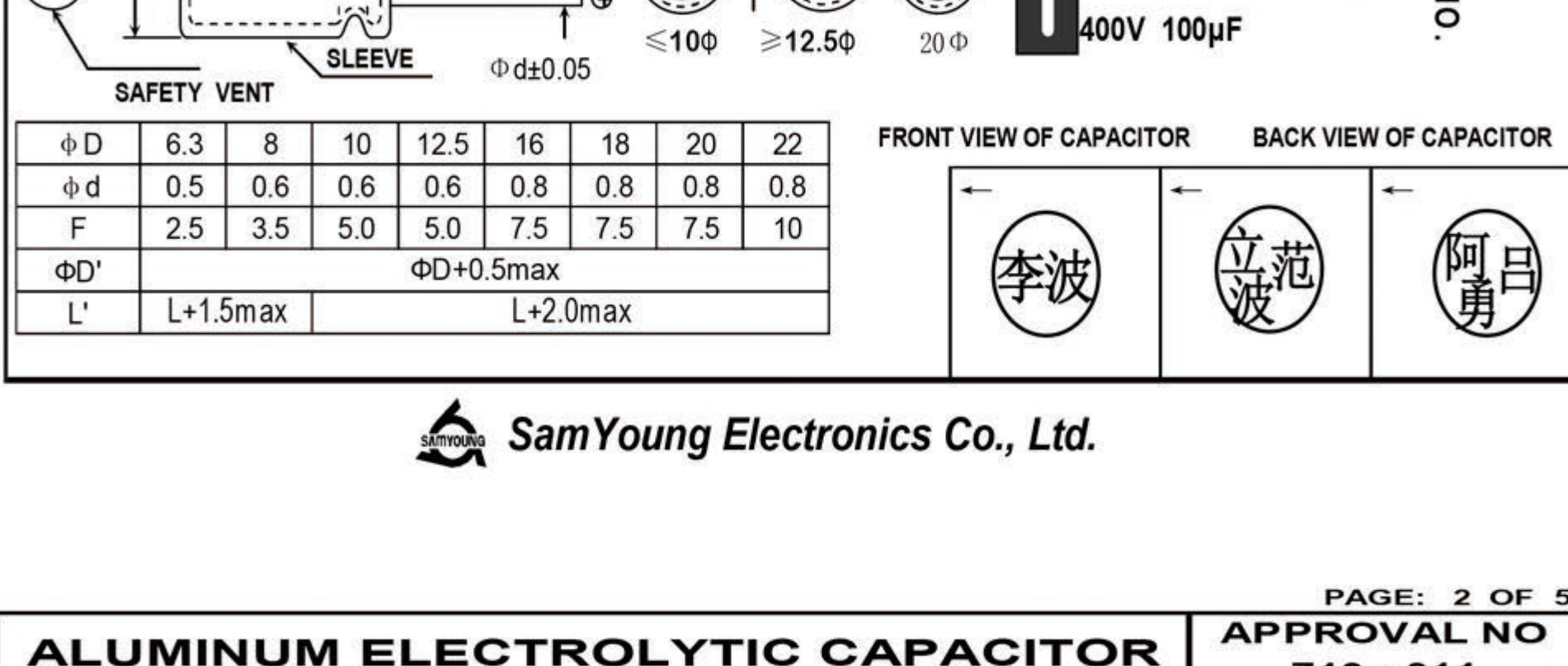


MESSRS:	APPROVAL NO	710 - 011
	DATE	2020.06.23
ALUMINUM ELECTROLYTIC CAPACITOR		
APPROVAL SHEET		
CATALOG TYPE	NFA SERIES	
USER PART NO.		
适用机种		
特记事项	Halogen-Free	
QINGDAO SAMYOUNG ELECTRONICS CO.,LTD. MANAGER OF DEVELOPMENT DEPARTMENT		
GONG JANG SUG		
		
USER APPROVAL:	APPROVAL NO.:	
SamYoung(Korea) : 47, SAGIMAKGOL-RO, JUNGWON-GU, SEONGNAM-SI, GYEONGGI-DO, KOREA SamYoung(China) : No.5 CHANGJIANG ROAD, PINGDU-CITY, SHANDONG-PROVINCE, CHINA 样式: H-1001-011 A4 (210x297)		

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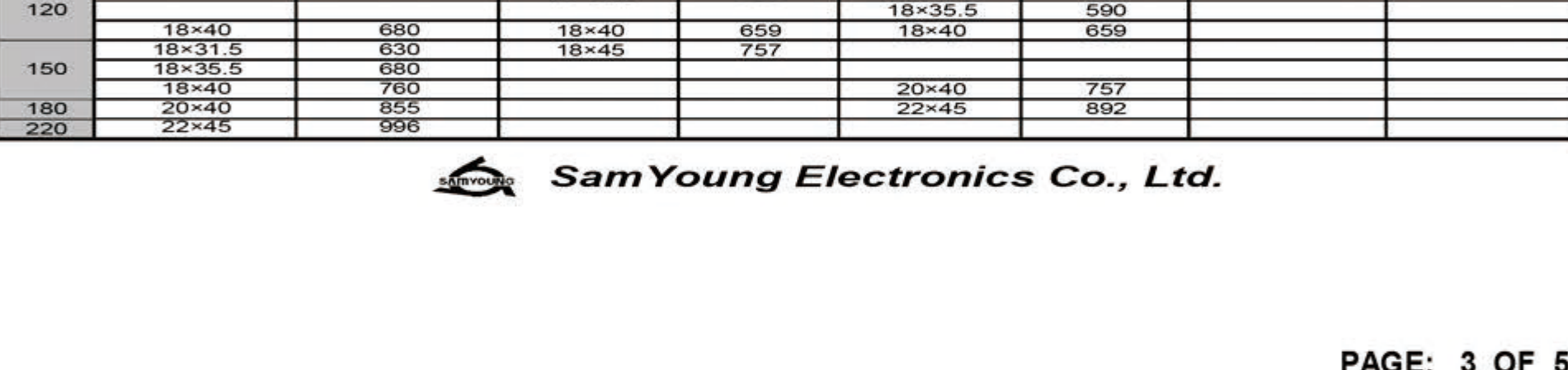
Item	Characteristics												
Rated Voltage Range	160 ~ 400Vdc	420 ~ 500VDC											
Operating Temperature Range	- 40 ~ + 105 °C	- 25 ~ + 105 °C											
Capacitance Tolerance	±20% <M> (at 20 °C, 120Hz)												
Leakage Current (at 20 °C)	Where, I: Max. Leakage current (µA) C: Nominal capacitance(µF) V: Rated Voltage (Vdc)												
	<table border="1"> <tr> <th colspan="2">After 1 minute</th> <th colspan="2">After 5 minutes</th> </tr> <tr> <th>CrVr≤1000</th> <th>CrVr>1000</th> <th>CrVr≤1000</th> <th>CrVr>1000</th> </tr> <tr> <td>0.1CrVr+40</td> <td>0.04CrVr+100</td> <td>0.03CrVr+15</td> <td>0.02CrVr+25</td> </tr> </table>		After 1 minute		After 5 minutes		CrVr≤1000	CrVr>1000	CrVr≤1000	CrVr>1000	0.1CrVr+40	0.04CrVr+100	0.03CrVr+15
After 1 minute		After 5 minutes											
CrVr≤1000	CrVr>1000	CrVr≤1000	CrVr>1000										
0.1CrVr+40	0.04CrVr+100	0.03CrVr+15	0.02CrVr+25										
Dissipation Factor (TAN δ) (at 20 °C, 120Hz)	Rated voltage(Vdc)	160 ~ 250	350 ~ 500										
	TANδ(Max.)	0.20	0.24										
Temperature Characteristic (Max. Impedance ratio)	Rated voltage(Vdc)	160-250	350-400	420-500									
	Z-25 °C/Z+20 °C	3	5	6									
	Z-40 °C/Z+20 °C	6	6	-									
Load Life	The following specifications shall be satisfied when the capacitors are restored to 20 °C after the rated voltage with the rated ripple current is applied(the peak voltage shall not exceed the rated voltage) at 105 °C for 10,000 hours.(Where,2,000 hours for φ6.3; 7,000 hours for φ8; 8,000 hours for φ10.) Capacitance change ≤± 20% of the initial Value TANδ ≤200% of the initial specified value LC ≤ The initial specified value												
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20 °C after exposing them for 1,000 hours at 105 °C without voltage applied.The rated voltage shall be applied to the capacitor for a minimum of 30 minutes, at least 24 hours and not more than 48 hours before the measurements. Capacitance change ≤± 20% of the initial Value TANδ ≤200% of the initial specified value LC ≤500% of the initial specified value												
Others	Satisfies characteristic KS C IEC 60384-4												



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RATINGS OF NFA Series								
Capacitance (µF)	160WV		200WV		250WV		350WV	
	Case size	Rated ripple current (mA/Arms/105 °C (120Hz))	Case size	Rated ripple current (mA/Arms/105 °C (120Hz))	Case size	Rated ripple current (mA/Arms/105 °C (120Hz))	Case size	Rated ripple current (mA/Arms/105 °C (120Hz))
1	6.3x11	16	8x11.5	42	6.3x11	20		
1.5	6.3x11	20	8x11.5	51	6.3x11	38		
2.2	6.3x11	24	6.3x11	45	8x11.5	48		
3.3	8x11.5	27	8x11.5	36	8x11.5	64		
4.7	8x11.5	33	10x16	150	10x16	120		
6.8	8x11.5	39	10x16	192	10x16	150		
10	10x16	48	12.5x20	236	12.5x20	230	10x20	126
15	10x16	57	12.5x20	288	12.5x20	285	16x20	284
22	10x16	66	12.5x20	340	12.5x20	340	16x20	364
33	12.5x20	81	16x25	548	16x25	551	18x20	284
47	12.5x20	96	16x25	660	16x25	660	18x20	648
68	12.5x20	111	16x25	792	16x25	792	18x20	724
100	16x25	135	18x31.5	1080	18x31.5	1080	18x40	760
120	16x25	150	18x31.5	1296	18x31.5	1296	18x40	970
150	18x25	180	20x40	1584	20x40	1584		
200	18x25	216	20x40	1944	20x40	1944		
220	18x25	231	20x40	2106	20x40	2106		
330	18x25	270	20x40	2592	20x40	2592		
470	18x25	315	20x40	3024	20x40	3024		

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CE04 TYPE MINIATURE SIZED TYPE CAPACITORS COMPONENT

PART NAME	MATERIALS	VENDER
LEAD WIRE	TINNED COPPER - PLY WIRE(Pb-FREE)	KISTRON (KOREA/CHINA) KOHOKU (JAPAN/CHINA) NANTONG HONG YANG (CHINA)
AL LEAD	ALUMINUM 99.92 % OVER	KANG WON AUTO FITTING (CHINA) NAN TONG HUI FENG (CHINA) NANTONG HONG YANG (JAPAN/CHINA) KOHOKU (KOREA/CHINA) KISTRON (KOREA/CHINA)
PACKING PAD	SYNTHETIC RUBBER	SUNG NAM (KOREA/CHINA) CCW/ZHE JIANG TIAN TAI (CHINA) ZHE JIANG TIAN HUA (CHINA)
SLEEVE	P.E.T(Poly Ethylene Terephthalate Resin)	MOO DEUNG (KOREA/CHINA) SUZHOU QILIAN (CHINA) SHUN PENG PLASTIC (CHINA) YUN LIN PLASTIC (CHINA)
AL CASE	ALUMINUM 99.0 % OVER	ZHANG JIA GANG LIAN YI (CHINA) LIN AN AO XING (CHINA) NANTONG CHUANGJIA DONG NAM (KOREA/CHINA) D.N TECH/HA NAM (KOREA/CHINA)
AL FOIL ⊕	FORMED ALUMINUM 99.9 % OVER	K.D.K/JCC/MATSUSHITA (JAPAN) SAM YOUNG (KOREA) BECROMAL (ITALY) SATMA (FRANCE) HEC (CHINA) XINJIANG JOINWORLD (CHINA) HUAJENG / NANTONG /RAOIO (TAIWAN) LUXON/LITON (TAIWAN)
AL FOIL ⊖	ETCHED ALUMINUM 98.0 % OVER	K.JCC (KOREA) K.D.K (JAPAN) AFT/INCU/LCU/SHENGHONG (CHINA) ELECON/WU JIANG FEILO (CHINA)
SEPARATOR	INSULATION PAPER	KAN/LUNAN (CHINA) SPO (GERMANY) N.K.K (JAPAN)
ADHESIVE TAPE	POLY PROPYLENE OR POLY IMIDE FILM	NITTO/NICHIBAN (JAPAN) DAEIL/SWECO (KOREA)

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- 1. Electrolytic capacitors used in DC application require polarization.**
Confirm the polarity. If used in reversed polarity, the circuit life may be shortened or the capacitor may be damaged. For use on circuits whose polarity is occasionally reversed or whose polarity is unknown, use bi-polarized capacitors (BP-series). Also, note that the electrolytic capacitor cannot be used for AC application.
- 2. Do not apply a voltage exceeding the capacitor's voltage rating.**
If a voltage exceeding the capacitor's voltage rating is applied, the capacitor may be damaged as leakage current increases. When using the capacitor with AC voltage superimposed on DC voltage, care must be exercised that the peak value of AC voltage does not exceed the rated voltage.
- 3. Do not allow excessive ripple current to pass.**
Use the electrolytic capacitor at current values within the permissible ripple range. If the ripple current exceeds the specified value, request capacitors for high ripple current applications.
- 4. Ascertain the operating temperature range.**
Use the electrolytic capacitors according to the specified operating temperature range. Usage at room temperature will ensure longer life.
- 5. The electrolytic capacitor is not suitable for circuits in which charge and discharge are frequently repeated.**
If used in circuits in which charge and discharge are frequently repeated, the capacitance value may drop, or the capacitor may be damaged. Please consult our engineering department for assistance in these applications.
- 6. Apply voltage treatment to the electrolytic capacitor which has been allowed to stand for a long time.**
If the electrolytic capacitor is allowed to stand for a long time, its withstand voltage is liable to drop, resulting in increased leakage current. If the rated voltage is applied to such a product, a large leakage current occurs and this generates internal heat, which damaged the capacitor. If the electrolytic capacitor is allowed to stand for a long time, therefore, use it after giving voltage treatment (Note 1). (However, no voltage treatment is required if the electrolytic capacitor is allowed to stand for less than 2 or 3 years at normal temperature.)
- 7. Be careful of temperature and time when soldering.**
When soldering a printed circuit board with various components, care must be taken that the soldering temperature is not too high and that the dipping time is not too long. Otherwise, there will be adverse effects on the electrical characteristics and insulation sleeve of electrolytic capacitors in the case of small-sized electrolytic capacitors, nothing abnormal will occur if dipping is performed at less than 260 °C for less than 10 seconds.
- 8. Do not place a soldering iron on the body of the capacitor.**
The electrolytic capacitor is covered with a vinyl sleeve. If the soldering iron comes in contact with the electrolytic capacitor body during wiring, damage to the vinyl sleeve and/or case may result in defective insulation, or improper protection of the capacitor element.
- 9. Clean circuit boards after soldering.**
Some solvents have adverse effects on capacitors. Please refer to the next page.
- 10. Do not apply excessive force to the lead wires or terminals.**
If excessive force is applied to the lead wires and terminals, they may be broken or their connections with the internal elements may be affected. (For strength of terminals, refer to KS C IEC 60384-4 (JIS C5101-1, JIS C5101-4))
- 11. Care should be used in selecting a storage area.**
If electrolytic capacitors are exposed to high temperatures caused by such things as direct sunlight, the life of the capacitor may be adversely affected. Storage in a high humidity atmosphere may affect the solderability of lead wires and terminals.
- 12. Surge voltage.**
The surge voltage rating is the maximum DC over-voltage to which the capacitor may be subjected for short periods not exceeding approximately 30 seconds at frequent intervals of not more than six minutes. According to KS C IEC 60384-4, the test shall be conducted 1000 cycles at room temperature for the capacitors of characteristic KS C IEC 60384-4 or at the maximum operating temperature for the capacitors of characteristics B and C of KS C IEC 60384-4 with voltage applied through a series resistance of 1000 ohms without discharge. The electrical characteristics of the capacitor after the test are specified in KS C IEC 60384-4. Unless otherwise specified, the rated surge voltage up to as follows:

Rated Voltage(V)	2	4	6.3	10	16	25	35	50	63	80	100	160	200	250	315	350	400	450	500
Rated Surge Voltage(V)	2.5	5	8	13	20	32	44	63	79	100	125	200	250	300	365	400	450	500	550

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Aluminum electrolytic capacitors that have been exposed to halogenated hydrocarbon cleaning and defluxing solvents are susceptible to attack by these solvents. This exposure can result in solvent penetration into the capacitors, leading to internal corrosion and potential failure. Common type of halogenated cleaning agents are listed below.

Chemical Name	Structural Formula	Representative Brand Name
Trichlorotrifluoroethane	C ₂ Cl ₃ F ₃	Freon TF, Daiflon S-3
Fluorotrichloroethane	CCl ₃ F	Freon-11, Daiflon S-1
1,1,1-Trichloroethane	F ₂ HCl	Chloroethane
Trichloroethylene	C ₂ HCl ₃	Trichlene
Methyl Chloride	CH ₃ Cl	MC

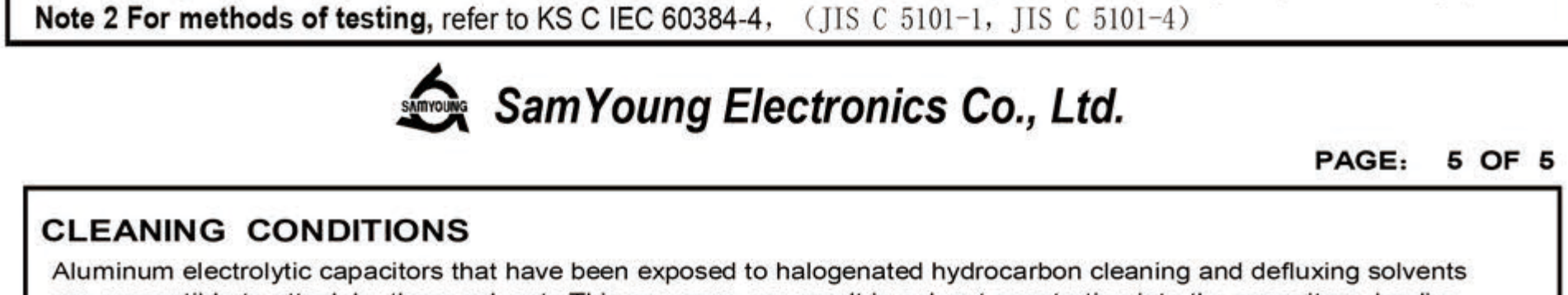
We would like to recommend you the below cleaning materials for your stable cleaning condition taking the place of previous materials.
 ◎ Isopropyl Alcohol(IPA) or Water
 Cleaning method: One of immersion, ultrasonic or vapor cleaning.
 Maximum cleaning time: 5 minutes(Chip type: 2 minutes)
 ※ Do not use AK225AES

Aluminum electrolytic capacitors are easily affected by halogen ions, particularly by chloride ions. Excessive amounts of halogen ions, if happened to enter the inside of the capacitors, will give corrosion accidents-rapid capacitance drop and vent open. The extent of corrosion accidents varies with kinds of electrolytes and seal-materials. Therefore, the prevention of halogen ion contamination is the most important check point for quality control in our production lines. At present, halogenated hydrocarbon-contained organic solvents such as Trichloroethylene, 1,1,1-Trichloroethane, and Freon are used to remove flux from circuit boards.

If electrolytic capacitors are cleaned with such solvents, they may gradually penetrate the seal portion and cause the erosion. When using latex-based adhesive on the capacitors rubber and seal for adhesion to a PCB, corrosion may occur depending on the kind of solvent in the adhesive. Select an adhesive as an organic solvent with dissolved polymer that is not halogenated hydrocarbon. Hot air drying is required for eliminating the solvent between the product and the PCB at 50 °C ~ 80 °C after coating.

Followings are the penetration path of the halogenated solvent.
 ① Penetration between the rubber and the aluminum case
 ② Penetration between the rubber and the lead wire
 ③ Penetration through the rubber

The inside of the capacitors, the mechanism of corrosion of aluminum electrolytic capacitors by halogen ions can be explained as follows:
 Halides(RX) are absorbed and diffused into the seal portion. The halides then enter the inside of the capacitors and contact with the electrolyte of the capacitors. Where by halogen ions are made free by a hydrolysis with water in the electrolyte.



※ MANUFACTURING SITE
 - SamYoung Electronics Co., Ltd.(Korea/China)

SamYoung Electronics Co., Ltd.

附:)

■ Standard Temperature Multiplying Factor

Assurance Load Life Time	65 °C	75 °C	85 °C	105 °C	Remarks
105 °C 7000~10000Hrs	1.5	1.5	1.5	1	

■ Rated Ripple Current Multipliers
 Frequency Multipliers

Freq. (Hz)	120	1K	10K	50K	100K
Factor	1.00	1.25	1.50	1.60	1.75