INFORMATION ON INTERNATIONAL STANDARDS

- **SAFETY**

Electronic devices such as TV sets, radios, computers, stereos, hair dryers, washing machines, etc. are all connected to the mains power supply and all generate «noise».
Since these devices, even when in the off mode, are continuously connected to the mains they must comply with rigorous safety standards. In addition, the noise they generate can be picked up by TV sets and radios in the form of visual and audible distortions and, in the case of computers, as malfunctions and errors.
This noise must be filtered or suppressed.

- **MAIN INTERNATIONAL COMMITTEES**

- IEC (International Electrotechnical Commission)
- CEN (European Committee for Standardization / Comité Européen de Normalisation)
- CENELEC (European Committee for Electrotechnical Standardization / Comité Européen de Normalisation Electrotechnique)

Note: EN . . . (European Standard / Norme Européenne)

- **NEW EUROPEAN STANDARD (EN 132400)**

With the aim to standardize all the European National Standards and have only one Standard of reference in all the member countries of CENELEC, EN 132400 Standard was issued on 26th June, 1995 replacing all the European National Standards in force up to that date.
The European Standard EN 132400 is identical to the International Standard IEC 60384-14 2nd Edition 1993. The IEC and CENELEC Committees are working in order to have the two standards identical also in the name: the future name of the European Standard will be “EN 60384-14”.
The old European National Standards used IEC 384-14, Edition 1981 as a reference.
Now the IEC 384-14 Edition 1981 has been replaced by IEC 60384-14 2nd Edition 1993.

CENELEC members are:
Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovakia, Spain, Sweden, Switzerland, UK.
Effects of the coming into force of EN 132400 Standard:

- since 26th June 1995 it is no longer possible to request approvals according to the old European National Standards (VDE, ASEV, IMQ, etc.);
- any national body can issue the approval and its validity is recognized by the bodies of all the other CENELEC member countries with no need to repeat the tests;
- marking: the coordinating committee has released their unified logo (**ENEC mark** = European Norms Electrical Certification) that is recognised throughout Europe as being equivalent to the individual marks of countries. It is issued for Luminaries and components, IT equipment, transformers, switches, suppression capacitors and filters.
  At present, the name of the standard EN 132400 or IEC 60384-14, is stamped near the logo of the institute performing the tests. Please note that if the component is approved according to the EN132400, it is no longer necessary to stamp the marking relevant to the old European National Standards;
- approval certificates relevant to the old European National Standards: they remained valid till to 26th June 2000.

- **SIGNIFICANT TESTS OF THE IEC 60384-14 (EN132400)**

Listed below you find the summary tables and some information on the most significant tests of the 60384-14 (EN 132400) Standard (see table 1, 2 and 3).
Table 1

Test	IEC 60384-14 (EN 132400) **(Present Standard)**
Impulse voltage before Endurance test	YES
Active Flammability test	YES
Passive Flammability test	YES

Table 2

Application	Peak pulse in service	Peak impulse before endurance test	Sub-class IEC 60384-14 2nd Ed. (EN 132400) (Present Standard)
High pulse application	**>2.5kV; ≤4.0kV**	4 kV per C ≤ 1µF 4/√C kV per C >1µF	**X1**
General purposes	**≤2.5kV**	2.5 kV per C ≤1µF 2.5/√C kV per C >1µF	**X2**
General purposes	**≤1.2kV**	None	**X3**

Table 3

Type of insulation bridged	Rated voltage	Peak impulse before endurance test	Sub-class IEC 60384-14 2nd Ed. (EN 132400) (Present Standard)
Double or reinforced insulation	≤500Vac	8 kV	Y1
Basic or supplementary insulation	≥150Vac; ≤300Vac	5 kV	Y2
Basic or supplementary insulation	≥150Vac; ≤250Vac	None	Y3
Basic or supplementary insulation	<150Vac	2.5kV	Y4

- **CCA (CENELEC CERTIFICATION AGREEMENT) AND CB (CERTIFICATION BODY) TEST CERTIFICATE:**

These have their origin from an agreement taken by the Certification Bodies. Following these agreements, certificates are issued which are called CCA and CB certificates.
These certificates allow the mutual recognition at a European (CCA) and world (CB) level and are particularly effective in case the reference standards are the EN ...
The countries accepting the CCA are:
Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland, UK.
The countries accepting the CB are:
Australia*, Austria, Belgium, Canada*, China, Czech. Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, India, Ireland, Israel, Italy, Japan, Korea Rep of, Netherlands, Norway, Poland, Russia, Singapore, Slovakia, Slovenian, South Africa, Spain, Sweden, Switzerland, Turkey, Ucraine, United Kingdom, U.S.A.*, Yugoslavia.
The countries with an asterisk may require additional tests to obtain the approval.

- **MAIN STANDARDS FOR SUPPRESSION CAPACITORS**

EUROPE

Reference Standard: EN 132400:1994 + A1,2,3:1998 + A4:2001
This standard, already in force, is identical to IEC 60384-14 2nd Edition 1993+A1: 1995. It harmonizes and supersedes any previous national standards into only one European Standard

U.S.A.

Reference Standard: UL 1414 and UL 1283
UL 1414: Across-the-line applications
- Max capacitance value: 1µF
- Max operating temperature: +85°C
- Max Voltage: 250Vac
- UL 1414 approval covers also 1283 approval (not viceversa)

UL 1283: Electromagnetic Interference filters
- The UL 1283 approval can be requested also for capacitance values higher than 1µF, temperatures higher than +85°C and voltages higher than 250Vac.

CANADA

Reference Standard: CAN/CSA C22.2N°1 and CAN/CSA 384-14

CAN/CSA C22.2 N°1 : Across-the-line applications

- Max capacitance value: 1µF
- Max operating temperature: +85°C

CAN/CSA 384-14: Across-the-line applications

- The **CAN/CSA 384-14** approval is identical to IEC 60384-14 2nd Edition 1993+A1:1995. It harmonizes and can be requested also for capacitance values higher than 1µF, temperatures higher than +85°C and voltages higher than 250Vac.

CHINA

Reference Standard: GB/IT14472-1998

From August 1st 2003 all the old marks have been replaced by:

- **CCC** (China Compulsory Certification) which is compulsory and it is foreseen only for a list of more critical products. Capacitors are not included in this list (http://www.cqc.com.cn/ccc/catalogureeng.pdf)
- **CQC** is the general standard and mark of the new Body. It may be utilized in all other cases (e.g. for capacitors) and it is optional but very appreccciated by Chinese Authorities and helpful in case it would became one day compulsory as per CCC.

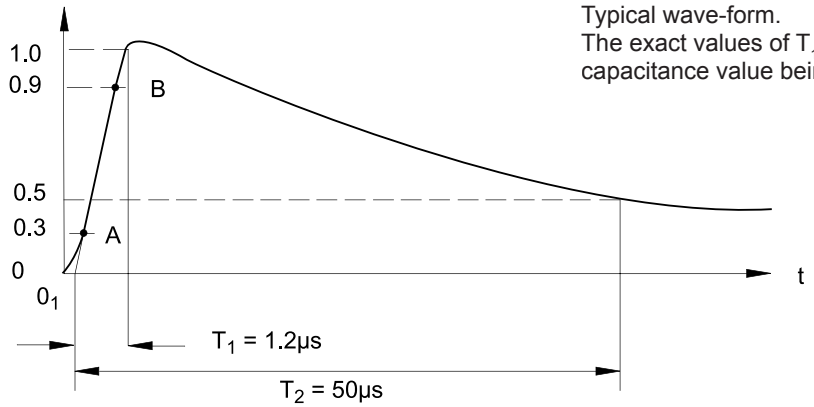
TESTS RELATED TO IEC 60384-14 (2nd edition '93 plus amendment A1: 1995) AND EN 132400

According to IEC 60384-14 (2nd Edition 1993 plus amendment A1: 1995) and EN132400 our X2 and Y2 suppression capacitors withstand the following tests (type test):

- IMPULSE VOLTAGE TEST (before EN DURANCE TEST)

  V_{PEAK} = 2.5KV (CLASS X2) V_{PEAK} = 4.0KV (CLASS X1)

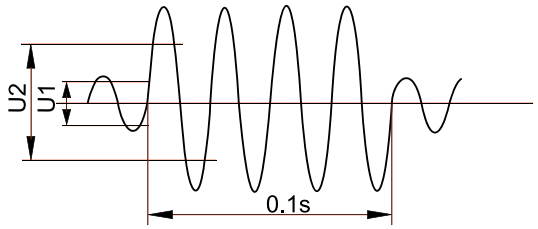
  V_{PEAK} = 5.0KV (CLASS Y2)



Typical wave-form.
The exact values of T_1 and T_2 depend on the capacitance value being tested.

- ENDURANCE TEST

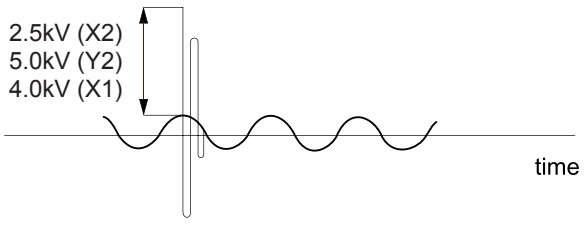
  The capacitors are tested for 1000 hours at upper category temperature with a voltage of 1.25 V_R for Class X2 and X1, 1.7 V_R for Class Y2.
  Every hour the test voltage is increased up to 1000 V_{RMS}/50Hz for a period of 0.1 s.



U1 = Rated Voltage
U2 = 1000V_{RMS}

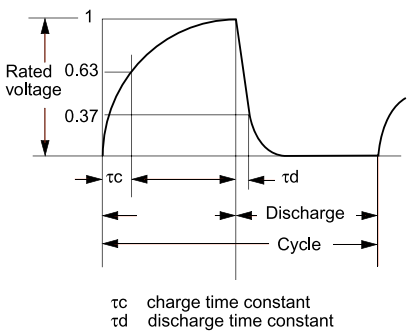
- ACTIVE FLAMMABILITY TEST

  The capacitors are tested at the rated voltage (Vac) at 50 Hz with superimposed 20 pulses at 2.5kV for Class X2, 4.0kV for Class X1 and 5kV for Class Y2 with an interval between the successive pulses of 5 seconds.
  The rated voltage is kept for 2 min after the last discharge. At the end of the test the capacitor does not burn (control made with the cheese-cloth wrapped on the body of capacitors).



- CHARGE AND DISCHARGE TEST

  The capacitors are subjected to 10000 cycles of charge and discharge at the rate of approximately one operation per second.



τc charge time constant
τd discharge time constant