Technical Information

Ratings
Capacitance tolerance: ±10%, ±5% on request
Useful life: 100,000hrs at 85°C hot-spot, Failure rate: 500FIT

Application
Expressly designed for heavy duty AC applications.
MKV capacitors may be used with dc voltage up to $U_{NDC}$

Environmental conditions
Operating temperature
$\theta_{\text{min}} = -25^\circ\text{C}$, $\theta_{\text{max}} = +85^\circ\text{C}$ (considering mounting position with terminals to the top)
$\theta_{\text{min}}$ is the temperature of the hottest point on the case at which the capacitor may operate, for further indication see Selection Rules;
$\theta_{\text{max}}$ is the minimum operating ambient temperature at which the capacitor may operate;

Storage temperature
$\theta_{\text{min}} = -40^\circ\text{C}$, $\theta_{\text{max}} = +85^\circ\text{C}$
$\theta_{\text{min}}$ is the maximum operating ambient temperature at which the capacitor may be continuously maintained non-operating;
$\theta_{\text{max}}$ is the minimum operating ambient temperature at which the capacitor may be continuously maintained non-operating;

Humidity class
MKV - B1/C1/D1 series: Class F. Max relative humidity 75% annual on average, 95% 30 days per year, condensation not permitted
MKV - B2/E1/E2 series: Class C. Max relative humidity 95% annual on average, 100% occasional, condensation permitted.

Design
The winding consists of alternating layers of polypropylene and bi-metallized paper impregnated with oil.
The paper does not work as dielectric but it is the means of impregnation and supports the metallization.
This technology gives many advantages:
- good impregnation, i.e. long life
- very low losses
- good capability to withstand inrush currents
- reduction of the field strength at the edges of the electrodes

Case material, filler and non metallic parts
Case: aluminium.
Filler and non metallic parts: low smoke and toxicity emission in accordance to UNI CEI 11170-3 GUIDELINES FOR FIRE PROTECTION OF RAILWAY VEHICLES: ACCEPTABILITY LIMITS

Environmental Compatibility
MKV - B1/C1/D1 series: do not contain PCB and are manufactured in accordance to RoHS restrictions
MKV - B2/E1/E2 series: do not contain PCB

Protection against accidental contact
All the capacitors are NOT protected against accidental contact

Discharge
All the capacitors are NOT provided with internal/external discharge device

Type of protection
Protected: presence of overpressure disconnector.
The over-pressure disconnector prevents the case bursting due to excess pressure when the capacitor is overloaded or at the end of its life.
Total elongation of the case is about 7mm after the over-pressure disconnector release.
Don't make use of rigid connections.

Assembly/Cooling
The useful life of a capacitor can be dramatically reduced if exposed to excessive heat. In general, an increase in the ambient temperature of 5°C will halve the expected lifetime.
Capacitors must be allowed to cool and should be shielded from external heat sources. Capacitors shall not be placed near to heat source and a minimum clearance of 20mm between the capacitors shall be maintained.

<table>
<thead>
<tr>
<th>Overvoltage</th>
<th>Maximum duration</th>
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<tbody>
<tr>
<td>$1.1 \times U_{NDC}$</td>
<td>30% of on load duration</td>
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<tr>
<td>$1.15 \times U_{NDC}$</td>
<td>30 min / day</td>
</tr>
<tr>
<td>$1.2 \times U_{NDC}$</td>
<td>5 min / day</td>
</tr>
<tr>
<td>$1.3 \times U_{NDC}$</td>
<td>1 min / day</td>
</tr>
<tr>
<td>$1.5 \times U_{NDC}$</td>
<td>30 ms, no more than 1000 times in the lifetime</td>
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Mounting: position, fixing and connection

Capacitors shall be preferably mounted upright, i.e. terminals on top. The capacitor shall be fixed using the mounting stud present at the base of the can.

Max tightening torque for mounting stud
- M6: 4 Nm
- M12: 10 Nm

To avoid torque transmission to the capacitor lid during cable connection terminals should be tightened using two spanners.

Recommended torque for screw connections:
- M6: 3 Nm
- M8: 5 Nm
- M10: 7 Nm

Routine dielectric tests

The performed tests before delivery are the following:

a) capacitance and tan δ measurement with LRC low voltage bridge, 100 Hz frequency;

b) A.C. voltage test between terminals (2.15 U rms for 10s);

c) A.C. voltage test between terminals and case (1.415 U eff + 1000V for 10s but not less than 2000 V);

d) Sealing test (90° C, 4 h).

Risk Of Explosion And Fire

Capacitors consist mainly on polypropylene film. The film may ignite as a result of internal fault or external overload. Appropriate measures should be ensured to avoid any risk of hazard in the event of failure.

FIRE LOAD: 46MJ/kg, EXTINGUISH WITH: solid extinguish agent, CO2, foam.

Reference standard

IEC 61071

Code and Type Designation

The capacitor designation is the following:

MKV - D1X - 47 - 45

- Rated r.m.s. voltage code: Urms divided by ten.
- Rated capacitance code: value in µF.
- Tolerance code: X=±10% J=±5%

Terminal code:
- B1: DF 6.3 x 0.8 mm (plastic lid, two double flat tags)
- B2: SF 6.3 x 0.8 mm (plastic lid, one single flat tag)
- C1: M6 screw (plastic lid, two M6 screws)
- D1: M8 screw (plastic lid, two M8 screws)
- E1: M10 screw (metal lid, two ceramic insulators)
- E2: M8 screw (metal lid, one ceramic insulator)

Operating life

The lifetime of a capacitor depends on the hot spot temperature and on the field strength in its dielectric during operation. The capacitors have been designed for an average probable service life of 100,000hrs at rated duty (voltage, temperature and frequency). During the life of the product the probable failure rate is 500FIT. Failures are considered short circuits, interruptions, capacitance drifts, reduction in the insulation between terminals and casing.

Lifetime is a statistical value calculated on the basis of experience and on theoretical evaluations. It does not have an absolute value and it is not possible to transfer automatically data coming from a limited quantity of capacitors to a whole population or even to a single batch of capacitors.

Please consult our technical department in case of working condition different from the rated ones.