CMCE SERTEC MARINE
ELECTROMAGNETIC FIELD PROTECTOR

The most effective protection system Against Lightning

www.sertec.com.py
THE CMCE SERTEC MARINE

Suitable for:

- Offshore Ships
- Transport Ships
- Marine Platforms
- Marine Buoys
- Cruise Ships
- Yachts
- Sailboats
- Fishing or Expedition Boats
- Catamarans
CMCE SERTEC MARINE
Multiple Field Electric Compensator

SERTEC Electromagnetic Field Protector

The CMCE SERTEC MARINE Protector aims to protect people, animals and structures in installations on land, air and water from any electrical phenomenon whose means of transmitted by air.

The CMCE SERTEC MARINE is designed to protect using countermeasures that control and compensate the electroatmospheric effects produced by climate change, industrial, meteorological or solar electromagnetic pollution, manifested in the form of electrical storms, electromagnetic pulses, etc. The CMCE SERTEC MARINE is permanently protecting its coverage area to correct the effects of electromagnetic disturbances according to their origin, frequency, voltage and intensity. Compensating, stabilizing the current of the electric charges in its environment, draining them to ground in harmless milliamperes, minimizing the formation of the lightning in its protection area.

The CMCE SERTEC MARINE is the result of the discovery of the behavior of electroatmospheric phenomena that interact in the atmosphere of our planet. The novelty of this technological development is supported by the well-known laws of OHM and Maxwell’s equations, on which this new technology is based. Essentially to have at all times the stabilized electric field of the atmosphere referring to ground in the protection area. The system behaves passively at the level of prevention, based on atmospheric electrical activity with the aim of maintaining a clean and controlled environment of electrical and magnetic contamination.

In 1916 Nikola Tesla in his patent No. 1,266,175 mentioned the operating principles of a primitive device based on the principles that underpin our developments, explaining the inconveniences caused by the lightning rods, which instead of protecting property and people, attracted the rays increasing the feasibility of electric discharges and consequently the risks that they entailed.

New materials and designs, added to years of experience, have allowed us to improve the experiences of the undisputed scientist Nikola Tesla, evolving in the protection of atmospheric phenomena.
The multiple electric field compensator, CMCE SERTEC MARINE.

Is a passive sensor system designed to balance and deionize the effects of atmospheric phenomena through multiple compensators, generating a protective shield in its coverage area, its operating principle is based on compensating, stabilizing the existing electric field in its environment, in this way it cancels the formation of the ascending tracer neutralizing the lightning draining the electric charges to earth, in harmless milliamperes.

In a balanced environment an atmospheric discharge is not formed.

When we propitiate the necessary conditions, a lightning strikes, whose power and impact is unpredictable.

Each capacitor has one of its electrodes referenced to ground which is charged with the same polarity as this one. The free electrode induces atmospheric charges of polarity contrary to that of the ground, balancing internally, between its electrodes, which generates a potential difference. This generates a flow of charges to ground, which are absorbed from the atmosphere, not allowing the formation of the lightning.

Drain current to ground in harmless milliamperes.
CURRENT SITUATION

The current climate change is generated by air pollution, deforestation, greenhouse gases. To all this we would have to add the solar eruptions that when they reach our atmosphere, generate meteorological phenomena producing electrification of the severe atmosphere for hours, creating large nuclei of thunderstorms with a lot of lightning activity, where the positive polarity predominates (ascending ray), although there is also the negative polarity (downward beam).

Aluminum life cycle

The high durability of aluminum and its 100% recycling, without loss of quality, has established its reputation as the green metal. Its remarkable strength and low maintenance characteristics make it the definitive construction material of an industry that is constantly searching for more resistant, lightweight, durable and ecological alternatives.

Recycling a ton of aluminum saves about 4 tons of bauxite, its main raw material, and 95% of the energy needed to produce primary aluminum. This, in turn, saves 9 tons of CO2 emissions. The recycling of aluminum scrap today saves around 80 million tons of greenhouse gas emissions every year. This is equivalent to the elimination of 15 million cars from the world's roads.

SERTEC S.R.L. demonstrates its commitment to the environment by developing a production system that is also effective, friendly and sustainable.

A high percentage of the materials used for the production of the CMCE SERTEC Protector are recycled, in this way we seek to collaborate with a more sustainable and above all more secure environment.
TECHNOLOGICAL CHANGE

THE CMCE SERTEC MARINE
A legacy of one of the most privileged minds: Nikola Tesla

The CMCE SERTEC MARINE ensures a 99% reduction of lightning impacts in almost all types of buildings and structures through the deionization of electrostatic charge.

Our device guarantees the reliability of computer systems and data during storms, optimizes production by increasing competitiveness and improves staff safety, among other positive aspects.

TECHNOLOGICAL DIFFERENCES BETWEEN THE PDCE-CMCE SERTEC AND THE CONVENTIONAL LIGHTNING ROD

<table>
<thead>
<tr>
<th>CMCE SERTEC MARINE</th>
<th>Conventional Lightning Rod</th>
</tr>
</thead>
<tbody>
<tr>
<td>It does not excite or capture the lightning, since it does not generate ascending tracers.</td>
<td>Excites and captures the lightning, generating upward tracers.</td>
</tr>
<tr>
<td>Protects all types of structures and environments with risk of fire or explosion (ATEX)</td>
<td>Increases the risk of fire or explosion.</td>
</tr>
<tr>
<td>It does not generate overvoltages.</td>
<td>Generates overvoltages.</td>
</tr>
<tr>
<td>Avoids electrical risks.</td>
<td>Creates high voltage electrical hazards.</td>
</tr>
<tr>
<td>Complies with the basic principles of occupational risk prevention.</td>
<td>Does not comply with the basic principles of occupational risk prevention</td>
</tr>
<tr>
<td>Does not generate Electromagnetic Compatibility effects.</td>
<td>Generates effects of Electromagnetic Compatibility, since it attracts the ray.</td>
</tr>
<tr>
<td>Ground connection is compatible with low voltage electrical ground connections according to the REBT.</td>
<td>Ground connection is NOT compatible with the low voltage electrical earth electrodes according to the REBT.</td>
</tr>
<tr>
<td>It is not radioactive and is manufactured according to the RoHS regulations.</td>
<td>Some are radioactive.</td>
</tr>
<tr>
<td>Environmentally friendly.</td>
<td>Indirectly generates electromagnetic pollution.</td>
</tr>
<tr>
<td>Price is very competitive in relation to safety.</td>
<td>Price is NOT competitive in relation to safety.</td>
</tr>
<tr>
<td>Offers guaranteed protection.</td>
<td>Does not offer guaranteed protection.</td>
</tr>
</tbody>
</table>

RISKS - COSTS - EFFECTIVENESS ANALYSIS

<table>
<thead>
<tr>
<th>Electrical Risk</th>
<th>Accident Risk</th>
<th>Security-Cost Ratio</th>
<th>Efficiency of the System</th>
<th>Return on Investment</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMCE SERTEC MARINE</td>
<td>LOW</td>
<td>LOW</td>
<td>LOW</td>
<td>HIGH- 99% No Lightning</td>
</tr>
<tr>
<td>Conventional</td>
<td>HIGH</td>
<td>HIGH</td>
<td>HIGH</td>
<td>LOW- 99% Lightning</td>
</tr>
</tbody>
</table>
It is popularly believed that by allowing a leak into the air, the needle-shaped lightning rod fulfills two functions: one, to drain the ground of its negative electricity, the other to neutralize the positive of the clouds. To a certain extent it performs both functions. But a systematic study of electrical disturbances on earth has made it palpably evident that the action of the Franklin conductor, as commonly interpreted, is largely illusory. The actual measurement proves that the amount of electricity escaping from numerous points is entirely insignificant when compared with that induced within a considerable terrestrial area, and unimportant in the dissipation process. But it is true that the negatively charged air in the vicinity of lightning rods, which has been converted into a conductor through the influence of lightning, facilitates the passage of lightning. This increases the probability of lightning strikes in the immediate vicinity. The fundamental facts behind this type of lightning conductor are: First, it attracts lightning, so that it will be struck by one more often than if it were not; second, it makes most, but not all, discharges it receives become harmless; third, by turning the air into a conductor, and for other reasons, it is sometimes the cause of damage to objects in the vicinity; and fourth, in general, its power to prevent damage predominates, more or less, over the risks it summons. (condensed translation patent 1,266,175)

Benjamin Franklin, published in London in his famous almanac (Poor Richard's Almanack), an article where he proposed the idea of using pointed steel rods, on roofs, to protect themselves from falling lightning. His theory was tested in England and France before he even executed his famous comet experiment in 1752. One would say that he invented the lightning rod and presented the so-called single fluid theory to explain the two types of atmospheric electricity, the positive and negative.

In 1753, the Russian Georg Wilhelm Richmann followed Franklin's investigations to verify the protective effect, but in his investigation a lightning strike struck him when he was excited and attracted by the lightning rod, and he received a deadly electric shock when manipulating part of the installation of the lightning rod.

The foundation of an ESE (Early Streamer Emission) terminal as it is known generates impulses of controlled magnitude and frequency at the tip of the terminal during high static fields before a lightning strike. This allows the creation of an uplink leader from the terminal that propagates into the downlink leader from the cloud.

A lightning conductor creates an electric field distribution with field lines concentrated at its tip, thus facilitating the current of ionized particles, which is a lightning bolt. This applies to any lightning rod, when trying to facilitate the path of charges and therefore say that it is "attracts lightning".

Already in 1916 Nikola Tesla in his patent Nº 1.266.175 mentioned the principles of operation of a primitive device based on the principles that sustain our product, the protector of electroatmospheric field PDCE-CMCE SERTEC, explaining the disadvantages that already at that time produced the point lightning conductors that instead of protecting the goods and people, attracted the rays increasing the feasibility of fall of lightning and consequently the risks for the goods and people.

...EVOLUTION Of The Lightning Rod...
Mast connection system:
It incorporates in its axis the connection system to the mast. The PDCE needs an internal measuring mast 42 mm Ø and external 49 mm Ø with through hole 8 mm Ø 32 mm from the edge of the mast (It can vary according to the model, more detailed information see the manual).

Materials that are composed:
Recycled Aluminum, Insulation: Polyacetal, also called polyoxymethylene (POM); o Depending on the model, consult the manual.

Maximum working voltage of the CMCE WITHOUT lightning strikes
640,000 volts to one meter, according to high voltage laboratory tests.

Maximum permissible short circuit current
Tests carried out according to IEC-10/350 Q energy curves of 100,000 Amps, specified in IEC-62305 standards, show that the equipment supports 7 continuous discharges of 89,908KA; 89.62KA; 88.53KA; 89.3KA; 90.44KA; 96,656KA; 89,688KA; without suffering material breakage or deterioration or perforation marks.

Protection effectiveness
99% reduction in direct lightning impact on the protected structure. In case of direct impact of lightning (1%) or indirect effects due to external induced surges in the protected structure, the CMCE behaves like a thermal fuse, absorbing part of the energy of the lightning in heat by melting its components, minimizing (between 60% - 90%) electromagnetic effects.

It does not contain components radioactive, electronic No heavy metals.
CERTIFICATIONS

Regulations

ISO 9001-2015 certified by STAREGISTER
ISO 9001 is the internationally recognized standard for quality management systems (SGC).

ISO 14001-2015 certified by STAREGISTER
The ISO 14001 standard is the international standard for environmental management systems (EMS), which helps your organization identify, prioritize and manage environmental risks, as part of your usual business practices.

INTN Product Certificate (National Institute of Technology and Standardization and Metrology).

High Voltage Comparative Tests in the INTI according to NFC-17100, where the comparative difference is that there are no lightning discharges.

ENAC; ILAC-MRA
A.1 General tests (Section.c.3.1 UNE21186: 2011 // NF C17-102: 2011)
Test: Documentation, information and identification (C.3.1.1)
Test: Marking (C.3.1.2)
A.2 Mechanical tests (Section.c.3.2 UNE21186: 2011 // NF C17-102: 2011)
Test: Mechanical tests (C.3.2)
A.3 Environmental tests (Section.c.3.3 UNE21186: 2011 // NF C17-102: 2011)
Test: Salt spray test (C.3.3.1)
Test: Test in sulphurous humid atmosphere (C.3.3.2)
A.4 Current test (Section.c.3.4 UNE21186: 2011 // NF C17-102: 2011)
Test: Current test (C.3.4)
TO 5. Priming advance tests (Section.c.3.5 UNE21186: 2011 // NF C17-102: 2011)
Test: Determination of the progress in the PDC priming (C.3.5.3 UNE 21186: / C.3.5.2.4 NF C17-102: 2011)

SERTEC S.R.L. is approved within the NATO Cataloging System (NOC) with the NCAGE code SFKU3 for our CMCE-SERTEC lightning conductors.

DUNS REGISTER Number 955067967
Environment solid waste management Complies with the requirements of law No. 3956/09 on solid waste management in the Republic of Paraguay, the SEAM Environment Secretariat, is the enforcement authority, whose regulatory content and practical use should generate the reduction of the same, to the minimum. Topic addressed: the SUMMIT OF THE EARTH at the 1972 Stockholm Convention held by the United Nations for the preservation of natural resources. Environmental Action Program to address global warming, generating agreements such as the Kyoto Protocol.

GREEN RECYCLING SEAL
The Green Seal delivered by SERTEC S.R.L. in its products it allows the user to be informed that we are a company responsible for the life cycle. By choosing this product you are collaborating with the environment since we use recycled materials.

Electrostatic field protection
It complies with Decree 10071/07 of the Secretary of the Environment SEAM Paraguay on the protection of electromagnetic fields, sets the maximum parameters of exposure to electric and magnetic fields in the frequency range from 0 to 300 Gz. The regulations approve as maximum permissible maximum permissible exposure limits, the values established as reference levels by the International Commission on Non-ionizing Radiation Protection ICNIRP (International Commission on Non-Ionizing Radiation Protection).

Electric field: 10 kV / m (occupational exposure)
5 kV / m (public exposure)
Magnetic field: 500 μT (occupational exposure)
100 μT (public exposure)

In situations in which simultaneous exposures of different frequencies are given, the criteria and recommendations of the ICNIRP are adopted. The enforcement authority is the Secretariat of the Environment.

WARRANTY
MANUFACTURED BY SERTEC S.R.L. IN ASUNCIÓN, PARAGUAY

MAINTENANCE: Annual mandatory, carried out and certified by the official installer.

PRODUCT WARRANTY 5 YEARS warranty for manufacturing defect, proving annual maintenance.
CMCE SERTEC MARINE ELECTROMAGNETIC FIELD PROTECTOR

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