G	Galvanized Steel	50 – 50	6	5	0,280
SC 7050G	Galvanized Steel	70 – 50	6	5	0,140
SC 7070G	Galvanized Steel	70 – 70	6	5	0,150
SC 9550G	Galvanized Steel	95 - 50	6	5	0,160
SC 9570G	Galvanized Steel	95 - 70	6	5	0,162
SC 9595G	Galvanized Steel	95 – 95	6	5	0,160

Please specify your special requirements for variable conductor sizes.

CONDUCTOR CONNECTION ELEMENTS

SQUARE CONNECTOR (T TYPE)

Product Code	Material	Conductor Size (mm^2 - mm^2)	Dimensions (mm) A - B	Weight (kg)
SC 471616C	Copper	16 – 16	5,8 5,8	0,120
SC 472525C	Copper	25 – 25	5,8 5,8	0,120
SC 473535C	Copper	35 – 35	5,8 5,8	0,120
SC 475050C	Copper	50 – 50	5,8 5,8	0,120
SC 477070C	Copper	70 – 70	5,8 5,8	0,120
SC 479595C	Copper	95 – 95	5,8 5,8	0,130
SC 47120120C	Copper	120 – 120	5,8 5,8	0,130
SC 475050G	Galvanized Steel	50 – 50	5,8 5,8	0,120
SC 477070G	Galvanized Steel	70 – 70	5,8 5,8	0,120
SC 479595G	Galvanized Steel	95 – 95	5,8 5,8	0,120

SQUARE CONNECTOR (X TYPE)

Product Code	Material	Conductor Size (mm^2 - mm^2)	Dimensions (mm) A - B	Weight (kg)
SCX 471616C	Copper	16 – 16	5,8 5,8	0,120
SCX 472525C	Copper	25 – 25	5,8 5,8	0,120
SCX 473535C	Copper	35 – 35	5,8 5,8	0,120
SCX 475050C	Copper	50 – 50	5,8 5,8	0,120
SCX 477070C	Copper	70 – 70	5,8 5,8	0,130
SCX 479595C	Copper	95 – 95	5,8 5,8	0,130
SCX 47120120C	Copper	120 – 120	5,8 5,8	0,140
SCX 475050G	Galvanized Steel	50 – 50	5,8 5,8	0,120
SCX 477070G	Galvanized Steel	70 – 70	5,8 5,8	0,120
SCX 479595G	Galvanized Steel	95 – 95	5,8 5,8	0,130

CONDUCTOR CONNECTION ELEMENTS

SQUARE CONNECTOR (ROUND TO RE-BAR)

Product Code	Material	Conductor Size (mm - mm)	Dimensions (cm) A - B	Weight (kg)
SC 08012G	Galvanized Steel	Ø 8 – Ø 12	7 5	0,210
SC 08016G	Galvanized Steel	Ø 8 – Ø 16	7 6	0,216
SC 08020G	Galvanized Steel	Ø 8 – Ø 20	7 6	0,220
SC 08026G	Galvanized Steel	Ø 8 – Ø 26	7 6	0,230
SC 08032G	Galvanized Steel	Ø 8 – Ø 32	7 6	0,320
SC 010012G	Galvanized Steel	Ø 10 – Ø 12	7 5	0,215
SC 010016G	Galvanized Steel	Ø 10 – Ø 16	7 6	0,265
SC 010020G	Galvanized Steel	Ø 10 – Ø 20	7 6	0,240
SC 010026G	Galvanized Steel	Ø 10 – Ø 26	7 6	0,240
SC 010032G	Galvanized Steel	Ø 10 – Ø 32	7 6	0,320

T TYPE CONNECTION TUBE (CASTING)

Product Code	Material	Conductor Size (mm^2)	Weight (kg)
CCT 35	Brass	35	0,090
CCT 50	Brass	50	0,100
CCT 70	Brass	70	0,100
CCT 95	Brass	95	0,110
CCT 120	Brass	120	0,120

X TYPE CONNECTION TUBE (CASTING)

Product Code	Material	Conductor Size (mm^2)	Weight (kg)
CCX 35	Brass	35	0,080
CCX 50	Brass	50	0,090
CCX 70	Brass	70	0,100
CCX 95	Brass	95	0,110
CCX 120	Brass	120	0,120

CONDUCTOR CONNECTION ELEMENTS

PARALLEL JOINTING CLAMP

Product Code	Material	Conductor Size (mm^2 - mm^2)	Weight (kg)
CCP 5050C	Copper	50 – 50	0,120
CCP 7070C	Copper	70 – 70	0,150
CCP 9595C	Copper	95 – 95	0,160
CCP 120120C	Copper	120 – 120	0,180
CCP 5050G	Galvanized Steel	50 – 50	0,060

CABLE TRAY CLAMP

Product Code	Material	Mounting Hole Diameter	Conductor Size (mm^2)	Weight (kg)
CCS 06B	Brass	M 6	6	0,010
CCS 10B	Brass	M 6	10	0,010
CCS 16B	Brass	M 6	16	0,020
CCS 25B	Brass	M 6	25	0,020
CCS 35B	Brass	M 6	35	0,020
CCS 50B	Brass	M 6	50	0,030
CCS 70B	Brass	M 6	70	0,030
CCS 95B	Brass	M 6	95	0,040
CCS 120B	Brass	M 6	120	0,050
CCS 150B	Brass	M 6	150	0,060
CCS 240B	Brass	M 6	240	0,110

- *Longer type clamps for two conductors available upon request.*
- *Different mounting hole sizes available upon request.*

BIMETALLIC WASHER

Product Code	Material	Diameter (mm)	Mounting Hole Diameter	Weight (kg)
CCW 16	Copper / Aluminium	16	M6	0,005
CCW 18	Copper / Aluminium	18	M6	0,010

- *Different mounting hole diameters available upon request.*

C CLAMP

Product Code	Material	Conductor Size (mm^2 - mm^2)	Weight (kg)
CCC 1616C	Copper	16 - 16	0,030
CCC 3535C	Copper	35 - 35	0,030
CCC 3550C	Copper	35 - 50	0,050
CCC 5050C	Copper	50 - 50	0,040
CCC 7025C	Copper	70 - 25	0,070
CCC 7035C	Copper	70 - 35	0,070
CCC 7070C	Copper	70 - 70	0,060
CCC 9535C	Copper	95 - 35	0,110
CCC 9595C	Copper	95 - 95	0,110
CCC 12070C	Copper	120 - 70	0,090
CCC 12095C	Copper	120 - 95	0,110
CCC 120120C	Copper	120 - 120	0,120
CCC 15070C	Copper	150 - 70	0,150
CCC 150120C	Copper	150 - 120	0,140
CCC 150150C	Copper	150 - 150	0,150
CCC 18595C	Copper	185 - 95	0,150
CCC 185185C	Copper	185 - 185	0,160
CCC 240240C	Copper	240 - 240	0,240

Tin plated copper available upon request.

CONDUCTOR CONNECTION ELEMENTS

QUICK CONNECTION CLAMP

Product Code	Material	Conductor Size (mm^2)	Weight (kg)
CCO 5070A	Aluminium	50 - 70	0,050
CCO 5070C	Copper	50 - 70	0,110
CCO 5070G	Galvanized Steel	50 - 70	0,120
CCO 5070AC	Aluminium - Copper	50 - 70	0,108

TRIANGLE T CLAMP

Product Code	Material	Conductor Size (mm^2)	Weight (kg)
CCTR 50	Brass	50	0,210
CCTR 70	Brass	70	0,280
CCTR 95	Brass	95	0,320

PARALLEL JOINTING CLAMP

Product Code	Material	Conductor Size (mm^2 - mm^2)	Weight (kg)
CCP 433535B	Brass	35 – 35	0,180
CCP 435050B	Brass	50 – 50	0,230
CCP 437070B	Brass	70 – 70	0,240
CCP 439595B	Brass	95 – 95	0,390

PARALLEL JOINTING CLAMP

Product Code	Material	Conductor Size (mm^2 - mm^2)	Weight (kg)
CCP 449595B	Brass	95 – 95	0,420
CCP 44120120B	Brass	120 – 120	0,460

H CLAMP

Product Code	Material	Conductor Size (mm^2 - mm^2)	Weight (kg)
CCH 3535C	Copper	35 - 35	0,030
CCH 3550C	Copper	35 - 50	0,030
CCH 5050C	Copper	50 - 50	0,040
CCH 5070C	Copper	50 - 70	0,050
CCH 5095C	Copper	50 - 95	0,080
CCH 50120C	Copper	50 - 120	0,080
CCH 7070C	Copper	70 - 70	0,040
CCH 70150C	Copper	70 - 150	0,090
CCH 70120C	Copper	70 - 120	0,090
CCH 9595C	Copper	95 - 95	0,080
CCH 95120C	Copper	95 - 120	0,090
CCH 120120C	Copper	120 - 120	0,090
CCH 150150C	Copper	150 - 150	0,150

The standard product is not tin plated. Tin plated one available upon request.

U CLAMP

Product Code	Material	Conductor Size (mm^2)	Weight (kg)
CCU 06	Brass	6	0,010
CCU 10	Brass	10	0,020
CCU 16	Brass	16	0,030
CCU 25	Brass	25	0,040
CCU 35	Brass	35	0,050
CCU 50	Brass	50	0,060
CCU 70	Brass	70	0,080
CCU 95	Brass	95	0,120
CCU 120	Brass	120	0,140
CCU 150	Brass	150	0,210

CONDUCTOR CONNECTION ELEMENTS

REINFORCEMENT CLAMP (TYPE 2)

Product Code	*Material*	*Conductor Size (mm)*	*Weight (kg)*
CCR 20303G 2	Galvanized Steel	Ø 20 - 30 x 3	0,140
CCR 20404G 2	Galvanized Steel	Ø 20 - 40 x 4	0,190

REINFORCEMENT CLAMP (TYPE 4)

Product Code	*Material*	*Conductor Size (mm)*	*Weight (kg)*
CCR 16303G 4	Galvanized Steel	Ø 16 – 20 / 30 x 3	0,080
CCR 22303G 4	Galvanized Steel	Ø 22 – 26 / 30 x 3	0,090
CCR 28303G 4	Galvanized Steel	Ø 28 – 32 / 30 x 3	0,090
CCR 16404G 4	Galvanized Steel	Ø 16 – 20 / 40 x 4	0,120
CCR 26404G 4	Galvanized Steel	Ø 26 – 32 / 40 x 4	0,400

REINFORCEMENT CLAMP (TYPE 5)

Product Code	*Material*	*Conductor Size (mm)*	*Weight (kg)*
CCR 168C 5	Copper	Ø 16 – 20 / Ø 8	0,340

CLAW TYPE CLAMP

Product Code	Material	Serial Number	Conductor Size (mm^2 - mm^2)	Weight (kg)
CCCL 1010B	Brass	1	10 - 10	0,026
CCCL 1616B	Brass	2	16 - 16	0,041
CCCL 2525B	Brass	3	25 - 25	0,050
CCCL 3535B	Brass	4	35 - 35	0,062
CCCL 5050B	Brass	5	50 - 50	0,070
CCCL 7070B	Brass	6	70 - 70	0,121
CCCL 9595B	Brass	7	95 -95	0,156
CCCL 120120B	Brass	8	120 - 120	0,180

HYDRAULIC CRIMPING TOOL

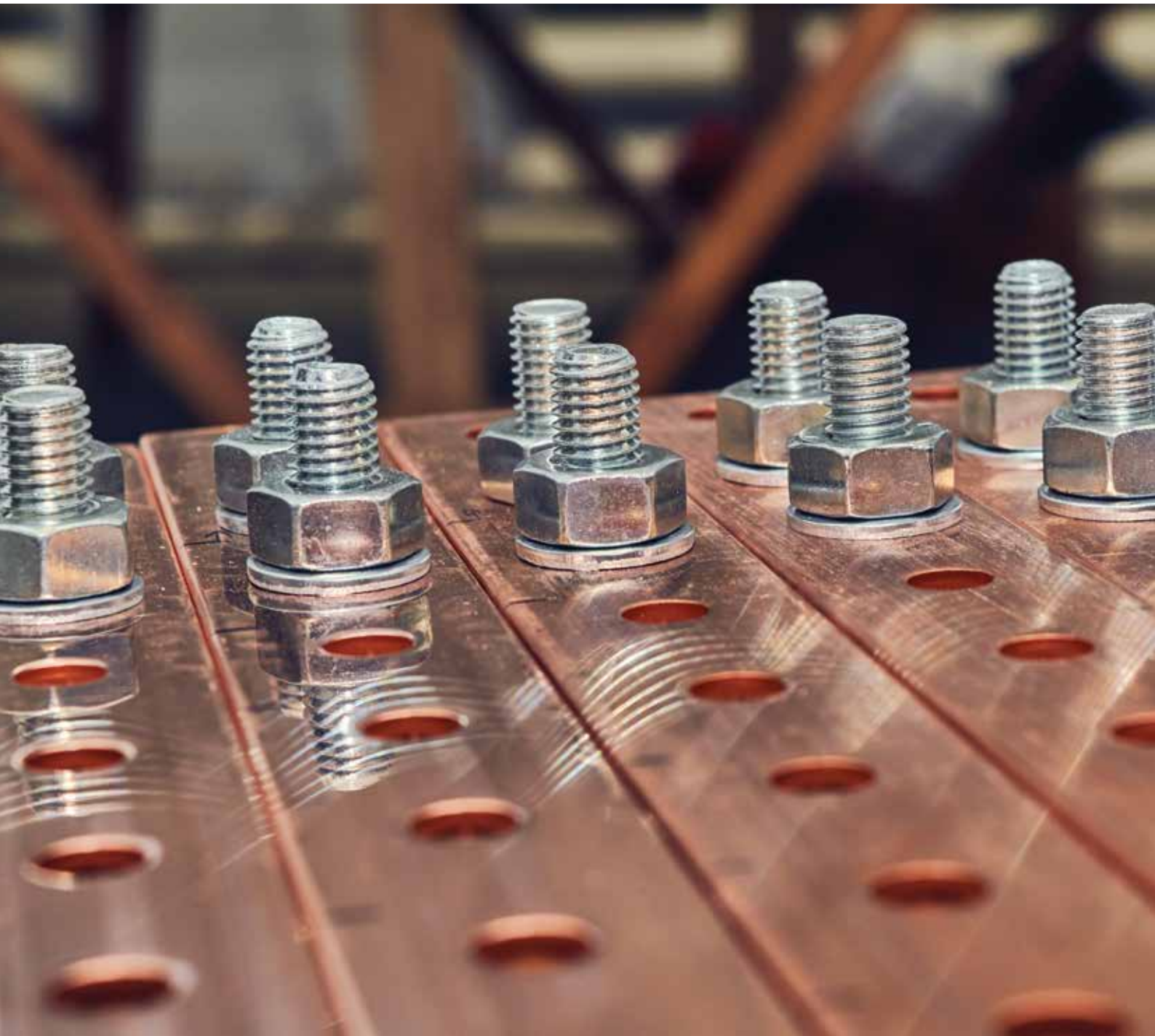
Product Code	Conductor Size (mm^2 - mm^2)	Weight (kg)
HC 00	16 - 300	6.500

DIES SET

Product Code	Conductor Size (mm^2 - mm^2)	Weight (kg)
DS 01	16 - 300	1,000

PROTART

GROUNDING SYSTEMS AND ACCESSORIES



EQUIPOTENTIAL EARTH BARS

EQUIPOTENTIAL BAR

Product Code	*Material*	*Number Of Holes*	*Section x Length (mm)*	*Weight (kg)*
EB 506300	Copper	4	50 x 6 x 300	1,470
EB 506400	Copper	6	50 x 6 x 400	1,910
EB 506500	Copper	8	50 x 6 x 500	2,360
EB 506650	Copper	10	50 x 6 x 650	3,100
EB 506750	Copper	12	50 x 6 x 750	3,540
EB 506850	Copper	14	50 x 6 x 850	3,980
EB 506950	Copper	16	50 x 6 x 950	4,420
EB 5061050	Copper	18	50 x 6 x 1050	4,860
EB 5061200	Copper	20	50 x 6 x 1200	5,600
EB 65061300	Copper	22	50 x 6 x 1300	6,040
EB 5061400	Copper	24	50 x 6 x 1400	6,480
EB 5061500	Copper	26	50 x 6 x 1500	6,920
EB 5061650	Copper	28	50 x 6 x 1650	7,660
EB 5061750	Copper	30	50 x 6 x 1750	8,100

- *Equipotential bar can be produced with one or two seperators upon request.*
- *Standard bolts are stainless steel M8. Standard base is hot dip galvanized steel.*
- *Different hole numbers and diameters available upon request.*

EQUIPOTENTIAL EARTH BARS

INSULATOR

Product Code	Material	Sizes (mm)	Weight (kg)
EBI 5112	Steel Bolt	M12	0,150
EBI 5110	Steel Bolt	M10	0,130
EBI 518	Steel Bolt	M8	0,100
EBI 516	Steel Bolt	M6	0,040

SPECIAL INSULATOR

Product Code	Material	Electrical Strength	Type
EBI 5202	Brass Nut	2 kV	1N500
EBI 5203	Brass Nut	3 kV	1N1000

BAR BOX

Product Code	Material	Sizes (mm)
EBB 15011070	Pvc	150 x 110 x 70
EBB 310230130	Pvc	310 x 230 x 130

PANEL EARTHING CLAMP

Product Code	Material	Number Of Holes	Hole Diameter	Sizes (mm)	Weight (kg)
EBC 2015180	Aluminum	10	M8	20 x 15 x 180	0,150
EBC 2015195	Copper	10	M8	20 x 15 x 195	0,360

BAR FOR INSPECTION PIT

Product Code	Material	Number Of Holes	Sizes (mm)	Weight (kg)
EBP 3010240	Copper	5	30 x 10 x 240	0,400

CONDUCTOR CONNECTION ELEMENTS

CABLE LUG

Product Code	*Material*	*Conductor Size (mm^2)*	*Mounting Hole Diameter (mm)*	*Weight (kg)*
CL 06	Tinned Copper	6	M 4	0,002
CL 10	Tinned Copper	10	M 4	0,003
CL 16	Tinned Copper	16	M 6	0,007
CL 25	Tinned Copper	25	M 8	0,008
CL 35	Tinned Copper	35	M 10	0,017
CL 50	Tinned Copper	50	M 10	0,023
CL 70	Tinned Copper	70	M 12	0,028
CL 95	Tinned Copper	95	M 12	0,039
CL 120	Tinned Copper	120	M 14	0,055
CL 150	Tinned Copper	150	M 14	0,070
CL 185	Tinned Copper	185	M 16	0,084
CL 240	Tinned Copper	240	M 16	0,111
CL 300	Tinned Copper	300	M 22	0,170
CL 400	Tinned Copper	400	M 22	0,226
CL 500	Tinned Copper	500	M 22	0,646
CL 630	Tinned Copper	630	M 24	0,848

- *Double or four holes available upon request.*
- *Long type available upon request.*

TUBULAR CABLE LUG

Product Code	Material	Conductor Size (mm^2)	Length (mm)	Weight (kg)
CLT 06	Tinned Copper	6	25,6	0,0020
CLT 10	Tinned Copper	10	30,5	0,0035
CLT 16	Tinned Copper	16	35,6	0,0065
CLT 25	Tinned Copper	25	40,7	0,0085
CLT 35	Tinned Copper	35	45,7	0,017
CLT 50	Tinned Copper	50	50,9	0,023
CLT 70	Tinned Copper	70	55,5	0,029
CLT 95	Tinned Copper	95	65,9	0,039
CLT 120	Tinned Copper	120	71,5	0,065
CLT 150	Tinned Copper	150	80,3	0,076
CLT 185	Tinned Copper	185	86,0	0,096
CLT 240	Tinned Copper	240	91,4	0,115
CLT 300	Tinned Copper	300	105,3	0,183
CLT 400	Tinned Copper	400	120,2	0,244
CLT 500	Tinned Copper	500	130,3	0,622
CLT 630	Tinned Copper	630	139,2	0,757

Please specify hole type at the time of order.

EARTHING ELECTRODES

COPPER BONDED STEEL EARTHING ROD

Product Code	Material	Plating Thickness (Micron)	Thread Size UNC (Inch)	Length (mm)	Shank Diameter (mm)	Weight (kg)
ER 2505812	Copper Bonded Steel	254	5/8	1200	14,2	1,530
ER 2505815	Copper Bonded Steel	254	5/8	1500	14,2	1,880
ER 2505818	Copper Bonded Steel	254	5/8	1800	14,2	2,260
ER 2505821	Copper Bonded Steel	254	5/8	2100	14,2	2,630
ER 2505824	Copper Bonded Steel	254	5/8	2400	14,2	3,010
ER 2505831	Copper Bonded Steel	254	5/8	3000	14,2	3,760
ER 2503412	Copper Bonded Steel	254	3/4	1200	17,2	2,210
ER 2503415	Copper Bonded Steel	254	3/4	1500	17,2	2,760
ER 2503418	Copper Bonded Steel	254	3/4	1800	17,2	3,310
ER 2503421	Copper Bonded Steel	254	3/4	2100	17,2	3,870
ER 2503424	Copper Bonded Steel	254	3/4	2400	17,2	4,420
ER 2503430	Copper Bonded Steel	254	3/4	3000	17,2	5,610

ROD COUPLING

Product Code	Material	Diameter (Inch)	Length (mm)	Weight (kg)
ERC 25058-1	Bronze	5/8	70	0,130
ERC 25034-1	Bronze	3/4	80	0,140
ERC 25058-2	Brass	5/8	70	0,110
ERC 25034-2	Brass	3/4	80	0,140

DRIVING STUDS

Product Code	Material	Diameter (mm)	Length (mm)	Weight (kg)
ERST 25058	Steel	5/8	40	0,080
ERST 25034	Steel	3/4	50	0,130

DRIVING SPIKES

Product Code	Material	Diameter (mm)	Length (mm)	Weight (kg)
ERSP 25058	Brass	5/8	50	0,050
ERSP 25034	Brass	3/4	60	0,060

SOLID COPPER EARTHING ROD

Product Code	*Material*	*Diameter - Length (mm - mm)*	*Weight (kg)*
ER 14100C	Copper	Ø 14 - 1000	1,380
ER 14120C	Copper	Ø 14 - 1200	1,660
ER 14150C	Copper	Ø 14 - 1500	2,080
ER 16100C	Copper	Ø 16 - 1000	1,800
ER 16120C	Copper	Ø 16 - 1200	2,170
ER 16150C	Copper	Ø 16 - 1500	2,710
ER 16180C	Copper	Ø 16 - 1800	3,250
ER 16200C	Copper	Ø 16 - 2000	3,590
ER 16250C	Copper	Ø 16 - 2500	4,520
ER 16300C	Copper	Ø 16 - 3000	5,420
ER 18100C	Copper	Ø 18 - 1000	2,200
ER 18120C	Copper	Ø 18 - 1200	2,640
ER 18150C	Copper	Ø 18 - 1500	3,300
ER 18180C	Copper	Ø 18 - 1800	3,960
ER 18200C	Copper	Ø 18 - 2000	4,400
ER 18250C	Copper	Ø 18 - 2500	5,500
ER 18300C	Copper	Ø 18 - 3000	6,600
ER 20100C	Copper	Ø 20 - 1000	2,800
ER 20120C	Copper	Ø 20 - 1200	3,360
ER 20150C	Copper	Ø 20 - 1500	4,200
ER 20180C	Copper	Ø 20 - 1800	5,040
ER 20200C	Copper	Ø 20 - 2000	5,600
ER 20250C	Copper	Ø 20 - 2500	7,000
ER 20300C	Copper	Ø 20 - 3000	8,400
ER 20350C	Copper	Ø 20 - 3500	9,800
ER 22150C	Copper	Ø 22 - 1500	5,080
ER 22300C	Copper	Ø 22 - 3000	10,160
ER 251500C	Copper	Ø 25 - 1500	6,560
ER 25300C	Copper	Ø 25 - 3000	13,120
ER 30150C	Copper	Ø 30 - 1500	9,450
ER 30300C	Copper	Ø 30 - 3000	18,900

EARTHING ELECTRODES

STAINLESS STEEL EARTHING ROD

Product Code	Material	Sizes (mm)	Weight (kg)
ER 16120SS	Stainless Steel	Ø 16 – 1200	1,870
ER 16150SS	Stainless Steel	Ø 16 – 1500	2,350
ER 16250SS	Stainless Steel	Ø 16 – 2500	3,933
ER 16300SS	Stainless Steel	Ø 16 – 3000	4,720
ER 18120SS	Stainless Steel	Ø 18 – 1200	2,430
ER 18150SS	Stainless Steel	Ø 18 – 1500	3,035
ER 18250SS	Stainless Steel	Ø 18 – 2500	5,066
ER 18300SS	Stainless Steel	Ø 18 – 3000	6,080
ER 20120SS	Stainless Steel	Ø 20 – 1200	2,960
ER 20150SS	Stainless Steel	Ø 20 – 1500	3,720
ER 20250SS	Stainless Steel	Ø 20 – 2500	6,192
ER 20300SS	Stainless Steel	Ø 20 – 3000	7,430

GALVANIZED STEEL EARTHING ROD

Product Code	Material	Coating Thickness (µm)	Sizes (mm)	Weight (kg)
ER 16120G	Galvanized Steel	70	Ø 16 – 1200	1,930
ER 16150G	Galvanized Steel	70	Ø 16 – 1500	2,415
ER 16250G	Galvanized Steel	70	Ø 16 – 2500	4,025
ER 16300G	Galvanized Steel	70	Ø 16 – 3000	4,830
ER 18120G	Galvanized Steel	70	Ø 18 – 1200	2,520
ER 18150G	Galvanized Steel	70	Ø 18 – 1500	3,150
ER 18250G	Galvanized Steel	70	Ø 18 – 2500	5,250
ER 18300G	Galvanized Steel	70	Ø 18 – 3000	6,300
ER 20120G	Galvanized Steel	70	Ø 20 – 1200	3,120
ER 20150G	Galvanized Steel	70	Ø 20 – 1500	3,900
ER 20250G	Galvanized Steel	70	Ø 20 – 2500	6,500
ER 20300G	Galvanized Steel	70	Ø 20 – 3000	7,800

COPPER PLATED STEEL EARTHING ROD

Product Code	Material	Plating Thickness (Micron)	Diameter - Length (mm - mm)	Weight (kg)
ER 100016100	Copper Plated Steel	1000	Ø 16 - 1000	1,570
ER 100016120	Copper Plated Steel	1000	Ø 16 - 1200	1,885
ER 100016150	Copper Plated Steel	1000	Ø 16 - 1500	2,355
ER 100016240	Copper Plated Steel	1000	Ø 16 - 2400	3,768
ER 100016300	Copper Plated Steel	1000	Ø 16 - 3000	4,710
ER 100018100	Copper Plated Steel	1000	Ø 18 - 1000	2,060
ER 100018120	Copper Plated Steel	1000	Ø 18 -1200	2,472
ER 100018150	Copper Plated Steel	1000	Ø 18 - 1500	3,090
ER 100018240	Copper Plated Steel	1000	Ø 18 - 2400	4,945
ER 100018300	Copper Plated Steel	1000	Ø 18 - 3000	6,180
ER 100020100	Copper Plated Steel	1000	Ø 20 - 1000	2,550
ER 100020120	Copper Plated Steel	1000	Ø 20 - 1200	3,063
ER 100020150	Copper Plated Steel	1000	Ø 20 - 1500	3,830
ER 100020240	Copper Plated Steel	1000	Ø 20 - 2400	6,120
ER 100020300	Copper Plated Steel	1000	Ø 20 - 3000	7,650

ROD DRIVING STUD

Product Code	Material	Diameter (mm)	Weight (kg)
ERST 16S	Steel	Ø 16	0,010
ERST 18S	Steel	Ø 18	0,020
ERST 20S	Steel	Ø 20	0,030

ROD COUPLING DOWELL

Product Code	Material	Diameter (mm)	Weight (kg)
ERD 16S	Steel	Ø 16	0,010
ERD 18S	Steel	Ø 18	0,020
ERD 20S	Steel	Ø 20	0,020

ROD SPIKE

Product Code	Material	Diameter (mm)	Weight (kg)
ERSP 16S	Steel	Ø 16	0,010
ERSP 18S	Steel	Ø 18	0,020
ERSP 20S	Steel	Ø 20	0,020

EARTHING ELECTRODES

GALVANIZED STEEL EARTHING ANGLE

Product Code	*Material*	*Coating Thickness* (µm)	*Sizes (mm)*	*Weight (kg)*
ERA 70404100G	Galvanized Steel	70	40 x 4 x 1000	2,500
ERA 70404150G	Galvanized Steel	70	40 x 4 x 1500	3,700
ERA 70505150	Galvanized Steel	70	50 x 5 x 1500	5,800
ERA 70505250G	Galvanized Steel	70	50 x 5 x 2500	9,660
ERA 70505300G	Galvanized Steel	70	50 x 5 x 3000	11,600
ERA 70605150G	Galvanized Steel	70	60 x 5 x 1500	6,900
ERA 70605250G	Galvanized Steel	70	60 x 5 x 2500	11,500
ERA 70605300G	Galvanized Steel	70	60 x 5 x 3000	13,800
ERA 70606150G	Galvanized Steel	70	60 x 6 x 1500	8,100
ERA 70606250G	Galvanized Steel	70	60 x 6 x 2500	13,500
ERA 70606300G	Galvanized Steel	70	60 x 6 x 3000	16,200
ERA 70656150G	Galvanized Steel	70	65 x 6 x 1500	9,000
ERA 70656250	Galvanized Steel	70	65 x 6 x 2500	15,000
ERA 70656300G	Galvanized Steel	70	65 x 6 x 3000	18,000
ERA 70657150	Galvanized Steel	70	65 x 7 x 1500	10,500
ERA 70657250	Galvanized Steel	70	65 x 7 x 2500	17,500
ERA 70657300	Galvanized Steel	70	65 x 7 x 3000	21,000

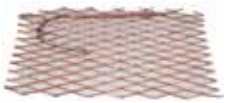
EARTHING ELECTRODES

EARTHING PLATE

Product Code	Material	Sizes (mm)	Weight (kg)
EP 70701C	Copper	700 x 700 x 1	4,410
EP 707015C	Copper	700 x 700 x 1,5	6,620
EP 70702C	Copper	700 x 700 x 2	8,820
EP 70703C	Copper	700 x 700 x 3	13,230
EP 1005015C	Copper	1000 x 500 x 1,5	6,750
EP 100502C	Copper	1000 x 500 x 2	9,000
EP 100504C	Copper	1000 x 500 x 4	18,000
EP 100505C	Copper	1000 x 500 x 5	22,500
EP 1001002C	Copper	1000 x 1000 x 2	18,000
EP 1001004C	Copper	1000 x 1000 x 4	36,000
EP 1001005C	Copper	1000 x 1000 x 5	45,000
EP 100502G	Galvanized Steel	1000 x 500 x 2	8,000
EP 1005025G	Galvanized Steel	1000 x 500 x 2,5	10,000
EP 100503G	Galvanized Steel	1000 x 500 x 3	12,000

EARTHING GRID

Product Code	Material	Sizes (mm)	Weight (kg)
EG 50010002	Copper	500 x 1000 x 2	2,000
EG 100010002	Copper	1000 x 1000 x 2	4,000
EG 100015002	Copper	1000 x 1500 x 2	6,000



EARTHING MAT

Product Code	Material	Sizes (mm)	Tape Size (mm)	Weight (kg)
EM 6006003	Copper	600 x 600 x 3	25 x 3	3,980
EM 9009003	Copper	900 x 900 x 3	25 x 3	7,200

EARTHING ROD CLAMPS

U BOLT CLAMP

Product Code	Material (Body)	Material (Bolt)	Rod Diameter (mm)	Conductor Size (mm / mm²)	Weight (kg)
ECU 1630240	Bronze	Copper	Ø 16 – Ø 30	16 – 240	0,350
ECU 1622120	Brass	Brass	Ø 16 – Ø 22	16 – 120	0,300
ECU 1636303	Brass	Stainless Steel	Ø 16 – Ø 36	25 x 3 – 30 x 3	0,300
ECU 1624185	Brass	Stainless Steel	Ø 16 – Ø 24	16 – 185	0,380

G TYPE CLAMP

Product Code	Material (Body)	Material (Bolt)	Rod Diameter (mm)	Conductor Size (mm / mm²)	Weight (kg)
ECG 161870	Bronze	Stainless Steel	Ø 16 – Ø 18	16 – 70	0,100
ECG 2095	Bronze	Stainless Steel	Ø 20	16 – 95	0,150
ECG 141670	Brass	Stainless Steel	Ø 14 – Ø 16	16 – 70	0,100

T TYPE CLAMP

Product Code	Material (Body)	Material (Bolt)	Rod Diameter (mm)	Conductor Size (mm / mm²)	Weight (kg)
ECT 1422	Copper Alloy	Stainless Steel	Ø 14 – Ø 22	25 x 3 - 30 x 3	0,116

EARTHING ROD CLAMPS

H TYPE

Product Code	*Material*	*Diameter - Plating Thickness (mm - mm2)*	*Weight (kg)*
ECH 16150C	Copper	Ø 16 – Ø 18 / 1 x 50	0,080
ECH 20150C	Copper	Ø 20 / 1 x 50	0,080
ECH 20170C	Copper	Ø 20 / 1 x 70	0,080
ECH 20195C	Copper	Ø 20 / 1 x 95	0,080
ECH 201120C	Copper	Ø 20 / 1 x 120	0,080
ECH 16150S	Steel	Ø 16 / 1 x 50	0,070
ECH 18150S	Steel	Ø 18 / 1 x 50	0,070
ECH 20150S	Steel	Ø 20 / 1 x 50	0,070

C TYPE

Product Code	*Material*	*Diameter - Plating Thickness (mm - mm2)*	*Weight (kg)*
ECC 16150C	Copper	Ø 16 – Ø 18 / 1 x 50	0,100
ECC 20125C	Copper	Ø 20 / 1 x 25	0,110
ECC 20135C	Copper	Ø 20 / 1 x 35	0,110
ECC 20150C	Copper	Ø 20 / 1 x 50	0,110
ECC 20170C	Copper	Ø 20 / 1 x 70	0,110
ECC 20195C	Copper	Ø 20 / 1 x 95	0,110

EARTHING ROD CLAMPS

J TYPE (TAPE CONDUCTOR)

Product Code	Material	Diameter - Plating Thickness (mm - mm)	Weight (kg)
ECJ 16253C	Copper	Ø 16 – Ø 18 / 25 x 3	0,320
ECJ 16303C	Copper	Ø 16 – Ø 18 / 30 x 3	0,320
ECJ 16404C	Copper	Ø 16 – Ø 18 / 40 x 4	0,340
ECJ 20253C	Copper	Ø 20 / 25 x 3	0,320
ECJ 20303C	Copper	Ø 20 / 30 x 3	0,320
ECJ 20404C	Copper	Ø 20 / 40 x 4	0,340
ECJ 16303S	Steel	Ø 16 - Ø 18 / 30 x 3	0,310
ECJ 16404S	Steel	Ø 16 - Ø 18 / 40 x 4	0,320
ECJ 20303S	Steel	Ø 20 / 30 x 3	0,310
ECJ 20404S	Steel	Ø 20 / 40 x 4	0,320

J TYPE (ROUND CONDUCTOR)

Product Code	Material	Diameter - Plating Thickness (mm - mm^2)	Weight (kg)
ECJ 16250C	Copper	Ø 16 – Ø 18 / 2 x 50	0,270
ECJ 16270C	Copper	Ø 16 – Ø 18 / 2 x 70	0,300
ECJ 202120C	Copper	Ø 20 / 2 x 120	0,350
ECJ 20250C	Copper	Ø 20 / 2 x 50	0,270
ECJ 20270C	Copper	Ø 20 / 2 x 70	0,280
ECJ 20250S	Steel	Ø 20 / 2 x 50	0,260
ECJ 20270S	Steel	Ø 20 / 2 x 70	0,240

M TYPE

Product Code	Material	Diameter - Plating Thickness (mm - mm^2)	Weight (kg)
ECM 18250C	Copper	Ø 18 / 2 x 50	0,170
ECM 20150C	Copper	Ø 20 / 1 x 50	0,210
ECM 20170C	Copper	Ø 20 / 1 x 70	0,210
ECM 20195C	Copper	Ø 20 / 1 x 95	0,210
ECM 201120C	Copper	Ø 20 / 1 x 120	0,210
ECM 20250C	Copper	Ø 20 / 2 x 50	0,170
ECM 20270C	Copper	Ø 20 / 2 x 70	0,330
ECM 20295C	Copper	Ø 20 / 2 x 95	0,350
ECM 202120C	Copper	Ø 20 / 2 x 120	0,370

PLASTIC INSPECTION PIT (5 TONES)

Product Code	Material	Dimensions (mm)	Weight (kg)
IP 303022P	Plastic	300 x 300 x 220	1,780

- *İstanbul Technical Universty Test Certificate.*
- *Laboratory test result is 5 tones resistanted.*

PLASTIC INSPECTION PIT

Product Code	Material	Dimensions (mm)	Weight (kg)
IP 404040P	Plastic	400 x 400 x 400	2,400
IP 555550P	Plastic	550 x 550 x 500	4,400

GALVANIZED INSPECTION PIT

Product Code	Material	Plating	Dimensions (mm)	Weight (kg)
IP 303030S	Steel	Hot Dip Galvanized	300 x 300 x 300	10,000
IP 404040S	Steel	Hot Dip Galvanized	400 x 400 x 400	17,500

CONCRETE INSPECTION PIT

Product Code	Material	Dimensions (mm)	Weight (kg)
IP 404040C	Concrete	400 x 400 x 400	63,00
IP 404020C	Concrete	400 x 400 x 200	40,00

EARTH CONDUCTIVITY MATERIAL

PRO - EARTH

Product Code	*Material*	*Weight (kg)*
PE 1010	Bentonite Based	10,000
PE 1012	Bentonite Based	12,000
PE 1025	Bentonite Based	25,000

PRO - EARTH MAX

Product Code	*Material*	*Weight (kg)*
PE 2011	Carbon Based	11,000

ETD 01 – EARTHING RESISTANCE TEST DEVICE

Product Code	**GSA 54455 P**
Measurement Ranges	Earth Resistance: 0 - 20 Ω / 0 - 200 Ω / 0 - 2000 Ω Earth Voltage: (50,60Hz): 0 - 200 V AC
Accuracy	Earth Resistance: ± 2 % rdg ± 0.1Ω (20 Ω level) ± 2 % rdg ± 3 dgt (200 Ω / 2000 Ω level) Earth Voltage: ± 1 % rdg ± 4 dgt
Overload Protection	Earth Resistance: 280V AC for 10 seconds / across 2 of the 3 terminals Earth Voltage: 300V AC for 1 minute
Dimensions (mm)	105 (L) x 158 (W) x 70 (D)
Weight (kg)	0,55
Power Supply	R6P (AA - 1.5V) X 6
Accessories	7095 TestLeads 1 set red-20m, yellow-10m,green-5m 8032 Auxiliary earth spikes 1set R6P AA 6, Neck strap, Instruction manual Soft case (Hard case is optional).

ETD 02 – EARTHING RESISTANCE TEST DEVICE

Product Code	**GSA 54474 P**		
Function	*Ranges*	*Resolution*	*Accuracy*
Earth Resistance	20 Ω	0.01Ω	± (3 % + 100d)
	200 Ω	0.1Ω	± (3 % + 3d)
	2000 Ω	1Ω	± (3 % + 3d)
Resistance	200 kΩ	0.1kΩ	± (1 % + 2d)
DC Voltage	1000 V	±(0.8%+3d)	-
AC Voltage	750 V	1V	± (1.2 % + 10d)
Weight (kg)	0,7		
Power Supply	6 x 1.5V AA battery or equivalent (DC9 V)		
Accessories	4 sets of test kit, 2 units of steel spike, *Carrying Case*, Instruction manual		

PROTART

EXOTHERMIC WELDING SYSTEMS

Exothermic Welding Materials

The materials to be used for exothermic welding shall have the following properties. All connection points remaining below ground (connections between grounding electrodes and down conductors etc.) shall be provided by exothermic welding method. Welding powder shall be fired by electronic methods (with an electronic flint gun) at a given distance as per occupational health and safety.

What is Exothermic Welding?

Exothermic welding is the welding process that can be applied easily even for different metals, such as copper-copper, copper-steel, steel-steel, aluminum-copper, aluminum-aluminum in joints that must be connected electrically. For electrical connections, it is very important to create an uninterrupted and solid transmission line in conductors.

Importance of Exothermic Welding in Grounding Systems

One of the most important problems experienced in grounding installations after many years is the corrosion in underground conductor connections, which brings about problems such as loosening and separation. In order to prevent such problems from occurring, underground conductors must be connected using exothermic welding. Exothermic welding is the most efficient way to create a high-quality electrical connection without the need for an external heat source.

Materials Used

Graphite Mould:

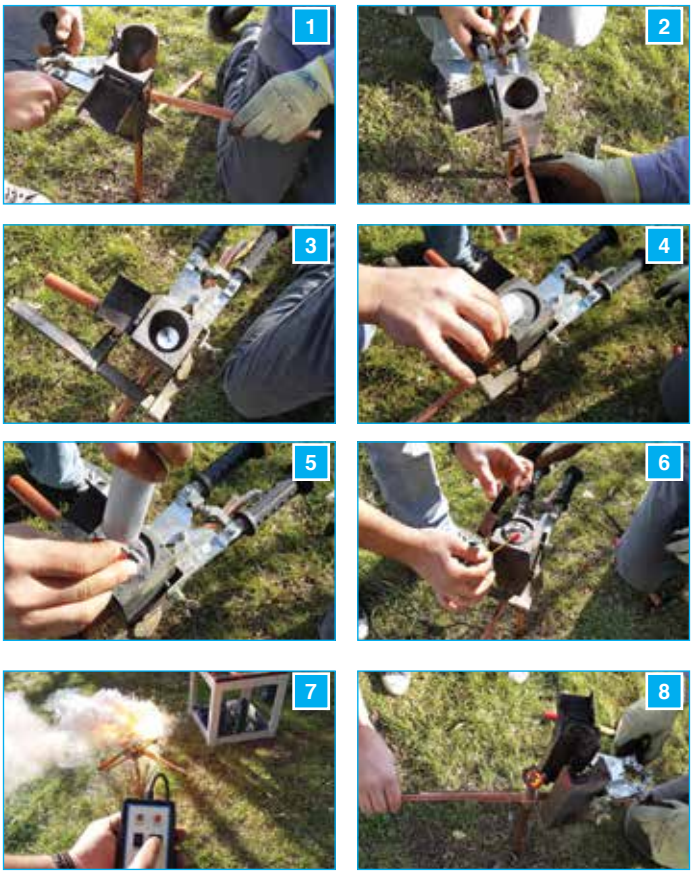
A specifically designed graphite mould is composed of a chamber, a discharge hole, and a weld gap. Thermal reaction occurs in the chamber. The molten copper pours into the weld gap from the discharge hole. This section is designed to easily separate the mould from the completed connection. Hence, it also prolongs the life of the mould if care is taken during use. The mean life of a welding mould is around 50 uses.

Handle Clamp:

It is the pliers with two handles that prevent the mould from opening and dispersion of the weldmetal inside the mould by clamping the graphite mould, including the conductors to be welded.

Proweld Powder:

A kind of copper alloy, Proweld powder is available in plastic tubes with various weights depending on the size of conductors to be connected and the shape of connection. Each tube contains enough weldmetal powder for the desired connection, along with silver-colored starting powder.



Igniter (Lighter):

This is used to start the reaction. Using the electronic crucible lighter developed according to Occupational Health and Safety Code No. 6331 is more advantageous than using a traditional exothermic welding lighter to ignite the powder during this process.

Cable Cleaner:

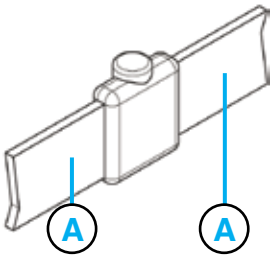
Designed to clean the conductors, i.e. rods and cables. The head of the cable brush can be changed.

How To Do

1. *Open the mould by using handle clamp, then fit the conductors in the mould.*
2. *Check if the mould is tightly closed. Also the conductors must be fixed and well positioned.*
3. *To prevent unwanted leaks, place the metallic disk in the bottom of the powder chamber.*
4. *Pour the needed amount of welding powder into the mould.*
5. *Pour the starter powder over the main powder. It locates inside the cap of the tube.*
6. *Place the welding fuse over the starter powder, then close the mould cover.*
7. *Press “on/off” button of the remote flint igniter and see the “ready” indicator is active. Then press “burn”.*
8. *After the reaction, wait during 15 seconds and open the mould. Clean it with the mould brush and the scraper.*

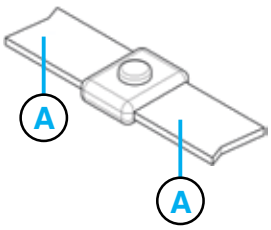
BB1 - BAR TO BAR

Conductor Size (mm) A	Welding Powder (gr)	Connection Type	Handle Clamp	Mould Type
25 x 3	PWM 65	BB1-253	PHC4	C
30 x 2	PWM 50	BB1-302	PHC4	C
30 x 3	PWM 115	BB1-303	PHC4	C
30 x 3,5	PWM 115	BB1-303,5	PHC4	C
30 x 5	PWM 115	BB1-305	PHC4	C
40 x 3	PWM 150	BB1-403	PHC4	C
40 x 4	PWM 200	BB1-404	PHC5	D
40 x 5	PWM 200	BB1-405	PHC5	D
50 x 3	PWM 200	BB1-503	PHC5	D
50 x 5	PWM 250	BB1-505	PHC5	D
50 x 6	PWM 250	BB1-506	PHC5	D



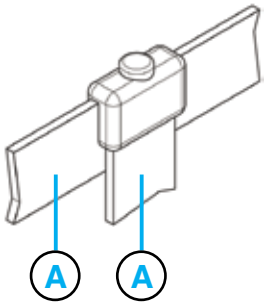
BB2 - BAR TO BAR

Conductor Size (mm) A	Welding Powder (gr)	Connection Type	Handle Clamp	Mould Type
25 x 3	PWM 90	BB7-253	PHC4	C
30 x 2	PWM 90	BB7-302	PHC4	C
30 x 3	PWM 90	BB7-303	PHC4	C
30 x 3,5	PWM 90	BB7-303,5	PHC4	C
30 x 5	PWM 115	BB7-305	PHC4	C
40 x 3	PWM 115	BB7-403	PHC4	C
40 x 4	PWM 150	BB7-404	PHC5	D
40 x 5	PWM 150	BB7-405	PHC5	D
50 x 3	PWM 200	BB7-503	PHC5	D
50 x 5	PWM 200	BB7-505	PHC5	D
50 x 6	PWM 250	BB7-506	PHC5	D



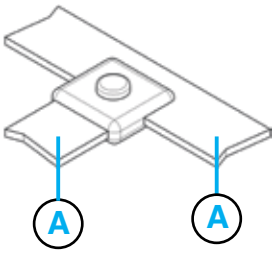
PRODUCT SELECTION CHARTS

BB3 - BAR TO BAR



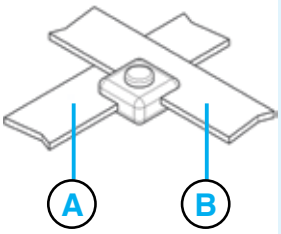
Conductor Size (mm) A	Welding Powder (gr)	Connection Type	Handle Clamp	Mould Type
25 x 3	PWM 90	BB3-203	PHC4	C
30 x 2	PWM 115	BB3-302	PHC4	C
30 x 3	PWM 115	BB3-304	PHC4	C
30 x 3,5	PWM 115	BB3-303,5	PHC4	C
30 x 5	PWM 115	BB3-305	PHC4	C
40 x 3	PWM 150	BB3-403	PHC4	C
40 x 4	PWM 150	BB3-404	PHC5	D
40 x 5	PWM 200	BB3-405	PHC5	D
50 x 3	PWM 200	BB3-503	PHC5	D
50 x 5	PWM 250	BB3-505	PHC5	D
50 x 6	PWM 250	BB3-506	PHC5	D

BB14 - BAR TO BAR



Conductor Size (mm) A	Welding Powder (gr)	Connection Type	Handle Clamp	Mould Type
25 x 3	PWM 90	BB14-253253	PHC4	C
30 x 2	PWM 90	BB14-302302	PHC4	C
30 x 3	PWM 115	BB14-304304	PHC4	C
30 x 3,5	PWM 115	BB14-303,5303,5	PHC5	D
30 x 5	PWM 115	BB14-305305	PHC5	D
40 x 3	PWM 115	BB14-403403	PHC5	D
40 x 4	PWM 150	BB14-404404	PHC5	D
40 x 5	PWM 150	BB14-405405	PHC5	D
50 x 3	PWM 150	BB14-503503	PHC5	D
50 x 5	PWM 200	BB14-505505	PHC5	D
50 x 6	PWM 250	BB14-50655506	PHC5	D

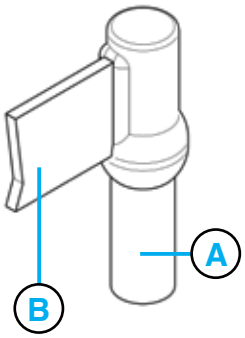
BB41 - BAR TO BAR



Conductor Size (mm)		*Welding Powder (gr)*	*Connection Type*	*Handle Clamp*	*Mould Type*
A	**B**				
25 x 3	25 x 3	PWM 65	BB41-253	PHC4	C
30 x 2	30 x 2	PWM 65	BB41-302	PHC4	C
30 x 3	30 x 3	PWM 115	BB41-304	PHC5	D
30 x 3,5	30 x 3,5	PWM 115	BB41-303,5	PHC5	D
30 x 5	30 x 5	PWM 115	BB41-305	PHC5	D
40 x 3	40 x 3	PWM 200	BB41-403	PHC5	D
40 x 4	40 x 4	PWM 200	BB41-404	PHC5	D
40 x 5	40 x 5	PWM 200	BB41-405	PHC5	D
50 x 3	50 x 3	PWM 200	BB41-503	PHC5	D
50 x 5	50 x 5	PWM 200	BB41-505	PHC5	D
50 x 6	50 x 6	PWM 200	BB41-506	PHC5	D

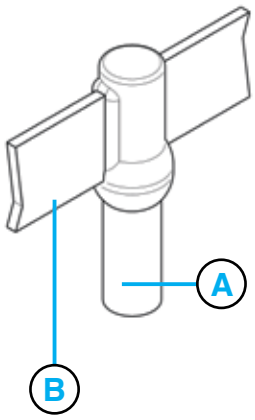
PRODUCT SELECTION CHARTS

BER1 – BAR TO EARTHING ROD



Conductor Size (mm)		Welding Powder (gr)	Connection Type	Handle Clamp	Mould Type
A	B				
14,2 (5/8”)	25 x 3	PWM 115	BER1-14253	PHC4	C
14,2 (5/8”)	30 x 3	PWM 115	BER1-14303	PHC4	C
17,2 (3/4”)	25 x 3	PWM 150	BER1-17253	PHC4	C
17,2 (3/4”)	30 x 3	PWM 150	BER1-17303	PHC4	C
16	25 x 3	PWM 150	BER1-16253	PHC4	C
16	30 x 3	PWM 150	BER1-16303	PHC4	C
16	30 x 5	PWM 200	BER1-16305	PHC4	C
16	40 x 3	PWM 200	BER1-16403	PHC4	C
16	40 x 4	PWM 200	BER1-16404	PHC5	D
16	40 x 5	PWM 200	BER1-16405	PHC5	D
16	50 x 3	PWM 250	BER1-16503	PHC5	D
16	50 x 5	PWM 2x150	BER1-16505	PHC5	D
18	25 x 3	PWM 150	BER1-18253	PHC5	D
18	30 x 3	PWM 150	BER1-18303	PHC4	C
18	30 x 5	PWM 200	BER1-18305	PHC4	C
18	40 x 3	PWM 200	BER1-18403	PHC4	C
18	40 x 4	PWM 200	BER1-18404	PHC5	D
18	40 x 5	PWM 200	BER1-18405	PHC5	D
18	50 x 3	PWM 250	BER1-18503	PHC5	D
18	50 x 5	PWM 2x150	BER1-18505	PHC5	D
20	25 x 3	PWM 150	BER1-20253	PHC4	C
20	30 x 3	PWM 200	BER1-20303	PHC4	C
20	30 x 5	PWM 250	BER1-20305	PHC4	C
20	40 x 3	PWM 250	BER1-20403	PHC4	C
20	40 x 4	PWM 250	BER1-20404	PHC5	D
20	40 x 5	PWM 250	BER1-20405	PHC5	D
20	50 x 3	PWM 2x150	BER1-20503	PHC5	D
20	50 x 5	PWM 2x150	BER1-20505	PHC5	D

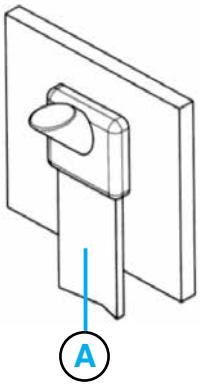
BER2 – BAR TO EARTHING ROD



Conductor Size (mm)		*Welding Powder (gr)*	*Connection Type*	*Handle Clamp*	*Mould Type*
A	**B**				
14,2 (5/8”)	25 x 3	PWM 115	BER2-14253	PHC4	C
14,2 (5/8”)	30 x 3	PWM 115	BER2-14303	PHC4	C
17,2 (3/4”)	25 x 3	PWM 150	BER2-17253	PHC4	C
17,2 (3/4”)	30 x 3	PWM 150	BER2-17303	PHC4	C
16	25 x 3	PWM 150	BER2-16253	PHC4	C
16	30 x 3	PWM 200	BER2-16303	PHC4	C
16	30 x 5	PWM 250	BER2-16305	PHC4	C
16	40 x 3	PWM 250	BER2-16403	PHC5	D
16	40 x 4	PWM 250	BER2-16404	PHC5	D
16	40 x 5	PWM 250	BER2-16405	PHC5	D
16	50 x 3	PWM 2x150	BER2-16503	PHC5	D
16	50 x 5	PWM 2x150	BER2-16505	PHC5	D
18	25 x 3	PWM 150	BER2-18253	PHC4	C
18	30 x 3	PWM 200	BER2-18303	PHC4	C
18	30 x 5	PWM 250	BER2-18305	PHC4	C
18	40 x 3	PWM 250	BER2-18403	PHC5	D
18	40 x 4	PWM 250	BER2-18404	PHC5	D
18	40 x 5	PWM 250	BER2-18405	PHC5	D
18	50 x 3	PWM 2x150	BER2-18503	PHC5	D
18	50 x 5	PWM 2x150	BER2-18505	PHC5	D
20	25 x 3	PWM 150	BER2-20253	PHC4	C
20	25 x 4	PWM 200	BER2-20254	PHC4	C
20	30 x 3	PWM 200	BER2-20303	PHC4	C
20	30 x 5	PWM 250	BER2-20305	PHC4	C
20	40 x 3	PWM 250	BER2-20403	PHC5	D
20	40 x 4	PWM 250	BER2-20404	PHC5	D
20	40 x 5	PWM 250	BER2-20405	PHC5	D
20	50 x 3	PWM 2x150	BER2-20503	PHC5	D
20	50 x 5	PWM 2x150	BER2-20505	PHC5	D

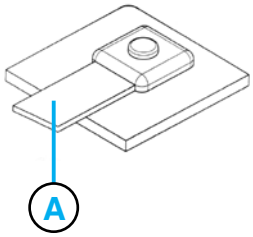
PRODUCT SELECTION CHARTS

BSS1 - BAR TO STEEL SURFACE



Conductor Size (mm) A	Welding Powder (gr)	Connection Type	Handle Clamp	Mould Type
25 x 3	PWM 90	BSS1-253	PHC4	C
30 x 2	PWM 90	BSS1-302	PHC4	C
30 x 3	PWM 115	BSS1-303	PHC4	C
30 x 3,5	PWM 115	BSS1-303,5	PHC4	C
30 x 5	PWM 150	BSS1-305	PHC4	C
40 x 3	PWM 150	BSS1-403	PHC5	D
40 x 4	PWM 200	BSS1-404	PHC5	D
40 x 5	PWM 200	BSS1-405	PHC5	D
50 x 3	PWM 200	BSS1-503	PHC5	D
50 x 5	PWM 250	BSS1-505	PHC5	D
50 x 6	PWM 2x150	BSS1-506	PHC5	D

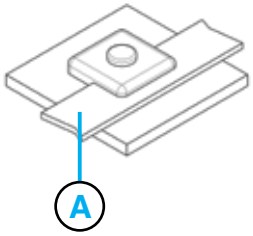
BSS2 - BAR TO STEEL SURFACE



Conductor Size (mm) A	Welding Powder (gr)	Connection Type	Handle Clamp	Mould Type
25 x 3	PWM 115	BSS2-253	PHC4	C
30 x 2	PWM 115	BSS2-302	PHC4	C
30 x 3	PWM 115	BSS2-303	PHC4	C
30 x 3,5	PWM 115	BSS2-303,5	PHC4	C
30 x 5	PWM 200	BSS2-305	PHC4	C
40 x 3	PWM 115	BSS2-403	PHC5	D
40 x 4	PWM 200	BSS2-404	PHC5	D
40 x 5	PWM 200	BSS2-405	PHC5	D
50 x 3	PWM 200	BSS2-503	PHC5	D
50 x 4	PWM 2x150	BSS2-504	PHC5	D
50 x 5	PWM 2x150	BSS2-505	PHC5	D

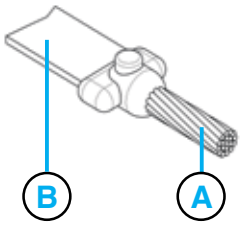
BSS3 - BAR TO STEEL SURFACE

Conductor Size (mm) A	*Welding Powder (gr)*	*Connection Type*	*Handle Clamp*	*Mould Type*
25 x 3	PWM 115	BSS3-253	PHC4	C
30 x 2	PWM 115	BSS3-302	PHC4	C
30 x 3	PWM 150	BSS3-303	PHC4	C
30 x 3,5	PWM 150	BSS3-303,5	PHC4	C
30 x 5	PWM 115	BSS3-305	PHC4	C
40 x 3	PWM 150	BSS3-403	PHC5	D
40 x 4	PWM 200	BSS3-404	PHC5	D
40 x 5	PWM 250	BSS3-405	PHC5	D
50 x 3	PWM 250	BSS3-503	PHC5	D
50 x 5	PWM 250	BSS3-505	PHC5	D
50 x 6	PWM 250	BSS3-506	PHC5	D



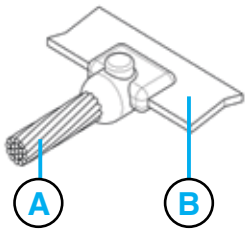
PRODUCT SELECTION CHARTS

CB1 - CABLE TO BAR



Conductor Size (mm²) A	Conductor Size (mm) B	Welding Powder (gr)	Connection Type	Handle Clamp	Mould Type
16	25 x 3	PWM 65	CB1-16253	PHC4	C
25	25 x 3	PWM 65	CB1-25253	PHC4	C
35	20 x 3	PWM 65	CB1-35203	PHC4	C
35	25 x 3	PWM 65	CB1-35253	PHC4	C
35	30 x 3	PWM 115	CB1-35303	PHC4	C
35	30 x 3,5	PWM 115	CB1-35303,5	PHC4	C
50	30 x 3	PWM 115	CB1-50303	PHC4	C
50	25 x 3	PWM 90	CB1-50253	PHC4	C
50	30 x 3,5	PWM 115	CB1-50303,5	PHC4	C
Ø8	30 x 3	PWM 115	CB1-8SC303	PHC4	C
Ø8	25 x 3	PWM 90	CB1-8SC253	PHC4	C
Ø8	30 x 3,5	PWM 115	CB1-8SC303,5	PHC4	C
70	25 x 3	PWM 90	CB1-70253	PHC4	C
70	30 x 3	PWM 115	CB1-70303	PHC4	C
70	30 x 3,5	PWM 115	CB1-70303,5	PHC4	C
Ø10	25 x 3	PWM 90	CB1-10SC253	PHC4	C
Ø10	30 x 3	PWM 115	CB1-10SC303	PHC4	C
Ø10	30 x 3,5	PWM 115	CB1-10SC303,5	PHC4	C
95	30 x 3	PWM 115	CB1-95303	PHC4	C
95	30 x 3,5	PWM 115	CB1-95303,5	PHC4	C
120	30 x 3	PWM 115	CB1-120303	PHC4	C
120	30 x 3,5	PWM 150	CB1-120303,5	PHC4	C
120	30 x 5	PWM 115	CB1-120305	PHC4	C
150	30 x 3	PWM 150	CB1-150303	PHC4	C
150	30 x 3,5	PWM 150	CB1-150303,5	PHC4	C
150	30 x 5	PWM 150	CB1-150305	PHC4	C
150	40 x 5	PWM 150	CB1-150405	PHC5	D
185	30 x 3	PWM 150	CB1-185303	PHC5	D
185	40 x 5	PWM 150	CB1-185405	PHC5	D
185	50 x 5	PWM 200	CB1-185505	PHC5	D
240	50 x 5	PWM 200	CB1-240505	PHC5	D
240	50 x 6	PWM 2x150	CB1-240506	PHC5	D
300	50 x 6	PWM 2x150	CB1-300506	PHC5	D

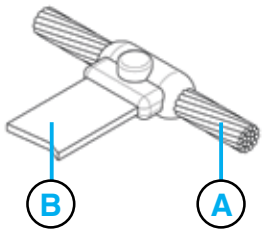
CB4 - CABLE TO BAR



Conductor Size (mm²) **A**	(mm) **B**	*Welding Powder (gr)*	*Connection Type*	*Handle Clamp*	*Mould Type*
16	25 x 3	PWM 65	CB4-16253	PHC4	C
25	25 x 3	PWM 65	CB4-25253	PHC4	C
35	20 x 3	PWM 65	CB4-35203	PHC4	C
35	25 x 3	PWM 65	CB4-35253	PHC4	C
50	30 x 3	PWM 115	CB4-50303	PHC4	C
50	25 x 3	PWM 65	CB4-50253	PHC4	C
50	30 x 3,5	PWM 115	CB4-50303,5	PHC4	C
Ø8	30 x 3	PWM 115	CB4-8SC303	PHC4	C
Ø8	25 x 3	PWM 65	CB4-8SC253	PHC4	C
Ø8	30 x 3,5	PWM 115	CB4-8SC303,5	PHC4	C
70	25 x 3	PWM 90	CB4-70253	PHC4	C
70	30 x 3	PWM 115	CB4-70303	PHC4	C
70	25 x 4	PWM 90	CB4-70254	PHC4	C
70	30 x 3,5	PWM 115	CB4-70303,5	PHC4	C
Ø10	30 x 3	PWM 115	CB4-10SC303	PHC4	C
Ø10	30 x 3,5	PWM 115	CB4-10SC303,5	PHC4	C
95	30 x 3	PWM 115	CB4-95303	PHC4	C
95	30 x 3,5	PWM 115	CB4-95303,5	PHC4	C
120	30 x 3	PWM 115	CB4-120303	PHC4	C
120	30 x 5	PWM 115	CB4-120305	PHC4	C
120	30 x 3,5	PWM 115	CB4-120303,5	PHC4	C
150	30 x 3	PWM 150	CB4-150303	PHC4	C
150	30 x 5	PWM 150	CB4-150305	PHC4	C
150	30 x 3,5	PWM 150	CB4-150303,5	PHC4	C
150	40 x 5	PWM 115	CB4-150405	PHC5	D
185	30 x 3	PWM 150	CB4-185303	PHC5	D
185	40 x 5	PWM 150	CB4-185405	PHC5	D
185	50 x 5	PWM 150	CB4-185505	PHC5	D
240	50 x 5	PWM 200	CB4-240505	PHC5	D
240	50 x 6	PWM 250	CB4-240506	PHC5	D
300	50 x 6	PWM 2x150	CB4-300506	PHC5	D

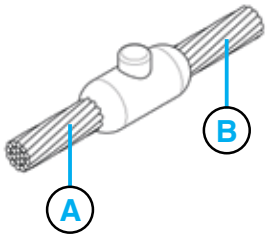
PRODUCT SELECTION CHARTS

CB5 - CABLE TO BAR



Conductor Size (mm²) A	Conductor Size (mm) B	Welding Powder (gr)	Connection Type	Handle Clamp	Mould Type
16	25 x 3	PWM 65	CB5-16253	PHC4	C
25	25 x 3	PWM 65	CB5-25253	PHC4	C
35	25 x 3	PWM 65	CB5-35253	PHC4	C
50	25 x 3	PWM 65	CB5-50253	PHC4	C
Ø8	25 x 3	PWM 65	CB5-8SC253	PHC4	C
70	25 x 3	PWM 90	CB5-70253	PHC4	C
70	30 x 3	PWM 150	CB5-70303	PHC4	C
70	30 x 3,5	PWM 150	CB5-70303,5	PHC4	C
Ø10	25 x 3	PWM 115	CB5-10SC253	PHC4	C
95	30 x 3	PWM 150	CB5-95303	PHC4	C
95	30 x 3,5	PWM 150	CB5-95303,5	PHC4	C
120	25 x 3	PWM 150	CB5-120253	PHC4	C
120	30 x 3,5	PWM 150	CB5-120303,5	PHC4	C
120	30 x 5	PWM 200	CB5-120305	PHC4	C
150	25 x 3	PWM 200	CB5-150253	PHC4	C
150	30 x 5	PWM 200	CB5-150305	PHC5	D
150	40 x 5	PWM 250	CB5-150405	PHC5	D
185	30 x 3	PWM 250	CB5-185303	PHC5	D
185	40 x 5	PWM 250	CB5-185405	PHC5	D
185	50 x 5	PWM 2x150	CB5-185505	PHC5	D
240	50 x 5	PWM 2x150	CB5-240505	PHC5	D
240	50 x 6	PWM 2x150	CB5-240506	PHC5	D
300	50 x 6	PWM 2x150	CB5-300506	PHC5	D

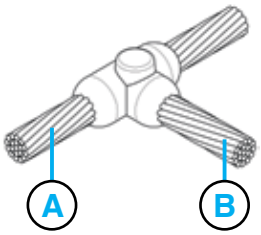
CC1 - CABLE TO CABLE



Conductor Size (mm²) **A**	*Welding Powder (gr)*	*Connection Type*	*Handle Clamp*	*Mould Type*
16	PWM 45	CC1-16	PHC4	C
25	PWM 65	CC1-25	PHC4	C
35	PWM 65	CC1-35	PHC4	C
50	PWM 65	CC1-50	PHC4	C
Ø8	PWM 65	CC1-8SC	PHC4	C
70	PWM 90	CC1-70	PHC4	C
Ø10	PWM 90	CC1-10SC	PHC4	C
95	PWM 90	CC1-95	PHC4	C
120	PWM 115	CC1-120	PHC4	C
150	PWM 150	CC1-150	PHC4	C
185	PWM 150	CC1-185	PHC5	D
240	PWM 200	CC1-240	PHC5	D
300	PWM 250	CC1-300	PHC5	D
400	PWM 2x150	CC1-400	PHC5	D
630	PWM 2x150	CC1-630	PHC5	D

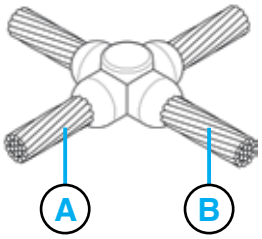
PRODUCT SELECTION CHARTS

CC2 - CABLE TO CABLE



Conductor Size (mm²) A	Conductor Size (mm²) B	Welding Powder (gr)	Connection Type	Handle Clamp	Mould Type
16	16	PWM 45	CC2-1616	PHC4	C
25	25	PWM 65	CC2-2525	PHC4	C
35	35	PWM 65	CC2-3535	PHC4	C
35	25	PWM 65	CC2-3525	PHC4	C
Ø8	Ø8	PWM 90	CC2-88SC	PHC4	C
50	50	PWM 90	CC2-5050	PHC4	C
50	35	PWM 90	CC2-5035	PHC4	C
50	25	PWM 90	CC2-5025	PHC4	C
Ø10	Ø10	PWM 115	CC2-1010SC	PHC4	C
70	70	PWM 115	CC2-7070	PHC4	C
70	50	PWM 115	CC2-7050	PHC4	C
70	35	PWM 90	CC2-7035	PHC4	C
70	25	PWM 90	CC2-7025	PHC4	C
95	95	PWM 115	CC2-9595	PHC4	C
95	70	PWM 115	CC2-9570	PHC4	C
95	50	PWM 115	CC2-9550	PHC4	C
95	35	PWM 90	CC2-9535	PHC4	C
120	120	PWM 150	CC2-120120	PHC4	C
120	95	PWM 150	CC2-12095	PHC4	C
120	70	PWM 115	CC2-12070	PHC4	C
120	50	PWM 115	CC2-12050	PHC5	D
150	150	PWM 200	CC2-150150	PHC5	D
150	120	PWM 200	CC2-150120	PHC5	D
150	95	PWM 150	CC2-15095	PHC4	C
150	70	PWM 115	CC2-15070	PHC4	C
185	185	PWM 250	CC2-185185	PHC5	D
185	150	PWM 200	CC2-185150	PHC5	D
185	120	PWM 200	CC2-185120	PHC5	D
185	95	PWM 200	CC2-18595	PHC5	D
240	240	PWM 2x150	CC2-240240	PHC5	D
240	185	PWM 200	CC2-240185	PHC5	D
240	150	PWM 200	CC2-240150	PHC5	D
240	120	PWM 200	CC2-240120	PHC5	D
300	300	PWM 2x200	CC2-300300	PHC5	D
300	240	PWM 2x200	CC2-300240	PHC5	D
300	185	PWM 250	CC2-300185	PHC5	D
630	630	PWM 2x200	CC2-630630	PHC5	D

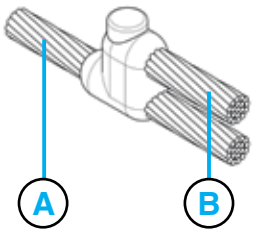
CC4 - CABLE TO CABLE



Conductor Size (mm²) A	Conductor Size (mm²) B	Welding Powder (gr)	Connection Type	Handle Clamp	Mould Type
16	16	PWM 65	CC4-1616	PHC4	C
25	25	PWM 65	CC4-2525	PHC4	C
35	35	PWM 90	CC4-3535	PHC4	C
35	25	PWM 90	CC4-3525	PHC4	C
Ø8	Ø8	PWM 90	CC4-88SC	PHC4	C
50	50	PWM 115	CC4-5050	PHC4	C
50	35	PWM 115	CC4-5035	PHC4	C
50	25	PWM 115	CC4-5025	PHC4	C
Ø10	Ø10	PWM 150	CC4-1010SC	PHC4	C
70	70	PWM 150	CC4-7070	PHC4	C
70	50	PWM 150	CC4-7050	PHC4	C
70	35	PWM 115	CC4-7035	PHC4	C
70	25	PWM 115	CC4-7025	PHC4	C
95	95	PWM 200	CC4-9595	PHC4	C
95	70	PWM 150	CC4-9570	PHC4	C
95	50	PWM 150	CC4-9550	PHC4	C
95	35	PWM 150	CC4-9535	PHC4	C
120	120	PWM 200	CC4-120120	PHC5	D
120	95	PWM 200	CC4-12095	PHC4	C
120	70	PWM 150	CC4-12070	PHC4	C
120	50	PWM 150	CC4-12050	PHC4	C
150	150	PWM 250	CC4-150150	PHC5	D
150	120	PWM 250	CC4-150120	PHC5	D
150	95	PWM 200	CC4-15095	PHC5	D
150	70	PWM 200	CC4-15070	PHC5	D
185	185	PWM 2x150	CC4-185185	PHC5	D
185	150	PWM 250	CC4-185150	PHC5	D
185	120	PWM 250	CC4-185120	PHC5	D
185	95	PWM 200	CC4-18595	PHC5	D
185	70	PWM 200	CC4-18570	PHC5	D
240	240	PWM 2x200	CC4-240240	PHC5	D
240	185	PWM 2x200	CC4-240185	PHC5	D
240	150	PWM 2x200	CC4-240150	PHC5	D
240	120	PWM 2x150	CC4-240120	PHC5	D

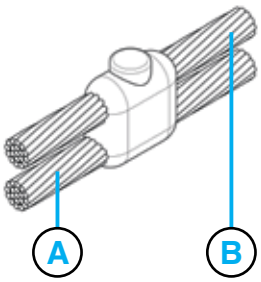
PRODUCT SELECTION CHARTS

CC6 - CABLE TO CABLE



Conductor Size (mm²) **A**	(mm²) **B**	*Welding Powder (gr)*	*Connection Type*	*Handle Clamp*	*Mould Type*
16	16	PWM 65	CC6-1616	PHC4	C
25	25	PWM 65	CC6-2525	PHC4	C
35	35	PWM 65	CC6-3535	PHC4	C
35	25	PWM 65	CC6-3525	PHC4	C
50	50	PWM 90	CC6-5050	PHC4	C
50	35	PWM 90	CC6-5035	PHC4	C
50	25	PWM 65	CC6-5025	PHC4	C
70	70	PWM 115	CC6-7070	PHC4	C
70	50	PWM 115	CC6-7050	PHC4	C
70	35	PWM 115	CC6-7035	PHC4	C
70	25	PWM 90	CC6-7025	PHC4	C
95	95	PWM 150	CC6-9595	PHC4	C
95	70	PWM 150	CC6-9570	PHC4	C
95	50	PWM 115	CC6-9550	PHC4	C
95	35	PWM 115	CC6-9535	PHC4	C
120	120	PWM 200	CC6-120120	PHC4	C
120	95	PWM 200	CC6-12095	PHC4	C
120	70	PWM 150	CC6-12070	PHC4	C
120	50	PWM 115	CC6-12050	PHC4	C

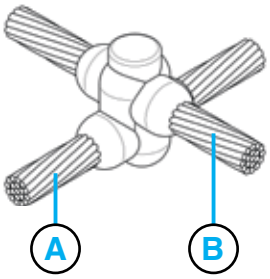
CC7 - CABLE TO CABLE



Conductor Size (mm²) A	Conductor Size (mm²) B	Welding Powder (gr)	Connection Type	Handle Clamp	Mould Type
16	16	PWM 65	CC7-1616	PHC4	C
25	25	PWM 65	CC7-2525	PHC4	C
35	35	PWM 65	CC7-3535	PHC4	C
35	25	PWM 65	CC7-3525	PHC4	C
Ø8	Ø8	PWM 115	CC7-88SC	PHC4	C
50	50	PWM 115	CC7-5050	PHC4	C
50	35	PWM 115	CC7-5035	PHC4	C
50	25	PWM 90	CC7-5025	PHC4	C
Ø10	Ø10	PWM 115	CC7-1010SC	PHC4	C
70	70	PWM 115	CC7-7070	PHC4	C
70	50	PWM 115	CC7-7050	PHC4	C
70	35	PWM 115	CC7-7035	PHC4	C
70	25	PWM 90	CC7-7025	PHC4	C
95	95	PWM 150	CC7-9595	PHC4	C
95	70	PWM 115	CC7-9570	PHC4	C
95	50	PWM 115	CC7-9550	PHC4	C
95	35	PWM 115	CC7-9535	PHC4	C
120	120	PWM 200	CC7-120120	PHC4	C
120	95	PWM 200	CC7-12095	PHC4	C
120	70	PWM 150	CC7-12070	PHC4	C
120	50	PWM 150	CC7-12050	PHC4	C
150	150	PWM 2x150	CC7-150150	PHC5	D
150	120	PWM 250	CC7-150120	PHC5	D
150	95	PWM 200	CC7-15095	PHC5	D
150	70	PWM 150	CC7-15070	PHC5	D
185	185	PWM 2x150	CC7-185185	PHC5	D
185	150	PWM 2x150	CC7-185150	PHC5	D
185	120	PWM 250	CC7-185120	PHC5	D
185	95	PWM 200	CC7-18595	PHC5	D
240	240	PWM 2x200	CC7-240240	PHC5	D
240	185	PWM 2x150	CC7-240185	PHC5	D
240	150	PWM 2x150	CC7-240150	PHC5	D
240	120	PWM 250	CC7-240120	PHC5	D
300	300	PWM 2x250	CC7-300300	PHC5	D
300	240	PWM 2x250	CC7-300240	PHC5	D
300	185	PWM 2x200	CC7-300185	PHC5	D
300	150	PWM 2x150	CC7-300150	PHC5	D

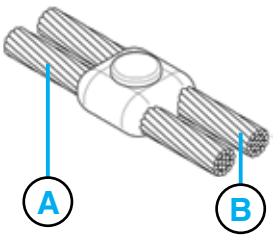
PRODUCT SELECTION CHARTS

CC11 – CABLE TO CABLE



Conductor Size (mm²) A	Conductor Size (mm²) B	Welding Powder (gr)	Connection Type	Handle Clamp	Mould Type
50	50	PWM 150	CC11-5050	PHC4	C
70	70	PWM 200	CC11-7070	PHC4	C
95	95	PWM 250	CC11-9595	PHC4	C
120	120	PWM 2x150	CC11-120120	PHC5	D
150	150	PWM 2x200	CC11-150150	PHC5	D
185	185	PWM 2x250	CC11-185185	PHC5	D
240	240	PWM 2x250	CC11-240240	PHC5	D
Ø8	Ø8	PWM 150	CC11-8SC8SC	PHC4	C
Ø10	Ø10	PWM 150	CC11-10SC10SC	PHC4	C

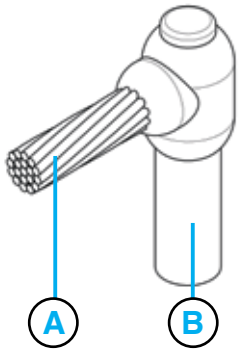
CC14 – CABLE TO CABLE



Conductor Size (mm²) A	Conductor Size (mm²) B	Welding Powder (gr)	Connection Type	Handle Clamp	Mould Type
16	16	PWM 65	CC14-1616	PHC4	C
25	25	PWM 65	CC14-2525	PHC4	C
35	35	PWM 65	CC14-3535	PHC4	C
35	25	PWM 65	CC14-3525	PHC4	C
Ø8	Ø8	PWM 90	CC14-88SC	PHC4	C
50	50	PWM 90	CC14-5050	PHC4	C
50	35	PWM 90	CC14-5035	PHC4	C
50	25	PWM 90	CC14-5025	PHC4	C
70	70	PWM 115	CC14-7070	PHC4	C
70	50	PWM 115	CC14-7050	PHC4	C
70	35	PWM 90	CC14-7035	PHC4	C
70	25	PWM 90	CC14-7025	PHC4	C
95	95	PWM 150	CC14-9595	PHC4	C
95	70	PWM 150	CC14-9570	PHC4	C
95	50	PWM 150	CC14-9550	PHC4	C
95	35	PWM 115	CC14-9535	PHC4	C
120	120	PWM 200	CC14-120120	PHC4	C
120	95	PWM 200	CC14-12095	PHC4	C
120	70	PWM 200	CC14-12070	PHC4	C
120	50	PWM 150	CC14-12050	PHC4	C

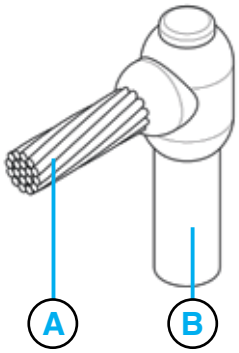
CER1 – CABLE TO EARTHING ROD

Conductor Size (mm) **A**	*Conductor Size* (mm^2) **B**	*Welding Powder (gr)*	*Connection Type*	*Handle Clamp*	*Mould Type*
14,2 (5/8”)	16	PWM 65	CER1-1416	PHC4	C
14,2 (5/8”)	25	PWM 90	CER1-1425	PHC4	C
14,2 (5/8”)	35	PWM 90	CER1-1435	PHC4	C
14,2 (5/8”)	50	PWM 90	CER1-1450	PHC4	C
14,2 (5/8”)	Ø8	PWM 90	CER1-148SC	PHC4	C
14,2 (5/8”)	70	PWM 115	CER1-1470	PHC4	C
14,2 (5/8”)	95	PWM 115	CER1-1495	PHC4	C
14,2 (5/8”)	120	PWM 115	CER1-14120	PHC4	C
14,2 (5/8”)	150	PWM 150	CER1-14150	PHC4	C
14,2 (5/8”)	185	PWM 150	CER1-14185	PHC5	D
14,2 (5/8”)	240	PWM 200	CER1-14240	PHC5	D
14,2 (5/8”)	300	PWM 300	CER1-14300	PHC5	D
17,2 (3/4”)	16	PWM 65	CER1-1716	PHC4	C
17,2 (3/4”)	25	PWM 90	CER1-1725	PHC4	C
17,2 (3/4”)	35	PWM 90	CER1-1735	PHC4	C
17,2 (3/4”)	50	PWM 90	CER1-1750	PHC4	C
17,2 (3/4”)	Ø8	PWM 90	CER1-178SC	PHC4	C
17,2 (3/4”)	70	PWM 115	CER1-1770	PHC4	C
17,2 (3/4”)	95	PWM 115	CER1-1795	PHC4	C
17,2 (3/4”)	120	PWM 115	CER1-17120	PHC4	C
17,2 (3/4”)	150	PWM 150	CER1-17150	PHC4	C
17,2 (3/4”)	185	PWM 150	CER1-17185	PHC5	D
17,2 (3/4”)	240	PWM 200	CER1-17240	PHC5	D
17,2 (3/4”)	300	PWM 300	CER1-17300	PHC5	D



PRODUCT SELECTION CHARTS

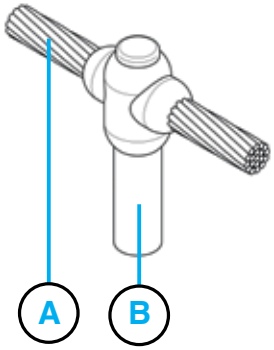
CER1 – CABLE TO EARTHING ROD



Conductor Size (mm) A	Conductor Size (mm^2) B	Welding Powder (gr)	Connection Type	Handle Clamp	Mould Type
16	16	PWM 65	CER1-1616	PHC4	C
16	25	PWM 90	CER1-1625	PHC4	C
16	35	PWM 90	CER1-1635	PHC4	C
16	50	PWM 90	CER1-1650	PHC4	C
16	Ø8	PWM 90	CER1-168SC	PHC4	C
16	70	PWM 115	CER1-1670	PHC4	C
16	95	PWM 115	CER1-1695	PHC4	C
16	120	PWM 115	CER1-16120	PHC4	C
16	150	PWM 150	CER1-16150	PHC4	C
16	185	PWM 150	CER1-16185	PHC5	D
16	240	PWM 200	CER1-16240	PHC5	D
18	16	PWM 90	CER1-1816	PHC4	C
18	25	PWM 90	CER1-1825	PHC4	C
18	35	PWM 90	CER1-1835	PHC4	C
18	50	PWM 90	CER1-1850	PHC4	C
18	Ø8	PWM 90	CER1-188SC	PHC4	C
18	70	PWM 115	CER1-1870	PHC4	C
18	95	PWM 115	CER1-1895	PHC4	C
18	120	PWM 150	CER1-18120	PHC4	C
18	150	PWM 200	CER1-18150	PHC4	C
18	185	PWM 200	CER1-18185	PHC5	D
18	240	PWM 250	CER1-18240	PHC5	D
20	16	PWM 90	CER1-2016	PHC4	C
20	25	PWM 90	CER1-2025	PHC4	C
20	35	PWM 90	CER1-2035	PHC4	C
20	50	PWM 115	CER1-2050	PHC4	C
20	Ø8	PWM 115	CER1-208SC	PHC4	C
20	70	PWM 115	CER1-2070	PHC4	C
20	95	PWM 150	CER1-2095	PHC4	C
20	120	PWM 150	CER1-20120	PHC4	C
20	150	PWM 200	CER1-20150	PHC4	C
20	185	PWM 250	CER1-20185	PHC5	D
20	240	PWM 250	CER1-20240	PHC5	D
20	300	PWM 250	CER1-20300	PHC5	D

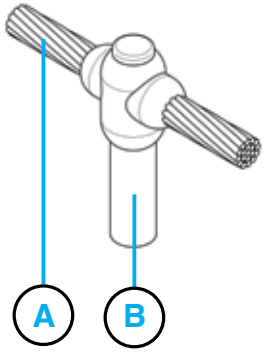
CER2 – CABLE TO EARTHING ROD

Conductor Size (mm) A	Conductor Size (mm^2) B	Welding Powder (gr)	Connection Type	Handle Clamp	Mould Type
14,2 (5/8”)	16	PWM 65	CER2-1416	PHC4	C
14,2 (5/8”)	25	PWM 90	CER2-1425	PHC4	C
14,2 (5/8”)	35	PWM 90	CER2-1435	PHC4	C
14,2 (5/8”)	50	PWM 90	CER2-1450	PHC4	C
14,2 (5/8”)	Ø8	PWM 90	CER2-148SC	PHC4	C
14,2 (5/8”)	70	PWM 115	CER2-1470	PHC4	C
14,2 (5/8”)	95	PWM 115	CER2-1495	PHC4	C
14,2 (5/8”)	120	PWM 115	CER2-14120	PHC4	C
14,2 (5/8”)	150	PWM 150	CER2-14150	PHC4	C
14,2 (5/8”)	185	PWM 150	CER2-14185	PHC5	D
14,2 (5/8”)	240	PWM 200	CER2-14240	PHC5	D
14,2 (5/8”)	300	PWM 300	CER2-14300	PHC5	D
17,2 (3/4”)	16	PWM 65	CER2-1716	PHC4	C
17,2 (3/4”)	25	PWM 90	CER2-1725	PHC4	C
17,2 (3/4”)	35	PWM 90	CER2-1735	PHC4	C
17,2 (3/4”)	50	PWM 90	CER2-1750	PHC4	C
17,2 (3/4”)	Ø8	PWM 90	CER2-178SC	PHC4	C
17,2 (3/4”)	70	PWM 115	CER2-1770	PHC4	C
17,2 (3/4”)	95	PWM 115	CER2-1795	PHC4	C
17,2 (3/4”)	120	PWM 115	CER2-17120	PHC4	C
17,2 (3/4”)	150	PWM 150	CER2-17150	PHC4	C
17,2 (3/4”)	185	PWM 150	CER2-17185	PHC5	D
17,2 (3/4”)	240	PWM 200	CER2-17240	PHC5	D
17,2 (3/4”)	300	PWM 300	CER2-17300	PHC5	D



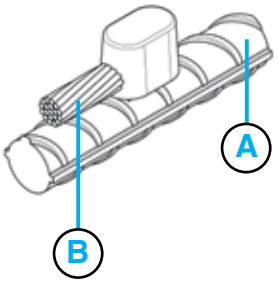
PRODUCT SELECTION CHARTS

CER2 – CABLE TO EARTHING ROD



Conductor Size (mm) A	Conductor Size (mm^2) B	Welding Powder (gr)	Connection Type	Handle Clamp	Mould Type
16	16	PWM 65	CER2-1616	PHC4	C
16	25	PWM 90	CER2-1625	PHC4	C
16	35	PWM 90	CER2-1635	PHC4	C
16	50	PWM 90	CER2-1650	PHC4	C
16	Ø8	PWM 90	CER2-168SC	PHC4	C
16	70	PWM 115	CER2-1670	PHC4	C
16	95	PWM 115	CER2-1695	PHC4	C
16	120	PWM 115	CER2-16120	PHC4	C
16	150	PWM 150	CER2-16150	PHC5	D
16	185	PWM 150	CER2-16185	PHC5	D
16	240	PWM 200	CER2-16240	PHC5	D
18	16	PWM 90	CER2-1816	PHC4	C
18	25	PWM 90	CER2-1825	PHC4	C
18	35	PWM 90	CER2-1835	PHC4	C
18	50	PWM 115	CER2-1850	PHC4	C
18	Ø8	PWM 115	CER2-188SC	PHC4	C
18	70	PWM 115	CER2-1870	PHC4	C
18	95	PWM 150	CER2-1895	PHC4	C
18	120	PWM 150	CER2-18120	PHC4	C
18	150	PWM 200	CER2-18150	PHC5	D
18	185	PWM 200	CER2-18185	PHC5	D
18	240	PWM 250	CER2-18240	PHC5	D
20	16	PWM 90	CER2-2016	PHC4	C
20	25	PWM 90	CER2-2025	PHC4	C
20	35	PWM 90	CER2-2035	PHC4	C
20	50	PWM 115	CER2-2050	PHC4	C
20	Ø8	PWM 115	CER2-208SC	PHC4	C
20	70	PWM 115	CER2-2070	PHC4	C
20	95	PWM 150	CER2-2095	PHC4	C
20	120	PWM 150	CER2-20120	PHC4	C
20	150	PWM 200	CER2-20150	PHC5	D
20	185	PWM 250	CER2-20185	PHC5	D
20	240	PWM 250	CER2-20240	PHC5	D
20	300	PWM 250	CER2-20300	PHC5	D

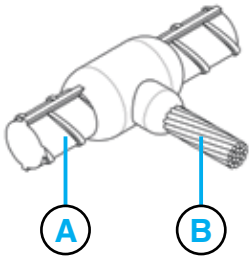
CR1 – CABLE TO REINFORCEMENT



Conductor Size (mm) **A**	*Conductor Size* (mm^2) **B**	*Welding Powder (gr)*	*Mould*	*Handle Clamp*	*Mould Type*
20	16	PWM 65	CR1-16	PHC3	C
20	25	PWM 65	CR1-25	PHC3	C
20	35	PWM 65	CR1-35	PHC3	C
20	Ø8	PWM 90	CR1-8SC	PHC3	C
20	50	PWM 90	CR1-50	PHC3	C
20	Ø10	PWM 115	CR1-10SC	PHC3	C
20	70	PWM 115	CR1-70	PHC3	C
20	95	PWM 115	CR1-95	PHC3	C
20	120	PWM 150	CR1-120	PHC3	C

PRODUCT SELECTION CHARTS

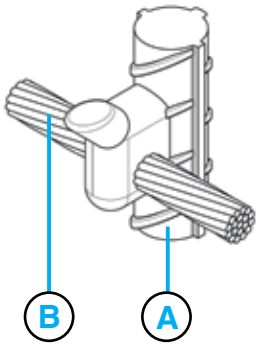
CR2 – CABLE TO REINFORCEMENT



Conductor Size (mm) A	Conductor Size (mm^2) B	Welding Powder (gr)	Mould	Handle Clamp	Mould Type
16	Ø8	PWM 115	CR2-16R8SC	PHC4	C
16	50	PWM 115	CR2-16R50	PHC4	C
16	Ø10	PWM 115	CR2-16R10SC	PHC4	C
16	70	PWM 115	CR2-16R70	PHC4	C
16	95	PWM 150	CR2-16R95	PHC4	C
16	120	PWM 150	CR2-16R120	PHC4	C
18	Ø8	PWM 150	CR2-18R8SC	PHC4	C
18	50	PWM 150	CR2-18R50	PHC4	C
18	Ø10	PWM 150	CR2-18R10SC	PHC4	C
18	70	PWM 150	CR2-18R70	PHC4	C
18	95	PWM 150	CR2-18R95	PHC4	C
18	120	PWM 200	CR2-18R120	PHC4	C
20	Ø8	PWM 150	CR2-20R8SC	PHC5	D
20	50	PWM 150	CR2-20R50	PHC5	D
20	Ø10	PWM 150	CR2-20R10SC	PHC5	D
20	70	PWM 150	CR2-20R70	PHC5	D
20	95	PWM 200	CR2-20R95	PHC5	D
20	120	PWM 200	CR2-20R120	PHC5	D
25	Ø8	PWM 200	CR2-25R8SC	PHC5	D
25	50	PWM 200	CR2-25R50	PHC5	D
25	Ø10	PWM 250	CR2-25R10SC	PHC5	D
25	70	PWM 250	CR2-25R70	PHC5	D
25	95	PWM 250	CR2-25R95	PHC5	D
25	120	PWM 250	CR2-25R120	PHC5	D
30	Ø8	PWM 2x150	CR2-30R8SC	PHC5	D
30	50	PWM 2x150	CR2-30R50	PHC5	D
30	Ø10	PWM 2x150	KD2-30R10SC	PHC5	D
30	70	PWM 2x150	CR2-30R70	PHC5	D
30	95	PWM 2x150	CR2-30R95	PHC5	D
30	120	PWM 2x200	CR2-30R120	PHC5	D

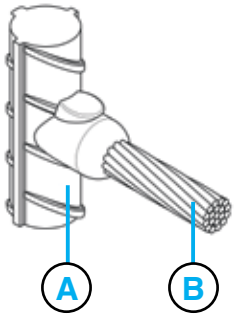
CR3 – CABLE TO REINFORCEMENT

Conductor Size (mm²) A	(mm²) B	Welding Powder (gr)	Mould	Handle Clamp	Mould Type
10-40	Ø10	PWM 90	CR3-10SC	PHC4	C
10-40	Ø8	PWM 90	CR3-8SC	PHC4	C
10-40	50	PWM 90	CR3-50	PHC4	C
10-40	70	PWM 90	CR3-70	PHC4	C
10-40	95	PWM 115	CR3-95	PHC4	C
10-40	120	PWM 115	CR3-120	PHC4	C



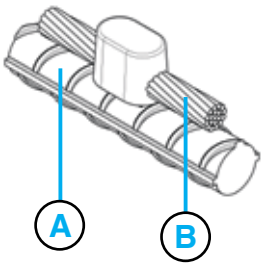
CR6 – CABLE TO REINFORCEMENT

Conductor Size (mm²) A	(mm²) B	Welding Powder (gr)	Mould	Handle Clamp	Mould Type
10-40	Ø8	PWM 65	CR6-8SC	PHC4	C
10-40	50	PWM 65	CR6-50	PHC4	C
10-40	Ø10	PWM 90	CR6-10SC	PHC4	C
10-40	70	PWM 90	CR6-70	PHC4	C
10-40	95	PWM 90	CR6-95	PHC4	C
10-40	120	PWM 90	CR6-120	PHC4	C



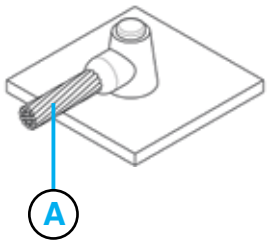
CR17 – CABLE TO REINFORCEMENT

Conductor Size (mm²) A	(mm²) B	Welding Powder (gr)	Mould	Handle Clamp	Mould Type
20	16	PWM 65	CR17-16	PHC4	C
20	25	PWM 65	CR17-25	PHC4	C
20	35	PWM 65	CR17-35	PHC4	C
20	Ø8	PWM 90	CR17-8SC	PHC4	C
20	50	PWM 90	CR17-50	PHC4	C
20	Ø10	PWM 115	CR17-10SC	PHC4	C
20	70	PWM 115	CR17-70	PHC4	C
20	95	PWM 115	CR17-95	PHC4	C
20	120	PWM 150	CR17-120	PHC4	C



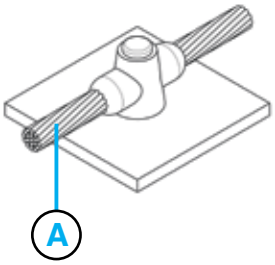
PRODUCT SELECTION CHARTS

CSS1 – CABLE TO STEEL FLAT SURFACE



Conductor Size (mm²) A	Welding Powder (gr)	Mould	Handle Clamp	Mould Type
16	PWM 45	CSS1-16	PHC1	C
25	PWM 45	CSS1-25	PHC1	C
35	PWM 45	CSS1-35	PHC1	C
Ø8	PWM 90	CSS1-8SC	PHC1	C
50	PWM 90	CSS1-50	PHC1	C
Ø10	PWM 90	CSS1-10SC	PHC1	C
70	PWM 90	CSS1-70	PHC1	C
95	PWM 115	CSS1-95	PHC1	C
120	PWM 115	CSS1-120	PHC1	C
150	PWM 150	CSS1-150	PHC1	C
185	PWM 200	CSS1-185	PHC1	C
240	PWM 200	CSS1-240	PHC1	C
300	PWM 250	CSS1-300	PHC1	C

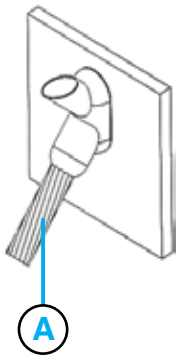
CSS2 – CABLE TO STEEL FLAT SURFACE



Conductor Size (mm²) A	Welding Powder (gr)	Mould	Handle Clamp	Mould Type
16	PWM 45	CSS2-16	PHC4	C
25	PWM 45	CSS2-25	PHC4	C
35	PWM 45	CSS2-35	PHC4	C
Ø8	PWM 90	CSS2-8SC	PHC4	C
50	PWM 90	CSS2-50	PHC4	C
Ø10	PWM 115	CSS2-10SC	PHC4	C
70	PWM 115	CSS2-70	PHC4	C
95	PWM 115	CSS2-95	PHC4	C
120	PWM 150	CSS2-120	PHC4	C
150	PWM 200	CSS2-150	PHC5	D
185	PWM 250	CSS2-185	PHC5	D
240	PWM 2X150	CSS2-240	PHC5	D
300	PWM 2X200	CSS2-300	PHC5	D

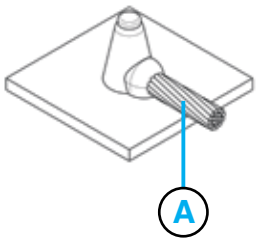
CSS3 – CABLE TO STEEL FLAT SURFACE

Conductor Size (mm²) **A**	*Welding Powder (gr)*	*Mould*	*Handle Clamp*	*Mould Type*
16	PWM 45	CSS3-16	PHC4	C
25	PWM 45	CSS3-25	PHC4	C
35	PWM 45	CSS3-35	PHC4	C
Ø8	PWM 65	CSS3-8SC	PHC4	C
50	PWM 65	CSS3-50	PHC4	C
Ø10	PWM 90	CSS3-10SC	PHC4	C
70	PWM 90	CSS3-70	PHC4	C
95	PWM 115	CSS3-95	PHC4	C
120	PWM 115	CSS3-120	PHC4	C
150	PWM 115	CSS3-150	PHC5	D
185	PWM 200	CSS3-185	PHC5	D
240	PWM 200	CSS3-240	PHC5	D
300	PWM 250	CSS3-300	PHC5	D



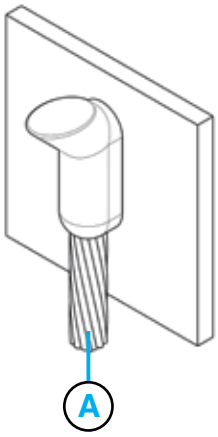
CSS8 – CABLE TO STEEL FLAT SURFACE

Conductor Size (mm²) **A**	*Welding Powder (gr)*	*Mould*	*Handle Clamp*	*Mould Type*
16	PWM 45	CSS8-16	PHC4	A
25	PWM 45	CSS8-25	PHC4	A
35	PWM 45	CSS8-35	PHC4	A
Ø8	PWM 45	CSS8-8SC	PHC4	A
50	PWM 45	CSS8-50	PHC4	A
Ø10	PWM 65	CSS8-10SC	PHC4	A
70	PWM 65	CSS8-70	PHC4	A
95	PWM 90	CSS8-95	PHC4	A
120	PWM 115	CSS8-120	PHC4	A
150	PWM 150	CSS8-150	PHC5	D
185	PWM 200	CSS8-185	PHC5	D
240	PWM 200	CSS8-240	PHC5	D
300	PWM 250	CSS8-300	PHC5	D



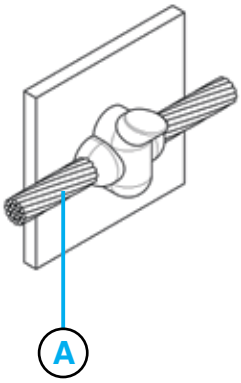
PRODUCT SELECTION CHARTS

CSS25 – CABLE TO STEEL FLAT SURFACE



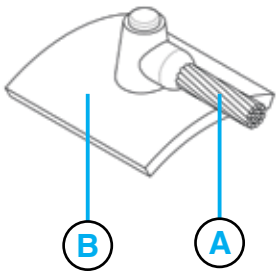
Conductor Size (mm²) **A**	*Welding Powder (gr)*	*Mould*	*Handle Clamp*	*Mould Type*
16	PWM 45	CSS25-16	PHC4	C
25	PWM 45	CSS25-25	PHC4	C
35	PWM 45	CSS25-35	PHC4	C
Ø8	PWM 65	CSS25-8SC	PHC4	C
50	PWM 65	CSS25-50	PHC4	C
Ø10	PWM 90	CSS25-10SC	PHC4	C
70	PWM 90	CSS25-70	PHC4	C
95	PWM 115	CSS25-95	PHC4	C
120	PWM 115	CSS25-120	PHC4	C
150	PWM 150	CSS25-150	PHC5	D
185	PWM 200	CSS25-185	PHC5	D
240	PWM 200	CSS25-240	PHC5	D
300	PWM 250	CSS25-300	PHC5	D

CSS27 – CABLE TO STEEL FLAT SURFACE



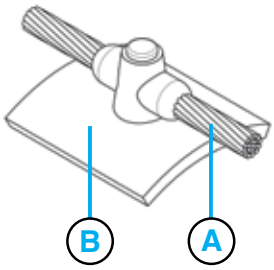
Conductor Size (mm²) **A**	*Welding Powder (gr)*	*Mould*	*Handle Clamp*	*Mould Type*
16	PWM 45	CSS27-16	PHC4	C
25	PWM 45	CSS27-25	PHC4	C
35	PWM 45	CSS27-35	PHC4	C
Ø8	PWM 65	CSS27-8SC	PHC4	C
50	PWM 65	CSS27-50	PHC4	C
Ø10	PWM 115	CSS27-10SC	PHC4	C
70	PWM 115	CSS27-70	PHC4	C
95	PWM 150	CSS27-95	PHC4	C
120	PWM 150	CSS27-120	PHC4	C
150	PWM 200	CSS27-150	PHC5	D
185	PWM 250	CSS27-185	PHC5	D
240	PWM 2X150	CSS27-240	PHC5	D
300	PWM 2X200	CSS27-300	PHC5	D

CSS32 – CABLE TO STEEL CURVED SURFACE OR PIPE



Conductor Size (mm^2) **A**	*Surface Size* (mm) **B**	*Welding Powder (gr)*	*Mould*	*Handle Clamp*	*Mould Type*
4	<125	PWM 15	CSS32-4-A	PHC4	C
4	>125	PWM 15	CSS32-4-B	PHC4	C
6	<125	PWM 15	CSS32-6-A	PHC4	C
6	>125	PWM 15	CSS32-6-B	PHC4	C
10	<125	PWM25	CSS32-10-A	PHC4	C
10	>125	PWM 25	CSS32-10-B	PHC4	C
16	<125	PWM 45	CSS32-16-A	PHC4	C
16	>125	PWM 45	CSS32-16-B	PHC4	C
25	<70	PWM 25	CSS32-25-C	PHC4	C
25	70-165	PWM 25	CSS32-25-D	PHC4	C
25	>165	PWM 25	CSS32-25-E	PHC4	C
35	<70	PWM 45	CSS32-35-C	PHC4	C
35	70-165	PWM 45	CSS32-35-D	PHC4	C
35	165-250	PWM 45	CSS32-35-F	PHC4	C
35	>250	PWM 45	CSS32-35-G	PHC4	C
50	<70	PWM 45	CSS32-50-C	PHC4	C
50	70-165	PWM 45	CSS32-50-D	PHC4	C
50	165-250	PWM 45	CSS32-50-F	PHC4	C
50	>250	PWM 45	CSS32-50-G	PHC4	C
70	<70	PWM 65	CSS32-70-C	PHC4	C
70	70-165	PWM 65	CSS32-70-D	PHC4	C
70	165-250	PWM 65	CSS32-70-F	PHC4	C
70	>250	PWM 65	CSS32-70-G	PHC4	C

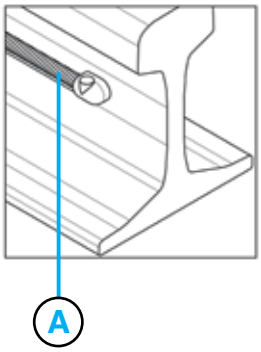
CSS34 – CABLE TO STEEL CURVED SURFACE OR PIPE

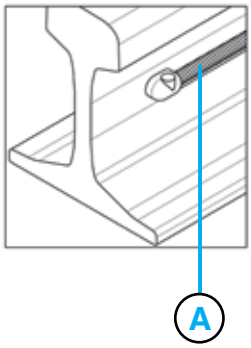


Conductor Size (mm^2) **A**	*Conductor Size* (mm) **B**	*Welding Powder (gr)*	*Mould*	*Handle Clamp*	*Mould Type*
4	<125	PWM 15	CSS34-4-A	PHC4	C
4	>125	PWM 15	CSS34-4-B	PHC4	C
6	<125	PWM 15	CSS34-6-A	PHC4	C
6	>125	PWM 15	CSS34-6-B	PHC4	C
10	<125	PWM 32	CSS34-10-A	PHC4	C
10	>125	PWM 32	CSS34-10-B	PHC4	C
16	<125	PWM 45	CSS34-16-A	PHC4	C
16	>125	PWM 45	CSS34-16-B	PHC4	C
25	<70	PWM 32	CSS34-25-C	PHC4	C
25	70-165	PWM 32	CSS34-25-D	PHC4	C
25	>165	PWM 32	CSS34-25-E	PHC4	C
35	<70	PWM 45	CSS34-35-C	PHC4	C
35	70-165	PWM 45	CSS34-35-D	PHC4	C
35	165-250	PWM 45	CSS34-35-F	PHC4	C
35	>250	PWM 45	CSS34-35-G	PHC4	C
50	<70	PWM 65	CSS34-50-C	PHC4	C
50	70-165	PWM 65	CSS34-50-D	PHC4	C
50	165-250	PWM 65	CSS34-50-F	PHC4	C
50	>250	PWM 65	CSS34-50-G	PHC4	C

CR40 – CABLE TO RAIL

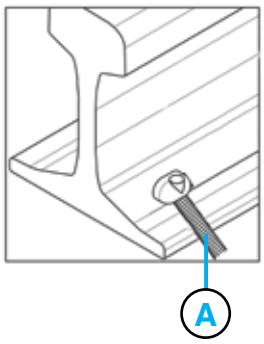
Conductor Size (mm²) **A**	*Welding Powder (gr)*	*Mould*	*Handle Clamp*	*Mould Type*
16	PWM 45	CR4L-16	PHC1	C
16	PWM 45	CR4R-16	PHC1	C
25	PWM 45	CR4L-25	PHC1	C
25	PWM 45	CR4R-25	PHC1	C
35	PWM 45	CR4L-35	PHC1	C
35	PWM 45	CR4R-35	PHC1	C
50	PWM 65	CR4L-50	PHC1	C
50	PWM 75	CR4R-50	PHC1	C
70	PWM 75	CR4L-70	PHC1	C
70	PWM 75	CR4R-70	PHC1	C
95	PWM 75	CR4L-95	PHC1	C
95	PWM 115	CR4R-95	PHC1	C
120	PWM 115	CR4L-120	PHC1	C
120	PWM 115	CR4R-120	PHC1	C
150	PWM 150	CR4L-150	PHC1	C
150	PWM 150	CR4R-150	PHC1	C





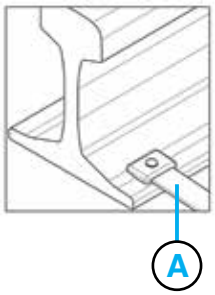
CR5 – CABLE TO RAIL

Conductor Size (mm²) **A**	*Welding Powder (gr)*	*Mould*	*Handle Clamp*	*Mould Type*
16	PWM 25	CR5-16	PHC1	C
25	PWM 25	CR5-25	PHC1	C
35	PWM 32	CR5-35	PHC1	C
50	PWM 45	CR5-50	PHC1	C
70	PWM 65	CR5-70	PHC1	C
95	PWM 65	CR5-95	PHC1	C
120	PWM 90	CR5-120	PHC1	C
150	PWM 115	CR5-150	PHC1	C



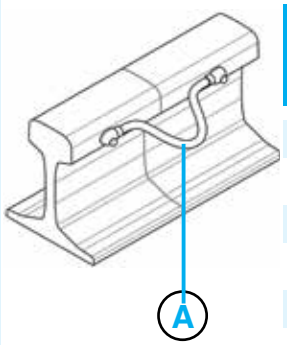
PRODUCT SELECTION CHARTS

CR6 – BAR TO RAIL



Conductor Size (mm²) **A**	Welding Powder (gr)	Mould	Handle Clamp	Mould Type
25 x 3	PWM 65	CR6-3-253	PHC1	C

CR12 – CABLE TO RAIL



Conductor Size (mm²) **A**	Welding Powder (gr)	Mould	Handle Clamp	Mould Type
25	PWM 32	CR12-25	PHC4	C
35	PWM 32	CR12-35	PHC4	C
50	PWM 45	CR12-50	PHC4	C
70	PWM 65	CR12-70	PHC4	C
95	PWM 75	CR12-95	PHC4	C
120	PWM 115	CR12-120	PHC4	C

WELDING POWDER (PROWELD)

Product Code	Material	Powder Weight (gr)	Box Quantity	Box Weight
PW 70165	Copper Alloy	65	20	1,72
PW 70190	Copper Alloy	90	20	2,22
PW 701115	Copper Alloy	115	20	2,76
PW 701150	Copper Alloy	150	10	1,79
PW 701200	Copper Alloy	200	10	2,28
PW 701250	Copper Alloy	250	10	2,79

WELDING MOULD

Product Code	Material	Type	Size (mm)	Weight (kg)
PW 7020C	Graphite	C	150 x 75 x 75	1,63
PW 7020D	Graphite	D	175 x 100 x 100	2,25

Graphite cover available upon request.

MOULD HANDLE CLAMP

Product Code	Type	Weight (kg)
PW 7035	PHC5 - L159	1,13
PW 7034	PHC4 - L160	1,10
PW 7031	PHC1 - L161	0,48

GROUNDING SYSTEMS

MOULD SEALER

Product Code	Weight (kg)
PW 70418	1,01

FLINT GUN

Product Code	Weight (kg)
PW 705	0,09

ELECTRONIC IGNITOR

Product Code	Weight (kg)
PW 706	0,18

WELDING FUSE

Product Code	Material	Box Quantity	Weight (kg)
PW 706-F	Welding Fuse	100	0,36

CORROSION TAPE STRIP

Product Code	Size (mm)	Roll Length (mt)	Weight (kg)
PW 70794	0,5 x 50	10	1,0
PW 70795	0,5 x 100	10	0,5

MOULD CLEANING SCRAPER

Product Code	Material	Weight (kg)
PW 708	Galvanized Steel	0,08

CLEANING BRUSH

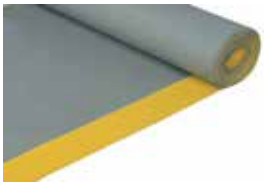
Product Code	Type	Weight (kg)
PW 70901	Conductor cleaning brush	0,10
PW 70902	Mould cleaning brush	0,02

PROTART

EQUIPOTENTIAL EARTH BARS

INSULATING EQUIPMENTS

INSULATING MAT



Product Code	*Thickness (mm)*	*Usage Voltage (kV)*	*Colour*	*Yellow Warning Band*
ES 60101 B	2	1	Black	No
ES 601010 B	2	10	Black	No
ES 601020 B	3	20	Black	No
ES 601036 B	5	36	Black	No
ES 601010 G	2	10	Grey	No
ES 601020 G	3	20	Grey	No
ES 601036 G	5	36	Grey	No
ES 601010 B-Y	2	10	Black	Yes
ES 601020 B-Y	3	20	Black	Yes
ES 601036 B-Y	5	36	Black	Yes
ES 601010 G-Y	2	10	Grey	Yes
ES 601020 G-Y	3	20	Grey	Yes
ES 601036 G-Y	5	36	Grey	Yes

Produced as 10 meter rolls.

DANGER OF DEAD WARNING PLATE

Product Code	Material	Dimensions (mm)	Weight (kg)
WPD 15	Aluminium	15 x 230	0.039

ACTIVE LIGHTNING CONDUCTOR WARNING PLATE

Product Code	Material	Dimensions (cm)	Weight (kg)
WPE 10	Aluminium	10x10x10	0,024

STATIC ELECTRIC PLATE

Product Code	Material	Dimensions (mm)	Weight (kg)
WPS 20	Copper	250 x 300 x 1,5	0,940

STATIC ELECTRIC REEL

Product Code	Cable	Clamp	Cable Length (m)	Weight (kg)
ES 906	Steel	Aluminium	6	4,000
ES 9015	Steel	Aluminium	15	8,000

Product Code	Cable Length (m)	Weight (kg)
ES 9108	8	16,000

PRO ART

SURGE PROTECTION DEVICES

TECHNICAL INFORMATION

What Is Instantaneous Overvoltage and How Is It Formed?

Instantaneous overvoltages (impulse voltages) are those that appear within a few microseconds (micro 1/100,000) and a few milliseconds (milli 1/1000) with a magnitude varying between 5 to 10KV. Voltages with such magnitude equal 8-10 times the tolerance limits of electronic devices.

Instantaneous overvoltages can be network-induced or atmospheric-induced. Atmospheric-induced voltages are known as "lightning impacts". Transient voltage fluctuations, voltage dips, short interruptions, slow and quick voltage changes and harmonics are examples of network-induced impacts. There are also electrical switching incidents that have an effective role on the formation of instantaneous overvoltages.

What Are Lightning-Induced Overvoltages?

Lightning is mostly known for the direct damage it causes as a naturally occurring event that generally leads to physical damage and fire. However, there are many reasons to take precautions against the indirect damages of lightning in electrical applications. An impulse voltage that can reach up to a level of 500V is about 2.5 times that of a 230VAC nominal operating voltage. Therefore, it is inevitable that impulse voltages able to reach up to 100 times the nominal voltage of a device will be destructive. Indeed, lightning discharges causing instantaneous overvoltages in energy, phone and data communication lines have been observed to grow up to 530,000 amperes of current. 200,000 amperes is the recognized upper limit within this scope, and these discharges generally occur between 2,000 and 200,000 amperes.

a) Direct Effect of Lightning (Galvanic Coupling)

When a lightning impact falls on an external lightning conductor (lightning rod, Meshed Cage) system on a building or any carrier metal point (dish, antenna, etc.) on the roof, it moves to the indoor installation through the available grounding system as a result of the voltage increase that occurs in the grounding impedance, and pumps high partial lightning currents to the connected devices. Lightning can also directly strike on energy lines (low voltage overhead lines) and data lines, which causes the high partial lightning currents to be transferred into the building.

b) Indirect Effects of Lightning

The secondary effect of lightning currents causes instantaneous overvoltages in two ways. Resistance coupling and inductive coupling.

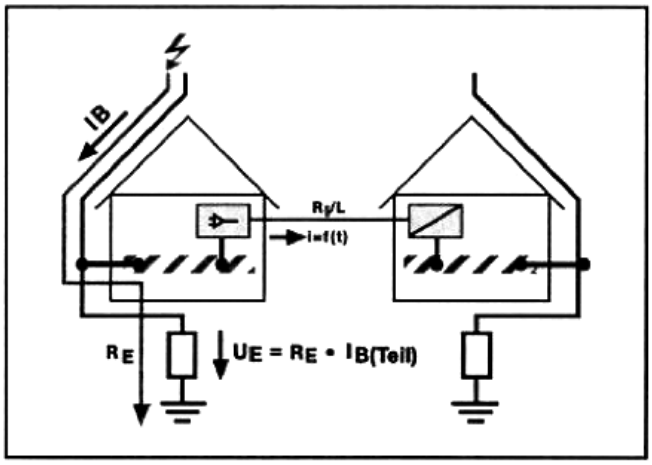
i) Resistance coupling

Resistance coupling occurs when lightning strikes on buildings or a group of buildings that have an electrical connection between each other. The two buildings seen in the figure have a single grounding system. The grounding system of the building close to the location of the lightning strike is under the effect of potential tent (voltage gradient) created by the lightning. However, the grounding system of the next building with which it has an electrical connection, is reference ground as compared to the potential tent. Therefore, circulating currents flow through the electrical connections between them, and overvoltages occur on the devices.

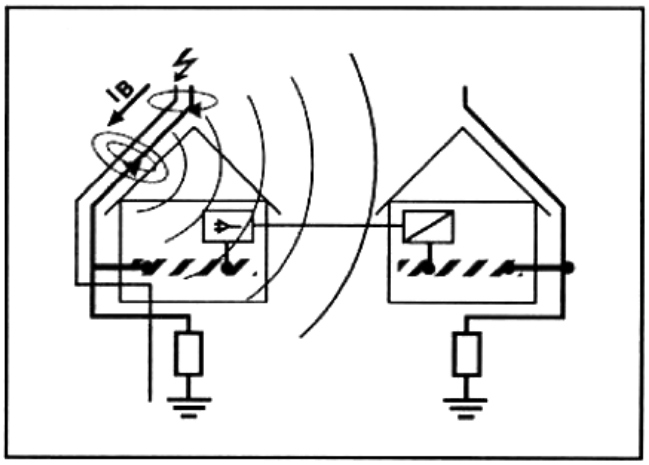
ii) Inductive coupling

Inductive coupling can be defined as the transforming effect between lightning currents and lines. A lightning current with a very large value creates a magnetic field, and this magnetic field induces voltages in nearby lines (Figure 3).

Resistance Coupling



Inductive Coupling



Overvoltage Protectors and their Operating Principles

Internal lightning conductors=overvoltage protectors connected between phases and the ground, and neutral loads and the ground in low voltage systems, switch to conduction in case of an impact and absorb the instantaneous overvoltage onto themselves. They take on the impulse voltages to which the system would be exposed.

• Type 1 = Class B Protection Products

Type 1 products have been designed to limit the effects of high-power lightning impacts, and generally operate with spark gap technology. They are used at the closest point to a low voltage supply line of a facility with a lightning rod or at a distance of 50m, and prevent damage to main supply points caused by lightning discharges. It is possible to individually protect each phase with unipolar manufactured modules. When the impulse voltage to which they are exposed reaches the critical value, they absorb this high voltage themselves and conduct it to the ground.

• Type 2 = Class C Protection Products

Placed on each distribution panel in an installation to protect against internally produced overvoltages, Type 2 = Class C overvoltage protectors operate with MOV (metal oxide varistor) technology, and are used against lower level impulse voltages for additional protection purposes. The overvoltages that switch in this way are reduced to acceptable levels.

• Type 1+2 = Class B+C Protection Products

In some facilities (GSM base stations), the distance between class B and C catchers can be shorter than it should be (container scale facilities). In such case, either inductive coupling is used or combined B+C protection sets, including class B and C protection, are preferred to enable coordination between elements.

• Type 3 = Class D Protection Products

An adapter-type protection module has been developed to meet the protection requirements of various devices. Thanks to its structure, the adapter is connected to the system easily, and enables an effective protection at ultimate device level. A protection circuit combining a varistor and gas arrester protects the connected devices against network harmonics. Varistors can become over-loaded due to very high or very frequent voltage impacts. As a result, the residual current might increase in the components within the circuit, leading to heating. A thermal separator connected to the varistor is mounted to prevent excessive heating of these components.

• Coaxial and Antenna Line Protectors

These are the modules that have been specifically designed for the protection of receiving and transmitting stations in the communication systems. They enable the protection of antenna input against instantaneous voltage flow impacts. They have a very wide field of application for the multiple input-output and wide-range radio communication systems of police and fire departments.

• Protection of Data Lines

In applications where signal transmission is handled through a coaxial cable, such as computers, data processing systems, or video systems, adapter modules with BNC connectors are recommended to prevent damage on devices caused by impulse voltages. This product can operate both grounded or floating. External grounding can be performed on the device. The protection circuit is placed in a metal case with BNC connection.

Other Factors Causing Overvoltages

a) Electrical Switching Incidents

Instantaneous voltages causing electrical switching incidents are very common and considered a significant interference source. The current flowing through a conductor creates a magnetic field around it, and the magnetic field suddenly decreases when the current is cut (switch is on). The energy accumulating on the conductor is distributed through induction as instantaneous overvoltage.

b) Network Peaks

No matter how solid the infrastructure is, due to non-compliance of the production or energy transfer lines with some international standards, and static load negations occurring in the areas it flows through, OSB transformers that feed hundreds of factories in the regions where companies or institutions using this energy are located generate peaks against instantaneous loads.

c) Network Harmonics

Harmonics is the most talked about power quality problem in recent years and has various disruptive effects on many different facilities. Electronic card failures are one of the effects of harmonics. Condensers inside the parasite filter found in the card leads might also draw over-current and explode. When it comes to card failures of critical loads such as CNC benches, the financial burden of this problem becomes serious.

Problems Caused by Overvoltages

Problems occur in three stages depending on the magnitude of the incoming overvoltage.

a) Failure

Although no physical damage occurs, data loss and unexplained computer freezing is experienced as a result of the disruptions in the analog and digital levels of the systems. The system has to be reset.

b) Wear

The life of electronic hardware that is exposed to instantaneous overvoltages intermittently is shortened, and this wear over time will probably lead to potential faults and failures. The life of an incandescent bulb can even be reduced to a 13th of the operating voltage. (If a 220 volt bulb is operated with 250V, its life decreases to 200 hours).

c) Damage

Great instantaneous overvoltages cause damages in hardware, circuit panels and I/O cards.

What Happens If An Overvoltage Protector Is Not Used?

The potential problems that can be encountered in the absence of an overvoltage protector are as follows.

- *Leakage of toxic substances as a result of halted measuring-control systems in chemical and nuclear facilities.*
- *Damage and failures due to loss of control of robotic systems.*
- *Damage and failures in medical electronic devices and life support units used in hospitals.*
- *Cease of communication due to damage in telephone switchboards.*
- *Renewal of expensive equipment due to damage.*
- *Cease of production in factories. (Especially in sites where computer-assisted manufacturing (CAM) is performed)*
- *Damage and failures in camera and alarm systems.*

SURGE PROTECTION DEVICES

TYPE 1 CLASS B

Product Code	Class	Continuous Operating Voltage (V)	Voltage Protection Level (kV)	Total Discharge Current (kA)
SPD 1B255-1	1	255	≤ 4.0	50
SPD 1B255-2	1	255	≤ 4.0	100

TYPE 1 + 2 CLASS B+C

Product Code	Class	Continuous Operating Voltage (V)	Voltage Protection Level (kV)	Total Discharge Current (kA)
SPD 12BC255-1	1-2	255	≤ 1.2, ≤ 1.5	25
SPD 12BC255-2	1-2	255	≤ 1.5	100

TYPE 2 CLASS C

Product Code	Class	Continuous Operating Voltage (V)	Voltage Protection Level (kV)	Total Discharge Current (kA)
SPD 2C275	2	275	≤ 1.3	20

TYPE 3 CLASS D

Product Code	Class	Continuous Operating Voltage (V)	Voltage Protection Level (kV)
SPD 3D05	3 - D	6	≤ 30

TYPE 3 CLASS D

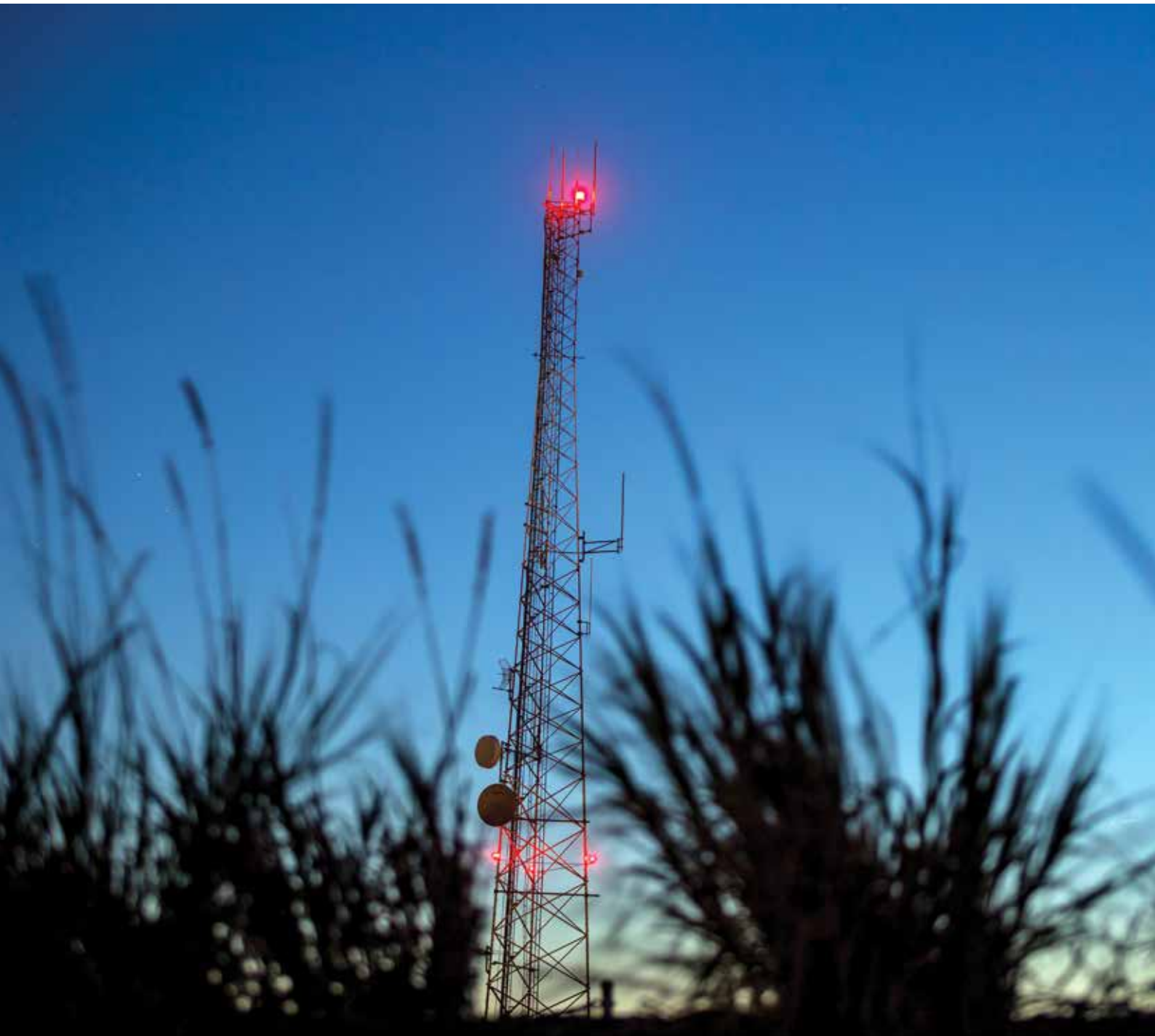
Product Code	Class	Continuous Operating Voltage (V)	Voltage Protection Level (kV)
SPD 3D29	3	29	≤ 60

TYPE 3 CLASS D

Product Code	Class	Continuous Operating Voltage (V)	Voltage Protection Level (kV)
SPD 3D06	3 - D	6	≤ 30

PRO ART

LED OBSTRUCTION LIGHTS



LED Obstruction Lights

According to the rules of the International Civil Aviation Organization, flashing warning systems that must be used on heights such as tall buildings, skyscrapers, towers, and mountains under the routes of aircraft such as airplanes and helicopters are vital to ensuring flight safety.

Specifications

** LED light designed for airway fixed obstacle marking application*
** It complies with ICAO & FAA regulation*
** Specially designed transparent smash proof, heat resistant glass cover*
** Aluminium frame and LED heat sink*
** IP 65 protection classı*
** Anti-static protection coated circuit*
** Inbuilt photo sensor*
** Failure signal*
** 600 lumen lighting power*
** LED light source ensures long lifetime, maintenance free*
** Low power consumption*
** Available both in single and double type*

Where Is It Used?

The areas of use for LED Obstruction Light are as follows:
** Telecommunication towers*
** Radio-communication towers*
** Wind turbines*
** Industrial chimneys*
** High rise buildings*
** Cranes*
** Power transmission lines*

Protart LED Obstruction Lights Operating Mode

The electronic circuit of the device features a micro processor by which flashing modes are programmed. So, the device has two different operating functions.
1. Flash Mode : The flash frequency is 1 Hz. (Fabrication Mode)
2. Fixed Mode : All LEDs emit a continuous light. (Manufactured upon order.)

A light sensor, which is capable of switching armatures on and off during day and night, is installed onto circuits.

Protart LED Obstruction Lights Failure Functions

Both armatures featured by the two-head warning light model have the identical electronic circuit and 2 failure detectors. (Of power failure and LED failure detectors) The first one (Power Failure) is normally closed, while the second one (Led Failure) is open. In case of a failure; a light which is externally connected to the related outlet is caused to give a warning signal with a buzzer or an alternative signal.

Power failure: If there is a power failure, the device may transmit information through a dry contact.
LED failure: If LEDs fail to emit light, the device may transmit information through a dry contact.

The micro processor controls LEDs every 15 minutes and detects failure. The power led system aircraft warning light is designed to switch one of the warning lights on as soon as the light sensor is triggered. In case of any failure of an operative lamp, the other lamp becomes active within a maximum of 10 seconds, and the failure unit gives a failure warning signal.

LED OBSTRUCTION LIGHTS

WARNING LIGHT (SINGLE HEAD)

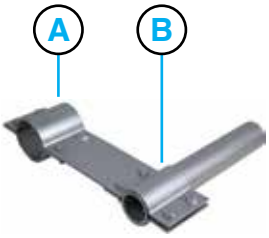
Product Code	*Material*	*Weight (kg)*
LO 90111	Aluminium / Glass	1,30

WARNING LIGHT (DOUBLE HEAD)

Product Code	*Material*	*Weight (kg)*
LO 90112	Aluminium / Glass	4,60

WARNING LIGHT FIXING ARM

Product Code	*Material*	*Pole Diameter (Inch)*		*Weight (kg)*
		A	B	
LO 90115	Galvanized Steel	2	5/4	1,80



PRO ART

CERTIFICATES & STANDARDS

CE CERTIFICATES

CERTIFICATE

ATTESTATION OF COMPLIANCE

Technical Construction File of the company mentioned below has been audited and completed successfuly.
2006/95/EC Low Voltage Directive has been taken as reference for these processes.

Company Name	: **Protart Elektrik ve Bilişim Teknolojileri Dış Ticaret A.Ş.**
Company Address	: Merkez Mah. Halaskargazi Caddesi No:141/7 Kat:4 Oda: A Şişli-İstanbul
Related Directive	: **Low Voltage Directive (LVD) 2006/95/EC**
Related Standards	: **TS EN 62305 / UNE 21186 / NF C 17-102**
Product Name	: **ESE Active Lightning Rod**
Product Brand/Model/Type	: Protart -30 ESE Active Lightning Rod Protart -45 ESE Active Lightning Rod Protart -60 ESE Active Lightning Rod

Certificate Number	: **AQ.2019-1025/02**
Initial Assessment Date	: 01.02.2019
Registration Date	: 06.02.2019
Reissue Date	: 05.02.2021
Expire Date	: **04.02.2024**

The statement is based on a single evaluation of one sample of the product it does not imply an assessment of the whole production. The cerificate is not valid in case of any changes of product and violation of related directive.

CE

A-KALITE
Address : Eski Bağdat Caddesi Çamlık Çıkmazı Sahil Apt. No:6/2 Küçükyalı – Maltepe
İstanbul – Turkey
Phone : + 90 216 366 06 74 Fax : +90 216 366 06 74
E-mail : tezel@a-kalite.com.tr www.a-kalite.com.tr

inspect

Certificate

Sertifika

Client Name and address
Müşteri ismi ve adresi

PROTART

PROTART ELEKTRİK VE BİLİŞİM TEKNOLOJİLERİ DIŞ TİC. A.Ş.

MERKEZ MAH. HALASKARGAZİ CAD. NO:141/7 K. 4
ŞİŞLİ / İSTANBUL -TURKEY

Standard
Standard

ISO 9001:2015 Quality Management System

INSPECT assessed and approved that related firm meets the requirements of the designated standard at related scope
INSPECT ilgili kuruluşun yukarıda belirtilen standardın gereklerine uyguniuğunu ilgili kapsamda tetkik etmiş olup onaylamaktadır.

Scope
Kapsam

YILDIRIMDAN KORUNMA SİSTEMLERİ, TOPRAKLAMA SİSTEMLERİ, TERMOKAYNAK SİSTEMLERİ, ELEKTRİK İZOLE HALILARI VE UÇAK İKAZ LAMBALARININ TASARIMI, ÜRETİMİ VE SATIŞI

DESIGNING, MANUFACTURING AND SALES OF LIGHTNING PROTECTION SYSTEMS, EARTHING SYSTEMS, THERMOWELDING SYSTEMS, INSULATING MATS AND LED BEACON LIGHTS

EA/Category Code: 17-19
Initial issue date: 08.Dec.2020
Issue date of this certificate: 08.Dec.2020
Validity of this certificate: 07.Dec.2021
Recertification date: 07.Dec.2023
Certificate No:20.10.322-QM

To verify the validity of this certificate please visit: www.inspect.com.tr
Bu sertifikanın geçerliliğini kontrol etmek için lütfen www.inspect.com.tr'yi ziyaret edinız.
The validity of this certificate is depend on the success of surveillance assessments
Bu belgenin geçerliliği ara denetimlerin başarılı olmasına bağlıdır.

IAF MEMBER OF MULTILATERAL RECOGNITION ARRANGEMENT

IAS ACCREDITED Management System Certification Body MSCB-148

INSPECT Uluslararası Belgelendirme ve Gözetim Hiz. Tic. Ltd. Şti./TURKEY
www.inspect.com.tr - Belge periyodu 3 yıldır. / Certificate period is 3 years

ISO CERTIFICATES

inspect

Certificate

Sertifika

Client Name and address
Müşteri ismi ve adresi

PROTART

PROTART ELEKTRİK VE BİLİŞİM TEKNOLOJİLERİ DIŞ TİC. A.Ş.

MERKEZ MAH. HALASKARGAZİ CAD. NO:141/7 K. 4
ŞİŞLİ / İSTANBUL -TURKEY

Standard
Standard

ISO 10002:2018 Quality Management - Custemer Satisfaction

INSPECT assessed and approved that related firm meets the requirements of the designated standard at related scope
INSPECT ilgili kuruluşun yukarıda belirtilen standardın gereklerine uygunluğunu ilgili kapsamda tetkik etmiş olup onaylamaktadır.

Scope
Kapsam

YILDIRIMDAN KORUNMA SİSTEMLERİ, TOPRAKLAMA SİSTEMLERİ, TERMOKAYNAK SİSTEMLERİ, ELEKTRİK İZOLE HALILARI VE UÇAK İKAZ LAMBALARININ TASARIMI, ÜRETİMİ VE SATIŞI

DESIGNING, MANUFACTURING AND SALES OF LIGHTNING PROTECTION SYSTEMS, EARTHING SYSTEMS, THERMOWELDING SYSTEMS, INSULATING MATS AND LED BEACON LIGHTS

EA/Category Code: 17-19
Initial issue date: 08.Dec.2020
Issue date of this certificate: 08.Dec.2020
Validity of this certificate: 07.Dec.2021
Recertification date: 07.Dec.2023
Certificate No:20.10.322-CS

To verify the validity of this certificate please visit: www.inspect.com.tr
Bu sertifikanın geçerliliğini kontrol etmek için lütfen www.inspect.com.tr 'yi ziyaret edin!

The validity of this certificate is depend on the success of surveillance assessments
Bu belgenin geçerliliği ara denetimlerin başarılı olmasına bağlıdır.

INSPECT Uluslararası Belgelendirme ve Gözetim Hiz. Tic. Ltd. Şti./TURKEY
www.inspect.com.tr - Belge periyodu 3 yıldır. / Certificate period is 3 years.

OSTİM TEKNİK ÜNİVERSİTESİ
Yüksek Gerilim Araştırma ve Uygulama Merkezi
-Y.G.A.M.-

DENEY RAPORU
Test Report

Rapor/Report NO:
210120/ygam/pro/3

1.RAPOR BİLGİLERİ / Report info:

Müşteri *Customer*	PROTART ELEKTRİK VE BİLİŞİM TEKNOLOJİLERİ DIŞ TİC. A.Ş
Adres *Address*	Merkez Mah. H.gazi Cad. No:141/7 Şişli-İstanbul
Numune *Sample*	Aktif Paratoner başlığı / E.S.E Lightning Conductor
Marka *Trade Mark*	PROTART
Deney Tarihi *Date of Test*	24/06/2019
Rapor Sayfa Sayısı *Number of Pages of Report*	11

2.TEST KATILIMCILARI / Test authority and observers:

Testi izleyen ve Koordine eden kurum *Test Monitored & Coordinated by*	OTU -E.E.B.	
Teste katılan firma ve yetkilisi *Test Customer representative*		
Test Laboratuarı *Test Lab. Conducted in*	HIZAL San.Tic.Ltd. Yüksek Gerilim Laboratuvarı 1273.sok./No:17-OSTİM – Ankara	
Laboratuvar Sorumlusu-Deneyi Uygulayan Mühendis *Lab Official-Test Executed by*	*MUSTAFA FAKILI Elektrik Elektronik Mühendis*	
Deney Sorumlusu-Deneyi İzleyen ve Kontrol eden *Test Official-Test Monitored and controlled by*	*PROF.DR.MIRZAHAN HIZAL OTU Mühendislik Fakültesi Elektrik Elektronik Bölümü*	

YGAM/PRO /OTU/HZL/REV

OSTİM TEKNİK ÜNİVERSİTESİ
Yüksek Gerilim Araştırma ve Uygulama Merkezi
-Y.G.A.M.-

DENEY RAPORU
Test Report

Rapor/Report NO:
210120/ygam/pro/3

5. ÇEVRE ŞARTLARI /Environmental conditions:

Test süresince bu değerlerde gözlenir bir değişiklik olmamıştır .
These values were observed not change appreciably during the test.

	Başlangıç/ Start	Orta/ Middle	Son/ Final
Ortam Sıcaklığı *Ambient Temperature*	26 C	26 C	27 C
Ortam Nemi *Relative Humidity*	% 60	%61	%60
Ortam Hava Basıncı *Relative Air Pressure*	1021 hPa	1022 hPa	1022 hPa

6.DENEY SONUÇLARI / Test results:

Deney sonuçları, sadece deneyi yapılan numunelere aittir.
Test results are just belong to tested item.

No	Numuneler/ Samples	Deney Adı / Test	Sonuç/ Result
1	PROTART-30	1-NFC17-102 (Appendix C) /Version 2011, TS 13709 (Mayıs 2016) Standart: Yıldırım Darbe Erken Emisyon Zaman Kazancı -Lightning Catching Head Impulse Voltage Streamer Time Lag. Gain Measurements 2-TSE EN 62561-1, NFC 17-102 (2011) c-3.5 (10/350) Yüksek Gerilim Akım Darbe Dayanım Testi – Current Impulse Withstand test 100kA current level	OK/Passed

7. RAPOR AÇIKLAMALARI / Test descriptions:

7.1-Yıldırım Darbe Erken Emisyon Zaman Kazancı / Lightning Imp. Early Streamer Emission Time Gain:
7.1.1.Testin Uygulanması:
Deneyler yukarıda zikredilen standartta öngörülen esaslara uygun olarak hazırlanmış bir yüksek gerilim elektrodu ile zemine yerleştirilmiş numune paratöner başlığı arasında, 50'ser adet ölçülebilir atlama olarak negatif polaritede yaklaşık 250 / 2500 µS (Rise time = 170 µS) dalga şekline sahip darbe gerilimleri uygulanmak suretiyle yapılmıştır. Atlamalar arasında 2 dk süre verilmiştir.

YGAM/PRO /OTU/HZL/REV

OSTİM TEKNİK ÜNİVERSİTESİ
Yüksek Gerilim Araştırma ve Uygulama Merkezi
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DENEY RAPORU
Test Report

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210120/ygam/pro/3

7.1.3.TEST SONUÇLARININ İNCELENMESİ / EVALUATION of THE TEST RESULTS

NFC17-102 (Appendix C) /Version 2011 Standardında öngörüldüğü üzere , SR Çubuk ve ESE Numune paratöner başlıkları ile elde edilen ortalama zaman gecikmeleri aşağıda Şekil.2 de gösterilen Referans elektrik alanı ve test elektrik alan eğrileri üzerinde uygulanarak , bu zaman gecikmelerine karşılık gelen elektrik alan değerlerinde , referans alan eğrisinden bulunan ;

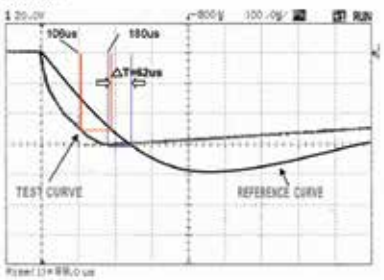
- PROTART-30/Numune 1 için ΔT = 62µs

As described in NFC17-102 (Appendix C) /Version 2011, the average time lags are applied to the reference curve and the test curve and the difference between the corresponding values are obtained as the time lag gain ΔT for the ESE sample;

- PROTART-30/Sample 1: ΔT = 62µs

Şekil.3 /Figure.3. Streamer Time Gain determination for the ESE Samples

1-PROTART-30:



YGAM/PRO /OTU/HZL/REV

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NFC TEST CERTIFICATES

OSTİM TEKNİK ÜNİVERSİTESİ
Yüksek Gerilim Araştırma ve Uygulama Merkezi
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5.ÇEVRE ŞARTLARI / Environmental conditions:

Test süresince bu değerlerde gözlenir bir değişiklik olmamıştır.
These values were observed not change appreciably during the test.

	Başlangıç/Start	Orta/Middle	Son/Final
Ortam Sıcaklığı *Ambient Temperature*	26 C	26 C	27 C
Ortam Nemi *Relative Humidity*	% 60	% 61	% 60
Ortam Hava Basıncı *Relative Air Pressure*	1021 hPa	1022 hPa	1022 hPa

6.DENEY SONUÇLARI / Test results:

Deney sonuçları, sadece deneyi yapılan numunelere aittir.
Test results are just belong to tested item.

No	Numuneler / Samples	Deney Adı / Test	Sonuç / Result
1	PROTART-60	1-NFC17-102 (Appendix C)/Version 2011, TS 13709 (Mayıs 2016) Standart: Yıldırım Darbe Erken Emisyon Zaman Kazancı - Lightning Catching Head Impulse Voltage Streamer Time Lag. Gain Measurements 2-TSE EN 62561-1, NFC 17-102 (2011) e3.5(10/350) Yüksek Gerilim Akım Darbe Dayanım Testi - Current Impulse Withstand test 100kA current level	OK/Passed

7.RAPOR AÇIKLAMALARI / Test descriptions:

7.1-Yıldırım Darbe Erken Emisyon Zaman Kazancı / Lightning Tip. Early Streamer Emission Time Gain:
7.1.1.Test in Uygulanması:
Deneyler yukarıda belirtilen standarta öngörülen esaslara uygun olarak hazırlanmış bir yüksek gerilim elektrodu ile zemine yerleştirilmiş numune paratoner başlığı arasında, 50' se adet ölçülebilir olarak negatif polaritede yaklaşık 250 / 2500 µS (Rise time = 170 µS) dalga şekline sahip darbe gerilimleri uygulanarak suretiyle yapılmıştır. Atımlar arasında 2 dk süre verilmiştir.
Yüksek gerilim elektrodu kenarları yuvarlak R=20 cm, 300 x 300 cm ebadında yerden min 200cm (H) yukarıda izole edilmiş düzlem bir elektrot olup Numune uç noktası ile elektrot arasındaki açıklık 100 cm ye (d) ayarlanmıştır. Teste kullanılan darbe gerilimleri 1.2 MV, 60 kJoule (HİZAL) darbe generatörü ile 20kV/m -25kV/m arasında uygulanmıştır.

OSTİM TEKNİK ÜNİVERSİTESİ
Yüksek Gerilim Araştırma ve Uygulama Merkezi
-YGAM-

DENEY RAPORU
Test Report

Rapor/Report No: 210120/ygam/pro/2

1.RAPOR BİLGİLERİ / Report info:

Müşteri *Customer*	PROTART ELEKTRİK VE BİLİŞİM TEKNOLOJİLERİ DIŞ TİC. A.Ş
Adres *Address*	Merkez Mah. Hgazi Cad. No:141/7 Şişli - İstanbul
Numune *Sample*	Aktif Paratoner başlığı / ESE Lightning Conductor
Marka *Trade Mark*	PROTART
Deney Tarihi *Date of Test*	24/06/2019
Rapor Sayfa Sayısı *Number of Pages of Report*	11

2.TEST KATILIMCILARI / Test authority and observers:

Testi İzleyen ve Koordine eden kurum *Test Monitored & Coordinated by*	OTU-E.E.B.	
Teste katılan firma ve yetkilisi *Test Customer representative*		
Test Laboratuarı *Test Lab. Conducted at*	HİZAL San. Tic. Ltd. Yüksek Gerilim Laboratuvarı 1273 sok. No:17-OSTİM - Ankara	
Laboratuvar Sorumlusu - Deneyi Uygulayan Mühendis *Lab official - Test Executed by*	*MUSTAFA FAKILI Elektrik Elektronik Mühendis*	
Deney Sorumlusu - Deneyi İzleyen ve Kontrol eden *Test Official - Test Monitored and controlled by*	*PROF. DR. MIZRAHAN HİZAL OTU Mühendislik Fakültesi Elektrik Elektronik Bölümü*	

OSTİM TEKNİK ÜNİVERSİTESİ
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-YGAM-

DENEY RAPORU
Test Report

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7.1.3.TEST SONUÇLARININ İNCELENMESİ / EVALUATION of THE TEST RESULTS

NFC17-102 (Appendix C)/Version 2011 Standardında öngörülüdüğü üzere, SR Çubuk ve ESE Numune paratoner başlıkları ile elde edilen ortalama zaman gecikmeleri aşağıda Şekil2 de gösterilmiştir. Referans elektrik alanı ve test elektrik alan eğrileri üzerinde uygulanarak, bu zaman gecikmelerine karşılık gelen elektrik alan değerlerinde, referans alan eğrisinden bulunan;

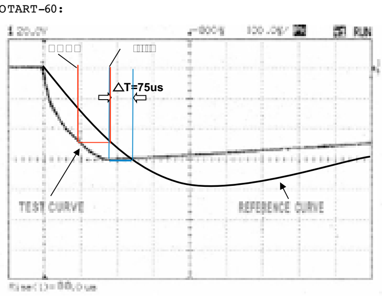
- PROTART-60/Numune 1 için ΔT =75µs

As described in NFC17 -102 (Appendix C)/Version 2011, the average time lags are applied to the reference curve and the test curve and the difference between the corresponding values are obtained as the time lag gain ΔT for the ESE sample;

- PROTART-60/Sample 1: ΔT =75µs

Sekil3 /Figure3 . Streamer Time Gain determination for the ESE Samples

1-PROTART-60:



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OSTİM TEKNİK ÜNİVERSİTESİ
Yüksek Gerilim Araştırma ve Uygulama Merkezi
-YGAM-

Rapor/Report No: 210120/ygam/pro/1

DENEY RAPORU
Test Report

1. RAPOR BİLGİLERİ /Report info:

Müşteri *Customer*	PROTART ELEKTRİK VE BİLİŞİM TEKNOLOJİLERİ DIŞ TİC.A.Ş
Adres *Address*	Merkez Mah. Hgazi Cad. No:141/7 Şişli -İstanbul
Numune *Sample*	Aktif Paratoner başlığı /ESE Lightning Conductor
Marka *Trade Mark*	PROTART
Deney Tarihi *Date of Test*	24/06/2019
Rapor Sayfa Sayısı *Number of Pages of Report*	11

2. TEST KATILIMCILARI /Test authority and observers:

Test İzleyen ve Kombine eden kurum *Test Monitored & Coordinated by*	OTU-E.E.B.	
Teste katılan firma ve yetkilisi *Test Customer representative*		
Test Laboratuarı *Test Lab. Conducted at*	HİZAL San. Tic. Ltd. Yüksek Gerilim Laboratuvarı 1273 sok. No:17-OSTİM – Ankara	
Laboratuvar Sorumlusu -Deneyi Uygulayan Mühendis *Lab Official-Test Executed by*	*MUSTAFA FAKILI Elektrik Elektronik Mühendis*	
Deney Sorumlusu -Deneyi İzleyen ve Kontrol eden *Test Official-Test Monitored and controlled by*	*PROF. DR. MUZAHAN HİZAL OTU Mühendislik Fakültesi Elektrik Elektronik Bölümü*	

OSTİM TEKNİK ÜNİVERSİTESİ
Yüksek Gerilim Araştırma ve Uygulama Merkezi
-YGAM-

Rapor/Report No: 210120/ygam/pro/1

DENEY RAPORU
Test Report

5. ÇEVRE ŞARTLARI / Environmental conditions:

Test süresince bu değerlerde gözlenir bir değişiklik olmamıştır.
These values were observed not change appreciably during the test.

	Başlangıç/Start	Orta/Middle	Son/Final
Ortam Sıcaklığı *Ambient temperature*	26 C	26 C	27 C
Ortam Nemi *Relative Humidity*	% 60	% 61	% 60
Ortam Hava Basıncı *Relative Air Pressure*	1021 hPa	1022 hPa	1022 hPa

6. DENEY SONUÇLARI/ Test results:

Deney sonuçları, sadece deneyi yapılan numunelere aittir.
Test results are just belong to tested item.

No	Numuneler/ Samples	Deney Adı/ Test	Sonuç/ Result
1	PROTART-45	1-NFC17-102 (Appendix C)/Version 2011, TS 13709 (Mayıs 2016) Standart: Yıldırım Darbe Erken Emisyon Zaman Kazancı -Lightning Catching Head Impulse Voltage Streamer Time Lag. Gain Measurements 2-TSE EN 62561-1, NFC 17-102 (2011) C3.5 (10/350) Yüksek Gerilim Akım Darbe Dayanım Testi – Current Impulse Withstand test 100kA current level	OK/Passed

7. RAPOR AÇIKLAMALARI/ Test descriptions:

7.1-Yıldırım Darbe Erken Emisyon Zaman Kazancı / Lightning tip. Early Streamer Emission Time Gain:

7.1.1 Testin Uygulanması:

Deneyler yukarıda sözü edilen standarta öngörülen esaslara uygun olarak hazırlanmış bir yüksek gerilim elektrodu ile zemine yerleştirilmiş numune paratoner başlığı arasında, 50'şer adet ölçülebilir atlama olacak negatif polaritede yaklaşık 250 / 2500 µS (Rise time = 170 µS) dalga şekline sahip darbe gerilimleri uygulanmak suretiyle yapılmıştır. Atlamalar arasında 2 dk süre verilmiştir.

OSTİM TEKNİK ÜNİVERSİTESİ
Yüksek Gerilim Araştırma ve Uygulama Merkezi
-YGAM-

Rapor/Report No: 210120/ygam/pro/1

DENEY RAPORU
Test Report

7.1.3 TEST SONUÇLARININ İNCELENMESİ / EVALUATION of THE TEST RESULTS

NFC17-102 (Appendix C)/Version 2011 Standardında öngörüldüğü üzere, SR Çubuk ve ESE Numune paratoner başlıkları ile elde edilen ortalama zaman gecikmeleri aşağıda Şekil 2 de gösterilmiştir. Referans elektrik alanı ve test elektrik alan eğrileri üzerinde uygulanarak, bu zaman gecikmelerine karşılık gelen elektrik alan değerlerinde, referans alan eğrisinden bulunan;

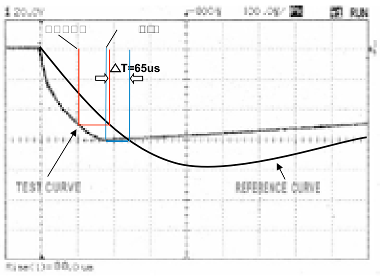
- PROTART-45/Numune 1 için ΔT =65µs

As described in NFC17-102 (Appendix C)/Version 2011, the average time lags are applied to the reference curve and the test curve and the difference between the corresponding values are obtained as the time lag gain ΔT for the ESE sample;

- PROTART-45/Sample 1: ΔT =65µs

Şekil 3 /Figure 3. Streamer Time Gain determination for the ESE Samples

1-PROTART-45:



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NFC TEST CERTIFICATES

METALTEK TEKNOLOJİ KİMYASAL ÜRÜNLER LTD. ŞTİ.
TEST LABORATORY

Address: Alınteri Bulvarı 55 GOI 86 San. Sit. No:1/49
06370 Ostim / ANKARA
Phone: 0 312 385 52 01-03 **Fax:** 0 312 385 52 02

TEST REPORT

AB-0547-T
2382-6/6
07-19

Customer Name / Address	: **PROTART ELEKTRİK VE BİLİŞİM TEKNOLOJİLERİ DIŞ TİC. A.Ş.** Merkez Mah. Halaskargazi Cad. No: 141 Şişli/İSTANBUL
Order No/Date	: 3095 / 07.05.2019
Name and Identity of Test Item	: Active Lightning Conductor (PROTART-60)
The Date of Receipt of Test Item	: 18.06.2019
Remarks	: -
Date of Test	: 24.06.2019 – 04.07.2019
Number of Pages of Report	: 5

METALTEK TEKNOLOJİ KİMYASAL ÜRÜNLER LTD. ŞTİ. had been accredited by TÜRKAK under registration number AB-0547-T for TS EN ISO/IEC 17025:2012 as test laboratory.

Turkish Accreditation Agency (TURKAK) is a signatory to the European co-operation for Accreditation (EA) Multilateral Agreement (MLA) and to the International Laboratory Accreditation Cooperation (ILAC) Mutual Recognition Arrangement (MRA) for the recognition of test reports.

The testing and/or measurement results, the uncertainties (if applicable) with confidence probability and test methods are given on the following pages which are part of this report.

Seal	Date	Person in Charge of Test	Writer of the Report	Approval
	06.07.2019	S. Ezgi YAZAR	Chem. Eng. Didar YEŞİLBAŞ Lab. Assist.	Chem. Eng. Tuncay KATIRCI Lab. Manager

METALTEK TEKNOLOJİ KİMYASAL ÜRÜNLER LTD. ŞTİ.
TEST LABORATORY
Address: Alınteri Bulvarı 55 GOI 86 San. Sit. No:1/49
06370 Ostim / ANKARA
Phone: 0 312 385 52 01-03 **Fax:** 0 312 385 52 02
TEST REPORT
AB-0547-T
2382-6/6
07-19

1. DEMAND OF THE CLIENT:

Below given tests must be carried out alternately on the PROTART Brand, Protart-60 Model Active Lightning Conductor according to *NF C 17-102 standard and the corrosion resistance must be evaluated on the lightning conductor.

1.1. *NF C 17-102 Standard, Section C.3.3.1. Salt Fog Test

Test Standard : EN 60068-2-52
Severity Degree : 2
Test duration : 3 cycles (72 hours)

1.2. *NF C 17-102 Standard, Section C.3.3.2. Sulphur dioxide test with general condensation of moisture

Test Standard : EN ISO 6988
Test duration : 7 cycles (168 hours)

2. SAMPLE UNDER THE TEST:

Equipment Description	: Protart-60 Active Lightning Conductor (Serial number: 3620, 3621 and 3622)
Material Type	: Stainless Steel
Equipment Brand / Model	: PROTART/Protart-60
Preparation and Condition *Before the Test*	: By customer.
Dimensions / Weigh / Item(s)	: Height: 440 mm, Diameter: 115 mm / 3 pieces

3. USED STANDARDS:

*NF C 17-102	Protection Against Lightning Early Streamer Emission Lightning Protection Systems
EN 60068-2-52	Environmental Testing–Part 2-52: Tests–Test Kb: Salt Mist, Cyclic (Sodium Chloride Solution)
EN ISO 6988	Metallic and other non-organic coatings – Sulfur dioxide test with general condensation of moisture

The test results are only valid for tested samples. Sampling is not performed by our laboratory, laboratory is not responsible for tested samples. This report shall not be reproduced other than in full except with the permission of the laboratory. Test report without signature and seal are not valid. FP 12.03 Rev.No/Date: 03/30.01.2019 Issue Date: 25.05.2016

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Phone: 0 312 385 52 01-03 **Fax:** 0 312 385 52 02
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If any, displacement number and sequence of the sample	None.
Any abnormality or incident occurring during the entire test	None.

After testing: At the end of the test period, the Active Lightning Conductor were removed from the test cabinet to ambient conditions. After dried, it was evaluated without any cleaning process or rinsing with water, and the photos were taken.

5. USED EQUIPMENT INFORMATION:

Name of Test Equipment	Calibration Date / Expiration Date of Calibration	Model	Manufacturer
Corrosion Test Cabinet MT-KOR-124	24.01.2019 / 24.01.2020	-	METALTEK
Conductivity meter MT-İLT-156	Calibration is done before every test.	HI98303 DIST 3	HANNA
pH Meter MT-PHM-110	Calibration is done before every test.	ORION STAR A111	THERMO SCIENTIFIC

6. TEST RESULTS:

Sample Name	Test Results
Protart-60 Active Lightning Conductor (Serial number: 3620, 3621 and 3622)	Red rust between 5 and 15% was observed on the air terminal and some surface points of the Active Lightning Conductor. After the test, the evaluation was carried out without cleaning or rinsing according to customer request. Therefore, the given red rust value may be different instead of actual value. (A small area of the air terminal was wiped with diesel fuel-impregnated paper to see if the rusting is permanent. Rusting can be removed from the surface.)

Appendix-1) Test Photographs

Note-3 : Appendices of the test report are only sent by e-mail. They aren't being in the original test report.
Note-4 : Tested samples have been delivered with the test report.
The tests are shown with * that aren't in our accreditation test scope.

The test results are only valid for tested samples. Sampling is not performed by our laboratory, laboratory is not responsible for tested samples. This report shall not be reproduced other than in full except with the permission of the laboratory. Test report without signature and seal are not valid. FP 12.03 Rev.No/Date: 03/30.01.2019 Issue Date: 25.05.2016

PROTART

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PRO ART

REFERENCES

REFERENCES

- *Sugar Factory, Konya, Turkey*

- *A private house, Suceava, Romania*

- *Restoration Church, Kigali, Rwanda*

- *Woodland Factory, Kiev, Ukraine*

REFERENCES

- *Tanh Dai Co, Viet Nam*

- *The Breeze Houses, Mugla, Turkey*

- *Ratanawiwekkhlongwan Temple, Prachuap Khiri Khan, Thailand*

Cousa Company, Montevideo, Uruguay

Lanco Company, Montevideo, Uruguay

Ban Haedsuksa School, KhonKaen Province, Thailand

Supermarket Epicentr K, Vinnitsa, Ukraine


PROTART

PROTART ELEKTRİK VE BİLİŞİM TEKNOLOJİLERİ DIŞ TİC. A.Ş.
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