Technical Terms and Definitions

1. Rated capacitance C_N
Capacitance value for which the capacitor has been designed.

2. Tolerance on rated capacitance Ctol
The deviation of actual measured capacitance from rated capacitance, the value is following:Ctol=(C—C_N)/C_N*100%
C:Actual measured capacitance of a capacitor
CN: Rated capacitance of a capacitor
Tolerance on rated capacitance determines its application its priority values are ±5% (J), ±10% (K).

3. Rated voltage U_N
Rated a. c. voltage (U_N):
Maximum operating peak voltage of either polarity of a reversing type waveform for which the capacitor has been designed.
Rated d. c. voltage (U_N):
Maximum operating peak voltage of either polarity but of a non-reversing type waveform for which the capacitor has been designed.

4. Rms voltage Urms
Root mean square of maximum value of sinusoidal a.c. voltage in continuous operation.

5. Ripple voltage Ur
Peak-to-peak alternating component of the unidirectional voltage

6. Non–recurrent surge voltage Us
Peak voltage induced by a switching or any other disturbance of the system which is allowed for a limited number of times and for durations shorter than the basic period.

7. Insulation voltage Ui
R.M.S. value of the sine wave voltage designed for the insulation between terminals of capacitors to case or earth. If not specified, the R.M.S. value of the insulating voltage is equivalent to the rated voltage divided by $\sqrt{2}$.

8. Maximum current Imax
Maximum R.M.S. current for continuous operation.

9. Maximum peak current Î
Maximum peak current that can occur during continuous operation.The value is following:$\hat{I}=C_N\times(dv/dt)$

10. Maximum surge current Îs
Peak non-repetitive current induced by switching or any other disturbance of the system which is allowed for a limited number of times, for durations shorter than the basic period.

11. Rated frequency (of a capacitor) f_N
Frequency for which the capacitor has been designed.

12. Resonance frequency
Lowest frequency at which the impedance of the capacitor becomes minimum.
The value is following: $Fr=1/\left(2\pi\sqrt{LsC_N}\right)$

13. Tangent of the loss angle of a capacitor tgδ
Ratio between the equivalent series resistance and the capacitive reactance of the capacitor at specified sinusoidal alternating voltage and frequency.

14. Dielectric dissipation factor tgδ0
Constant dissipation factor of dielectric mate rial for all capacitors at the rated frequency. The typical loss factor of polypropylene Film is 2×10^{-4}

15. Equivalent series resistance of a capacitor ESR
Effective resistance which, if connected in series with an ideal capacitor of capacitance value equal to that of the capacitor in question, would have a power loss equals to active power dissipated in that capacitor under specified operating conditions.

16. Self–inductance Ls
Effective inductance which, if connected in series with an ideal capacitor of capacitance value equal to that of the capacitor in question, would have the resonance frequency equals to the resonance frequency in that capacitor.

17. Thermal resistance Rth
A heat property and a measurement of a temperature difference by which a capacitor resists a heat flow. it shows the temperature difference when a unit of heat energy flows through a capacitor in unit time. it has the units ℃/W or K/W.

18. Capacitor losses Pj
Active power dissipated in the capacitor. The value is following:
$Pj=Irms^2\times ESR$

19. Operating temperature Θo
Temperature of the hottest point on the case of the capacitor when in thermal equilibrium.

20. Maximum operating temperature Θmax
Highest temperature at which the capacitor may be energized.

21. Lowest operating temperature Θmin
Lowest temperature at which the capacitor may be energized.

22. Cooling–air temperature Θamb
Temperature of the cooling air measured at the hottest position in bank, under steady-state conditions, midway between two units. If one unit is involved ,it is the temperature measured at a point approximately 0.1m away from the capacitor container and two-thirds of the height from its base.

Technical Terms and Definitions

23. Container temperature rise △Θcase

Difference between the temperature of the hottest point of the container and the temperature of the cooling air.

24. Hotspot temperature Θhs

Temperature at the hottest spot inside the capacitor. The value is following:Θhs=Θamb+Pj×Rth

25. Climatic category

The climatic category which the capacitor belongs to is expressed with minimum, maximum operating temperature and damp heat severity,
For example, 40/85/56

26. Insulation resistance IR

The insulation resistance is the ratio between an applied DC voltage and the resulting leakage current. It is expressed in MΩ.
The insulation resistance is usually expressed with time constant(τ), the time constant in expressed in seconds with the following formula: $\tau=IR\times C_N$

27. Self-healing

It is only applicable to metallized film capacitor. Self-healing means the ability that the electrical properties of the capacitor are rapidly restored after a local breakdown of the dielectric.
The electrode of metallized film capacitor is the metal coating of the metalinzed film, which are vacuum-deposited directly onto the plastic film, have a thickness of only several tens nm. At weak point or impurities in the dielectric, a dielectric breakdown would occur. The energy released by the arc discharge in the break-down channel rapidly evaporate the thin matal coating in the vicinity of the channel. The insulated region thus resulting around the former faulty area will cause the capacitor to regain its full operation ability.

28. Failure rate

Failure rate indicates the failure probability of capacitors in unit time after a certain point, while the capacitor haven't failed before the certain point. The unit is FIT （1FIT=1/10^9hours）
For example, 10000 pcs of the capacitors work at given conditions for 10000 hrs and 10 pcs of capacitors failed,
So λ=10/(10000×l0000)=100FIT.

29. Expected lifetime of a capacitor

Expected Lifetime is a statistical value calculated on the basis of experience and on theoretical evaluations, it depends on the applied voltage and the hot spot temperature during operation. Generally speaking, for capacitors applied in different situation, the designed average service lifes are different. For example, capacitors used in DC- Link circuits will have a expected lifetime of probable 100000 hrs at rated voltage and 70℃ hot spot temperature.
A rough evaluation for the expected capacitor life-time can be indicated like this: 10% increase of the voltage, half long lifetime will lose. Also 10% increase of hotspot increase, half long lifetime will lose.

Application Notes

1. Caution items in using plastic film capacitors

1) The plastic film capacitor varies in the maximum applicable voltage depending on the applied voltage, current, frequency and operational environment.

2) Generally speaking, although flame retardant shell or flame retardation epoxy is used in the coating or encapsulating of plastic film capacitor, continuous high temperature of firing will break the coating layer or plastic case of the capacitor, and may lead to melting and firing of the capacitor element.

2. Caution items in storing plastic film capacitors

1) It shouldn't t be located in particular high temperature and high humidity.

2) Capacitors may not be stored in corrosive atmospheres, such as sulfides, acids, lye, salts, organic solvents or other corrosive substances.

3) When unchanging primal package, it shouldn't be stored more than 24 months (from the date marked on the capacitor's body or the label glued to the package)

Guide For Customer Ordering

Please provide following information as much as you can

1.Applications: such as transducer, welding machine, induction heating machine

2.Application situation: such as DC-Link, IGBT snubber, resonance, etc.

3.Rated capacitance and tolerance

4.Voltage: such as rated voltage , working voltage, ripple voltage, non-recurrent surge voltage, etc.

5.Current: such as maximum current, maximum peak current ,pulse current, etc.

6.Frequency: such as working frequency, pulse frequency, etc.

7.Working environment: such as environment temperature, humidity, cooling mode, etc.

8.Dimensions: such as diameter,height or length,width etc.

9.Terminal types: such as lug, tab etc.