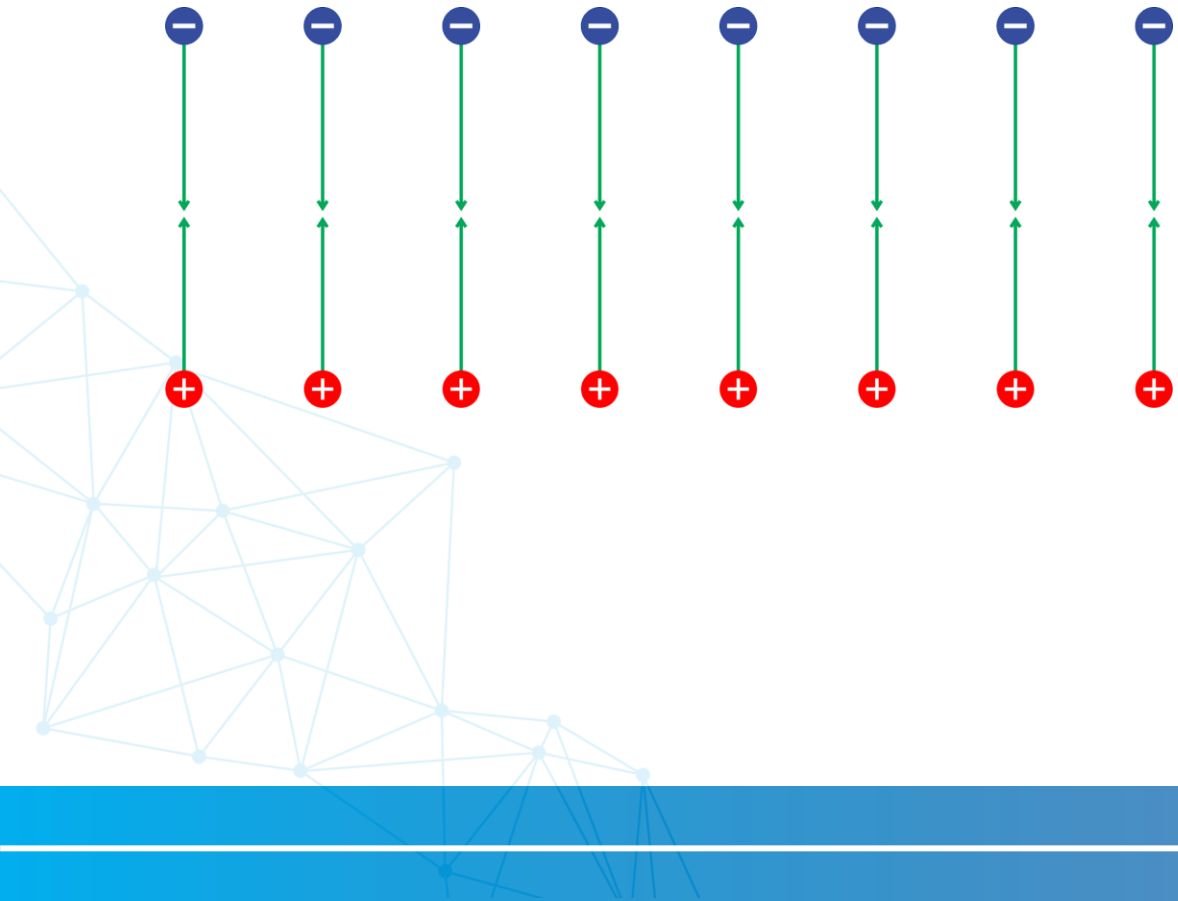# CMCE SERTEC MARINE

Operation Principle
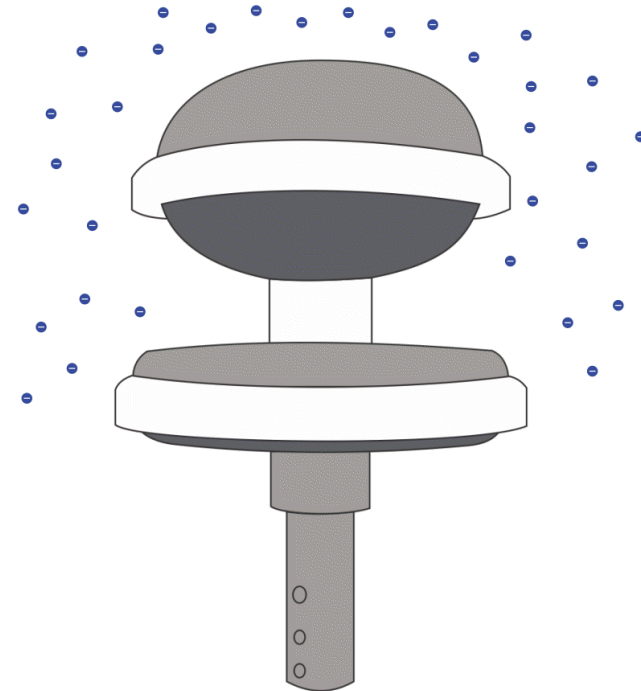
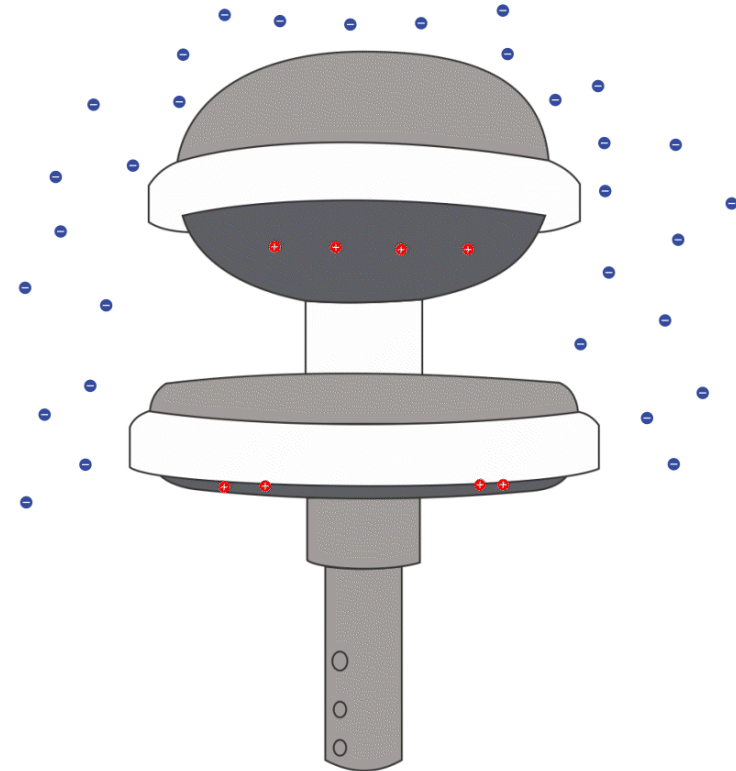Step 1: Opposite charges attract each other

STEP BY STEP OPERATION

In each capacitor there is a potential difference this generates the attraction of charges of opposite polarity to balance the capacitors.
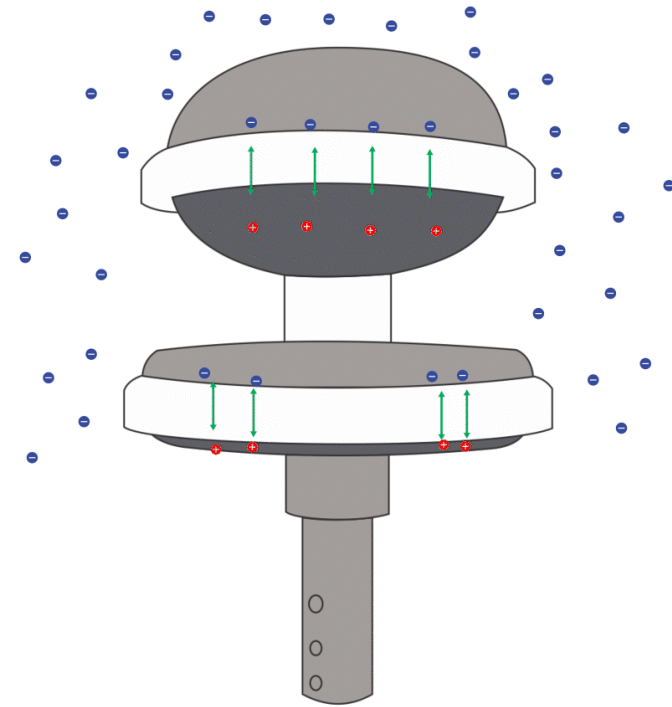
The electrical voltage is the **tendency of compensation of charges**, caused by the **potential difference** of them.

The electric current that appears on the ground wire (I) is the result of the ordered movement of charges between the two electrodes, generated by an internal electrical field, this is in mA.

The intensity of the current that leaks through the ground cable (I), is directly proportional to the voltage that appears between electrodes (V) and inversely proportional to the resistance of the electrical ground (R)
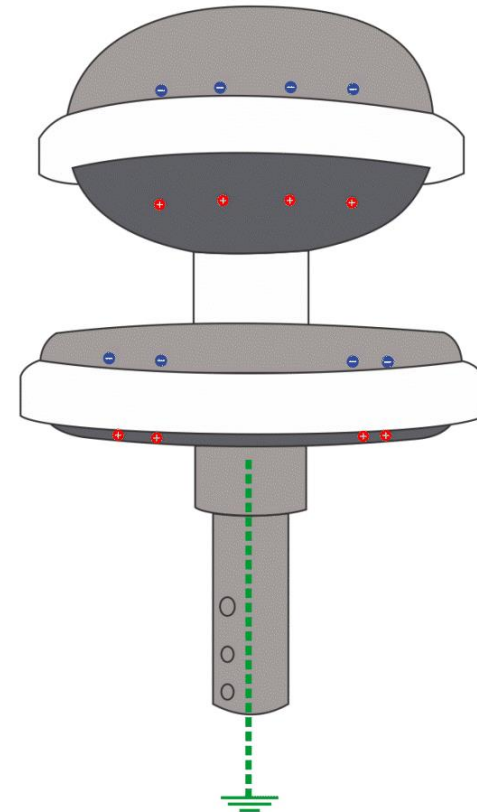
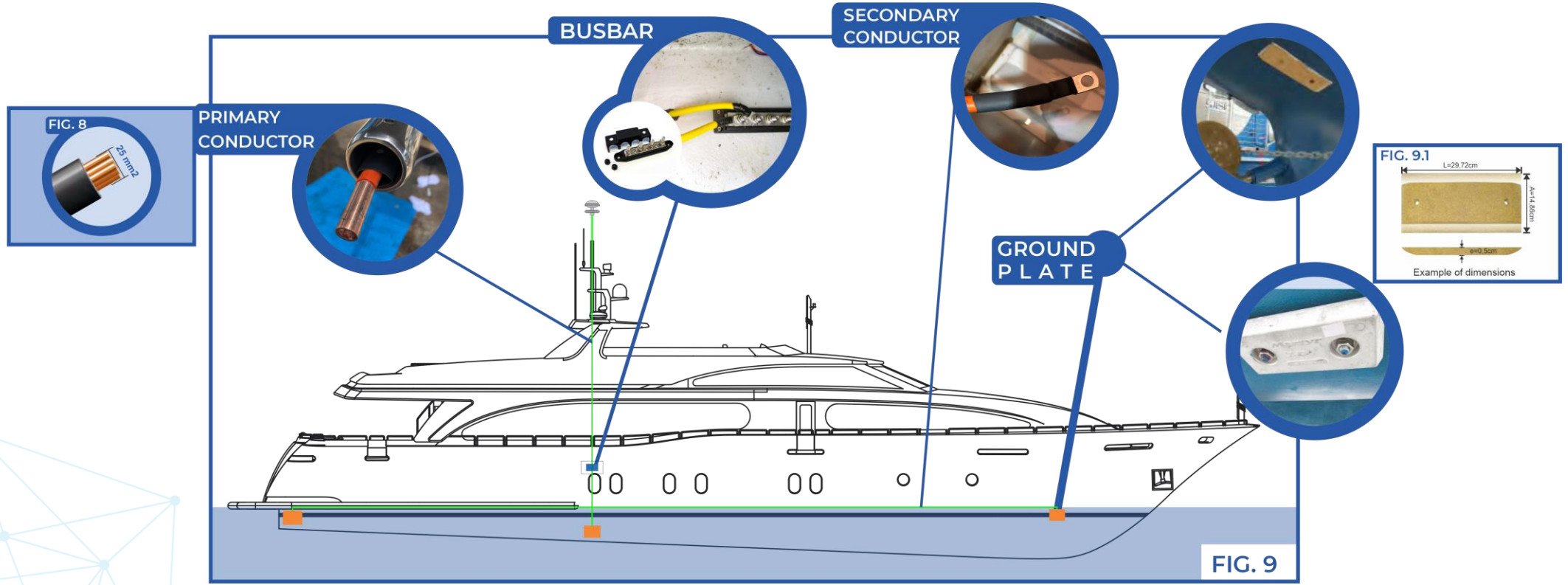The materials accomplish the Ohm´s Law.

$$I = \frac{V}{R}$$

V = Potential difference, depends on the speed of displacement and load of the cloud.
R = resistance value of the ground connection.
I = Leakage Current Intensity (milliamperes)

GROUNDING

PRIMARY CONDUCTOR

BUSBAR

SECONDARY CONDUCTOR

FIG. 8

25 mm2

GROUND PLATE

FIG. 9.1

L=29,72cm

A=14,86cm

e=0,5cm

Example of dimensions

FIG. 9

FUNCIONALITY TEST

In high voltage tests, the device is subjected to an electric field generated between an artificial cloud and the ground plane at a distance of 1 meter between the device and the artificial cloud.

An impulse generator delivers an electrical potential in the artificial high voltage cloud on a KV scale.

The device withstands 840 KV without the formation of an electric discharge.

The device is subjected to 50 impulses of the same voltage at which the lightning discharge is formed in a Franklin or ESE lightning rod (425KV to 468 KV), demonstrating that the discharge is not formed.

Then, to demonstrate the maximum capacity of the device, it is subjected to a progressive increase in voltage that begins at 595 KV until reaching 840 KV **WITHOUT GENERATING DISCHARGE.**

NOTE: Impulse supported (o) implies that the voltage curve applied to the plate raised above the sample is not conducted to ground through the object located at a distance "d". On the contrary, the result indicated as cut (x) implies that the beam is primed and guided to ground through the test object.

Test performed by: Roberto Hernández and Vicent Berga
Job title: Laboratory technicians

Then, several impulses were applied by increaing the voltage until the first cut was observed in the sample ME-ITE-210912-03:

Shoot no.	Programmed voltage (kV)	Measured voltage (kV)	Current (A)	Supported (o) Cut (x)
1	595	497,196		o
2	600	500,378		o
3	605	505,036		o
4	610	509,28	0,8	o
5	620	518,368	0,742	o
6	630	525,786	0,703	o
7	640	529,224	0,859	o
8	650	541,262	0,82	o
9	660	553,9	0,859	o
10	670	561,361	0,898	o
11	680	567,685	0,507	o
12	690	577,224	0,429	o
13	700	585,938	0,82	o
14	710	594,239	0,468	o
15	715	599,963	0,781	o
16	720	603,355	0,82	o
17	730	611,563	0,625	o
18	740	619,352	0,781	o
19	750	627,684	0,781	o
20	760	637,079	0,585	o
21	770	645,844	0,625	o

SERTEC INTERNAL TESTS

The factory has its own laboratory where each manufactured device is electrically tested by means of an artificial cloud system in DC and AC at 13 cm where the electric discharge does not form and is compared with parameterized values at which the discharge forms in the conventional Franklin tip. Vastly exceeding the threshold of formation.