

Quality policy

ICAR, a synonym for capacitor since 1946, has always considered the quality and the effectiveness of its internal processes as a key-factor in the company strategy.

The compliance with International Standards has always been kept as a fundamental reference for offering products and processes which completely match customers' requirements and expectations. ICAR Quality System is certified according to EN ISO 9001:2008 standard and for the products used in railways applications according to IRIS standard.

ICAR representatives are members of the most important international standard committees, in charge for issuing the reference standards for the capacitor industry.

In order to comply with the international regulations and with the most severe customers acceptance criteria, products are submitted to tests both in the internal laboratories and in the most important internationally recognized laboratories.



Selection rules and definitions

SELECTION RULES

VOLTAGE

Select a capacitor with surge peak voltage (U_S), rated voltage (U_N) and max ripple voltage (U_{rms}) higher than the operating ones.

Consider that:

- rated DC voltage of the capacitor (U_N) shall be higher than the sum of operating dc voltage + operating ripple peak voltage
- rms ripple voltage shall be lower than 10% of the rated voltage U_N , and it shall not exceed $150V_{rms}$

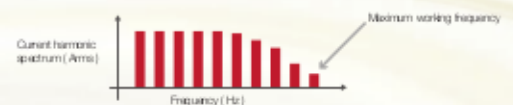
It is possible, within certain limits, to work above the rated voltage but this reduces the expected life of the capacitor.

CURRENT

Select a capacitor with maximum current I_{max} , higher than the operating current I_{rms}

Consider that:

- a thermal check shall be performed in order to verify that the chosen capacitor does not exceed the max operating temperature at operating I_{rms}
- for each family, the I_{max} has been calculated for a well defined $\vartheta_h - \vartheta_0$.
The dielectric losses ($Q \tan \delta_0$) have not been considered and the harmonic spectrum is supposed to be made of different frequency components ending up to the specified maximum working frequency. I_{max} should not be considered totally concentrated at the maximum working frequency.



THERMAL CHECK

Double check the expected working temperature of the capacitor in your application.

Consider that:

the hot spot temperature can be estimated as follows:

$$\vartheta_h = R_{\vartheta_h} \cdot P + \vartheta_0$$

the total dissipated power can be calculated as follows:

$$P = Q \tan \delta_0 + R_S I_{rms}^2$$

During stationary operation ϑ_h must not exceed the maximum hot spot temperature given in this catalogue for each families of capacitors.

At rated duty and hot spot temperature of 70°C (65°C for LNK-M3, LNK-M2 and LNK-P3 series) the expected lifetime is 100.000 hours with a statistical failure rate of 300FIT (97% survival).

WARNING

The thermal check is based on the hypothesis that the heat generated into the capacitor is transmitted to the environment through the case surface. Possible localised overheating (poor connections, hot components in the nearby as other capacitors, operation with high harmonics frequency etc.) would bring the capacitor to a dramatic failure or to a reduction of the expected life.

Special tests by means of thermocouples should be performed to be sure that the maximum hot spot temperature is not exceeded even under the most critical ambient circumstances. Capacitors with thermocouples can be supplied on request.