INTEGRAL SAFETY IN LIFASA POWER CAPACITORS

Safety requirements have been taken into account in all matters of design of LIFASA power capacitors. They form an integral part of them and cover all potential risks described in the standards of the International Electrotechnical Commission.

PROTECTION AGAINST ECOLOGICAL AND FIRE RISKS:

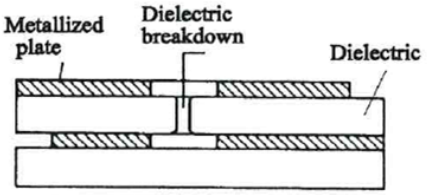
DRY CONSTRUCTION

LIFASA power capacitors are of dry construction and so, ecologically sure: there is no risk of impregnating liquid leakage.

Impregnating liquids used in other types of capacitors are usually toxic and persistent. In certain cases (PCB) their use is even prohibited in a large number of countries.

Dry construction of capacitors is intrinsically sure because any escape of impregnating liquid is particularly dangerous. This is because all impregnants used nowadays are flammable. Besides, all space between elements composing LIFASA power capacitors are filled with a material of mineral origin, inert and non-flammable and they are mounted in strong metallic cases.

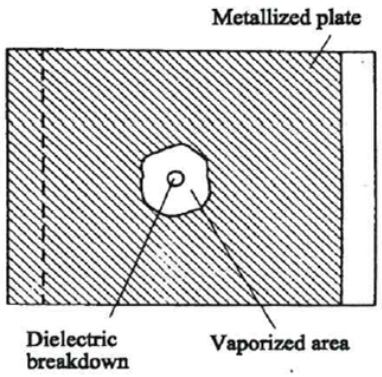
PROTECTION AGAINST TRANSIENT OVERVOLTAGES:



SELF-HEALING DIELECTRIC

Capacitors are composed by capacitive elements winded with metalized polypropylene of low looses.

This dielectric is of self-healing type: this means that the plates of the capacitor are of a so extremely small thickness that in the case of a transient, overvoltage produces a dielectric breakdown; the current circulating through the breakdown point will vaporize the metallic plate around this breakdown point, allowing the capacitor to continue working normally. Self-healing process is extremely fast and requires a few microseconds only.



PROTECTION AGAINST ELECTRICAL DISCHARGES:

DISCHARGE RESISTORS

Power capacitors store electrical charges that even when being disconnected from the mains they can produce dangerous voltages in their terminals. LIFASA power capacitors incorporate discharge resistors that avoid any risk of electric discharges during handling of capacitors, as well as during their installation or maintenance operations.

Discharge resistors used are in accordance to the new requirements of the IEC 831 standard, so their heating is much lower than the one obtained with the previous standards, reducing the total looses of the capacitors and increasing the reliability of the equipment.

PROTECTION AGAINST PERMANENT OVERLOADS:

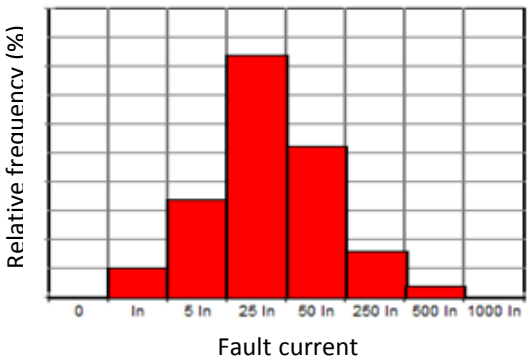
CONSTRUCTIVE DESIGN

Capacitive elements that form the capacitor are fully encapsulated with thermo hardening resin and are mounted into steel cases. Void spaces between elements and the case are filled with a non-flammable inert mineral material.

This construction system avoids any risk of explosion of the capacitor and allows meeting all the tests specified in the IEC 831-1 and IEC 831-2 standards. Type test certificates from Official Laboratories according to these standards are available.

INTERNAL FUSE + OVERPRESSURE SYSTEM (Patented system)

In certain markets, there are standards and specifications asking for an individual protection of each capacitor element. This additional protection is also incorporated to LIFASA capacitors. Its principle of function is as follows:



IEC standards establish maximum limits of overload, on temperature, voltage and current among which a power capacitor can work.

If these limits are exceeded in a permanent way, self-healing mechanism is likely not able to act effectively and the overloaded capacitor can fail definitively.

Unlike those capacitors with a metallic plate, self-healing capacitors present a fault impedance that can have very different values.

These impedance values produce fault currents that can vary between the order of the rated current and several hundred times of itself (see enclosed graphic).

To avoid this type of failure, LIFASA power capacitors are provided with a double protection system in each element: Internal fuse and Overpressure system.

In the case of a medium or high fault current, the internal fuse acts as a conventional fuse interrupting the circuit of the damaged element and allowing the rest of the capacitor to continue working normally.

In the case of low fault current, not enough to blow the fuse, heating located in the damaged area of the dielectric provokes a generation of gas that increases internal pressure of the element. This pressure increase activates the overpressure system which interrupts in a mechanical way the circuit of the damaged element and allows the rest of the capacitor continues normally working.