

8. Specifications

8.1 Capacitance Specifications for Anode Foil

Items	Specifications
Effective Width of Foil	① U147 ▪ U140 Formed Foil : 480mm (485mm wide roll less 2.5mm at each edge) Etched Foil : 480mm (500mm wide roll less 10mm at each edge) ① U199-50.2Vfs over ▪ U191-45.6Vfs over 475mm (500mm wide roll less 12.5mm at each edge) ③ All Other Foils Formed Foil: 480mm (500mm wide roll less 10mm at each edge) Etched Foil: 480mm (500mm wide roll less 10mm at each edge)
Average Capacitance (X)	As per Specifications
Tolerance of Verage Capacitance (X)	As per Specifications
Calculation of Average Capacitance (X)	A1, A2, A3 : Measured capacitance values at outer side of a foil B1, B2, B3 : Measured capacitance values at core side of a foil $\bar{X} = (A \text{ max} + A \text{ min} + B \text{ max} + B \text{ min}) \div 4$
Dispersion Range	13% or less
Calculation of Dispersion Range	A1, A2, A3 : Measured capacitance values at outer side of a foil B1, B2, B3 : Measured capacitance values at core side of a foil $\text{Dispersion Rate} = \frac{A \text{ max or B max} - A \text{ min or B min}}{\text{Average Capacitance}} \times 100 (\%)$

※ Please download each test method from the KDK's website.
<http://www.kdk.com/index.html>

8.2 Specifications for Cathode Foil Capacitance

Items	Specifications
Effective Width of Foil	480mm (500mm wide roll less 10mm at each edge)
Capacitance	As per Section 3. Specifications
Determination of Capacitance	The minimum value of either outer side capacitance A or core side capacitance B
Hydration Process Time	60 minutes
Change of Capacitance after Hydration Process	$\Delta C_{60} \geq -10\%$

* ΔC_{60} (change of capacitance after Hydration Process) is applied to C518,C519,C439 and C531.

It is not applied to other cathode etched foil and cathode formed foil.

8.3 Nominal Formation Voltage Range

Foil Category	Nominal Formation Voltage Range
Formed Foil, Extreme Low Voltage	$3.0 \leq V_{fs} \leq 7.9$
Formed Foil, Low Voltage	$8.0 \leq V_{fs} \leq 170$
Formed Foil, Middle to High Voltage	$208 \leq V_{fs} \leq 664$
Formed Foil, Cathode	$0.9 \leq V_{fs} \leq 3.0$

8.4 Specifications for Residual Chloride Content

Items	Specifications	
Residual Chloride Content	Etched Foil for Anode, Low Voltage	2.0mg/m ² or less
	Formed Foil for Anode, Low Voltage, Cathode Formed Foil	0.8mg/m ² or less
	Etched Foil for Anode, Middle to High Voltage Formed Foil for Anode, Middle to High Voltage Cathode Etched Foil	1.0mg/m ² or less

8.5 Specifications for Visual Appearance

Items	Specifications
Visual Appearance	For Etched and Formed Foil, the appearance of one roll may be slightly different from another. They may look different because of variances in raw foil, production process, etc. The following minor defects shall not be reasons for rejection as long as they are proven not to be harmful electrically and/or mechanically to the capacitor: 1) Small speckles 2) Wrinkles and marks or visible corrections of them 3) Visible aluminum hydroxide on foil surface 4) Small pin-holes 5) Small scratch 6) Variations of surface color If you have any question about your shipment of foil, please contact us based upon "12-4 Rejections and Claims".

8.6 Specifications for Rise Time and Dielectric Withstanding Voltage

8.6.1 Formed Foil for Anode, Extreme Low Voltage

Items	Specifications
Nominal Formation Voltage Range	$3.0 \leq V_{fs} \leq 7.9$
Name of Test Methode	Vt Measurement
Code of Dielectric Withstanding Voltage	Vt
Dielectric Withstanding Voltage (Vt)	$V_{fs} \leq V_t$
Rise Time (Tr)	$T_r \leq (V_{fs} \times 0.5 + 100)$ second
Hydration Resistance Test Time	60 minutes
Rise Time after Hydration Process (Tr60)	$T_{r60} \leq 150$ second

8.6.2 Formed Foil for Anode, Low Voltage

Items	Specifications
Nominal Formation Voltage Range	$8.0 \leq V_{fs} \leq 170$
Name of test methode	Vt Measurement
Code of Dielectric Withstanding Voltage	Vt
Dielectric Withstanding Voltage (Vt)	$V_{fs} \leq V_t$
Rise Time (Tr)	$T_r \leq (V_{fs} \times 0.5 + 100)$ second
Hydration Resistance Test Time	60 minutes
Rise Time after Hydration Process (Tr60)	$T_{r60} \leq 150$ second

8.6.3 Formed Foil for Anode, Middle to High Voltage

Items	Specifications
Nominal Formation Voltage Range	$208 \leq V_{fs} \leq 664$
Name of Test Methode	Vt Measurement
Code of Dielectric Withstanding Voltage	Vt
Dielectric Withstanding Voltage (Vt)	$V_{fs} \leq V_t$
Rise Time (Tr)	$T_r \leq (V_{fs} \times 0.5 + 100)$ second
Hydration Resistance Test Time	60 minutes
Rise Time after Hydration Process (Tr60)	$T_{r60} \leq 150$ second

8.6.4 Formed Foil for Cathode

Items	Specifications
Nominal Formation Voltage Range	$0.9 \leq V_{fs} \leq 3.0$
Name of Test Methode	Vt Measurement
Code of Dielectric Withstanding Voltage	Vt
Dielectric Withstanding Voltage (Vt)	Each voltage is equivalent to the dielectric withstanding voltage in the catalog.