

SICE-SP-L010

SPECIFICATION

REV. Date

2015.11.23

DAEWOO ELECTRONIC
EQUIPMENT VIETNAM Co., Ltd.ELECTROLYTIC CAPACITORS
FUX SERIES**DACHS****SUPPLIER'S DAEWOO**

Maker	Checker	Approval

CUSTOMER'S DACHS

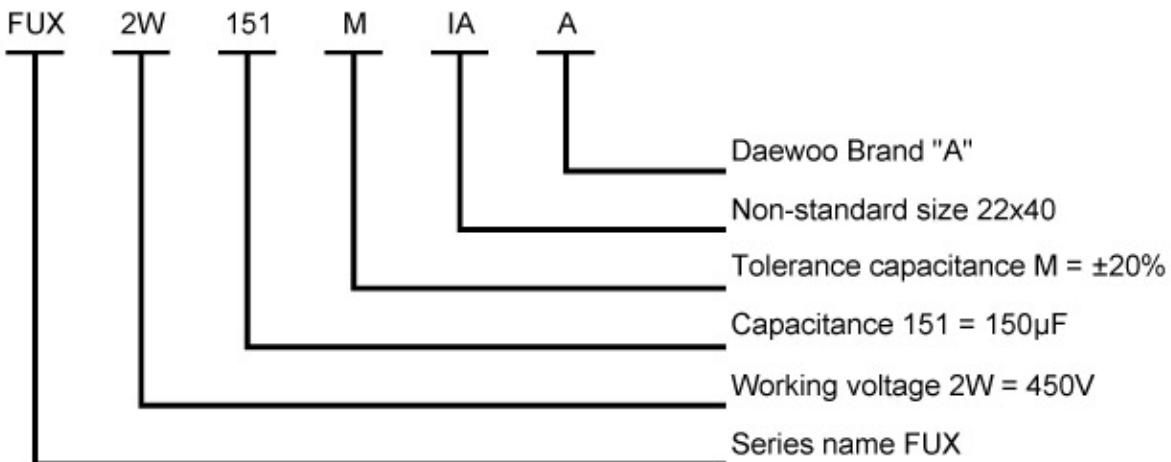
Maker	Checker	Approval

Please return us one copy your signed specification after you approved of it



We hand in this specification in order to be approved of electrolytic capacitor FUX Series that our company is going to deliver your company.

1. Composition Type: Ex: FUX2W151MIAA "22x40"



2. Operating temperature range:

160WV ~ 250WV: -40°C to +105°C (-40°F to +221°F)

315WV ~ 450WV: -25°C to +105°C (-13°F to +221°F)

3. Electrical characteristic:

3.1 Capacitance.

The capacitance is measured at a frequency of 120Hz at a temperature of 20°C ± 2°C

(68°F ± 3.6°F) with a maximum of 0.5 Vrms applied.

Capacitance tolerance	-20% ~ +20% (M)
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3.2 Leakage current (L.C)

160 ~ 450V	$I \leq 0.02CV$ or 2mA (5Min) Whichever is less
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I = DC Leakage current (μ A)

C = Nominal capacitance (μ F)

V = Rated Voltage (WV.DC)

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3.3 Tangent of Loss Angle (Tanδ)

The tangent of the loss angle when measured at a frequency of 120Hz at a temperature of (20°C ± 2°C) (68°F ± 3.6°F) shall be less than the values indicated below:

Tanδ (max., at 20°C, 120Hz)	160~250(V)	315~450(V)
	0,15	0,20

4. Test.

4.1 Damp heat

The capacitor shall be stored at a temperature of 40 ± 2°C and relative humidity of 90% to 95% for 240 ± 8 hours. And then the capacitor shall be subjected to standard atmospheric conditions for 1 to 2 hours, after which measurements shall be made.

Capacitance change	Within ± 10% of the initial value.
Tanδ	Within value specified above.
Leakage current	Within value specified above.

4.2 Load life

After applying rated working voltage for 2000hours at +105°C and then being stabilized at +20°C capacitors shall meet following limits.

Capacitance change	Within ± 20% of the initial measured value.
Tanδ	≤ ± 200% of initial specified value
Leakage current	≤ The initial specified value.

4.3 Shelf life

After storage for 1000 hours at +105°C with no voltage applied and then being stabilized at +20°C capacitors shall meet following limits.

Capacitance change	Within ± 20% of the initial measured value.
Tanδ	≤ 150% of initial specified value
Leakage current	The initial specified value.



4.4 Impedance ratio at low temperature

When capacitor are stored at the temperature of $-40^{\circ}\text{C} \pm 3^{\circ}\text{C}$, $-25^{\circ}\text{C} \pm 3^{\circ}\text{C}$ and $20^{\circ}\text{C} \pm 2^{\circ}\text{C}$ respectively the ratio of impedance measured at each test temperature with the frequency of 120 Hz shall be less than value.

W.V (V)	160 ~ 250	315 ~ 450
Z- 25°C / $+20^{\circ}\text{C}$	4	8
Z- 40°C / $+20^{\circ}\text{C}$	12	-

4.5 Resistance to soldering heat

For other procedures than those specified below soldering iron method.

+ Temperature : 260 ± 5

+ Application time of soldering iron : 10 sec.

Capacitance change	Within $\pm 10\%$ of the initial value.
Tan δ	Within values specified above
Leakage current	Within values specified above

4.6 Solderability

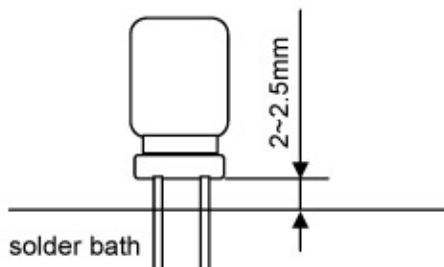
Dipping condition :

+ Temperature of solder bath : 235 ± 5

+ Dipping speed : 25 ± 2.5 mm/sec.

+ Dipping time : 3 ± 0.2 sec.

Result : 95% over covered.





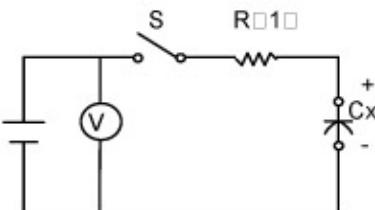
4.7 Surge test

The capacitor shall be subjected to 1000cycles at a temperature specified below, each consisting of a charge period of 30 ± 5 s. followed by a discharge period of approx. 5 min 30 s.

And the capacitor shall be stored under standard atmospheric conditions to obtain thermal stability, after which measurements shall be made.

* Condition : Normal room temperature, DC32V Supply

Capacitance change	Referred to the value before test $\pm 5\%$
Tan δ	Initial specified value
Leakage current	Initial specified value



4.8 Terminal strength test

4.8.1 Tensile

> A static load of (A) N shall be applied to the terminal to the axial direction opposite to the body for (B) s. >>> (A) : 10 N { 1.0 kgf } (B) : 10 s

* However for lead terminal with a diameter of $\varphi 0.5$, the load shall be 5N { 0.5kgf }

4.8.2 Bending

> The capacitor shall be held by its body in such a manner that the axis of the terminal is vertical a mass applying a force of (A) N shall be suspended from the end of the terminal.

The body of the capacitor shall then be inclined through an angle of 90° in the vertical plane and then returned to its initial position over a period of (B) sec; this operation constitutes 1 bend.

The terminal shall be subjected to 1 bend in each direction to give a total of 2 bends.

>>> (A) : 5 N { 0.5 kgf } (B) : 5 s

* However, for lead terminals with a diameter of $\varphi 0.5$ the lead shall be 2.5 N { 0.25kgf }.

There shall be no such mechanical damage as terminal damage, etc.



4.9 Pressure relief test

4.9.1 AC test

> Applied voltage : AC voltage not exceeding 0.7times the direct or 250V AC, whichever is the lower.

> Frequency : 50Hz or 60 Hz

> Series resistor : Refer to the table below

Capacitance(□)	Series resistor(Ω)
C ≤ 1	1000
1 < C ≤ 10	100
10 < C ≤ 100	10
100 < C ≤ 1000	1
1000 < C ≤ 10000	0,1
10000 < C	*

* Resistance is equivalent to a half of impedance by test frequency.

The safety vent shall open to avoid any danger of fire or explosion of capacitor elements (terminal and metal foil etc.) or cover.

When the safety vent does not open 30min. after the beginning of the test, the test shall be finished.

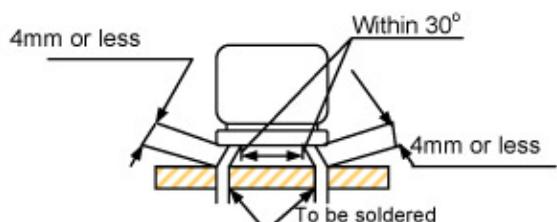
4.10 Vibration test

The entire frequency range, from 10Hz to 55Hz and return 10Hz shall be trans versed in 1minute.

This motion shall be applied for a period of 2hours in each 3 mutually perpendicular direction.

* Amplitude (total excursion) : 1.5mm

During the last 30min of vibration in each direction. The capacitance shall be measured 3 to 5 times.



Capacitance change max.	Referred to the value before ±5%
Appearance	There shall be no such mechanical damage as terminal damage etc. Or leakage of electrolytic or swelling of the case. The marking shall be legible.
Inner construction	There shall be no damage of tab terminals or electrodes.

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5. Recommended cleaning solvents

Methanol, isopropanol, isobutanaol, ethanol, petroleum ether, propanol and or commercial detergents.

Halogenated hydrocarbon cleaning agents such as freon (MF, TF, TMC or TC) trichloroethylene, trichloroethane, or methylchloride are not recommended as they may damage the capacitor.

6. Marking

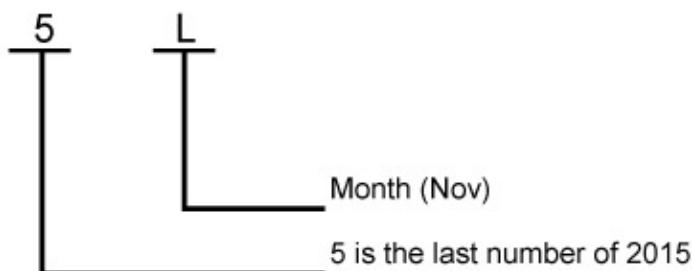
The following items shall be marked indelibly and legibly on the specified location.

- 1). Brand: 
- 2). Series Designation: FUX
- 3). Rated Voltage (DC): 450V
- 4). Capacitance (μF): 150 μF
- 5). Capacitance Tolerance: (M): $\pm 20\%$
- 6). Maximum Operating Temperature: 105°C
- 7). Lot No: 5L
- 8). Polarity of the terminals
- 9). Sleeve Colour: MAROON

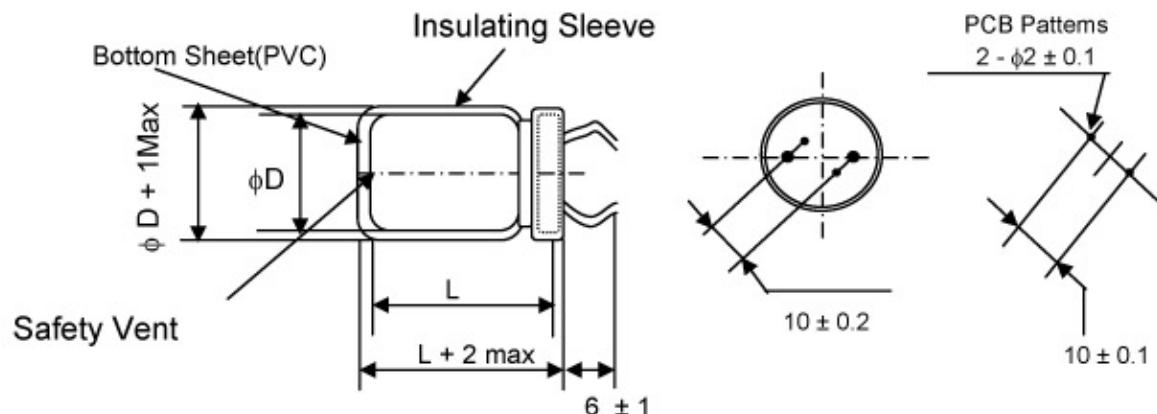
7. Lot Number

The lot number regulates the following formula. But 1, 0, I are exception

Ex: Nov 2015



MONTH YEAR	1	2	3	4	5	6	7	8	9	10	11	12
2010	A	B	C	D	E	F	G	H	J	K	L	M
2019												

8.CASE SIZE AND DIMENSION

$$D = \phi 22 \sim 35$$

9.RIPPLE CURRENT COEFFICIENT

* Frequency

W.V	Freq(Hz)	50	120	1K	10K	100K
160~250		0,80	1,0	1,25	1,40	1,50
315~450		0,84	1,0	1,15	1,20	1,32

* Temperature

Temperature	$\leq 45^{\circ}\text{C}$	60°C	85°C	105°C
Factor	0,40	2,20	1,65	1,00

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10. FUX SERIES

W.V Cap (μF)	160(2C)				180(2S)				200(2D)				250(2E)				
	φ 22	φ 25	φ 30	φ 35	φ 22	φ 25	φ 30	φ 35	φ 22	φ 25	φ 30	φ 35	φ 22	φ 25	φ 30	φ 35	
180													22x25				
													0,75				
220													22x30	25x25			
													0,95	0,95			
270					22x25				22x25				22x35	25x30			
					0,95				0,95				1,20	1,20			
330	22x25				22x30				22x30	25x25			22x40	25x30	30x25		
	1,15				1,17				1,20	1,20			1,25	1,25	1,25		
390	22x30				22x30	25x25			22x35	25x30	30x25		22x45	25x35	30x30		
	1,27				1,30	1,30			1,37	1,37	1,48		1,45	1,45	1,45		
470	22x35	25x25			22x35	25x30			22x40	25x30	30x30		22x50	25x40	30x30	35x25	
	1,40	1,40			1,42	1,42			1,48	1,48	1,60		1,55	1,55	1,55	1,55	
560	22x40	25x30			22x40	25x35	30x25		22x45	25x35	30x30	35x25		25x45	30x35	35x30	
	1,52	1,52			1,53	1,53	1,52		1,57	1,57	1,80	1,78		1,80	1,78	1,80	
680	22x45	25x35	30x30		22x45	25x40	30x30		22x50	25x40	30x35	35x30		25x50	30x40	35x35	
	1,72	1,70	1,70		1,73	1,75	1,75		1,80	1,80	2,10	2,15		2,05	2,05	2,08	
820	22x50	25x40	30x30	35x25	22x50	25x45	30x35	35x25		25x50	30x45	35x35			30x45	35x35	
	2,05	2,05	2,00	2,00	2,08	2,08	2,05	2,05		2,15	2,40	2,40			2,20	2,20	
1000		25x45	30x35	35x30		25x50	30x40	35x30			30x50	35x40			30x50	35x40	
		2,25	2,25	2,25		2,30	2,30	2,25			2,58	2,58			2,45	2,45	
1200		25x50	30x40	35x30			30x45	35x35				35x45				35x45	
		2,50	2,50	2,45			2,52	2,52				3,05				2,60	
1500			30x45	35x35			30x50	35x40				35x50					
			2,80	2,80			2,90	2,90				3,40					
1800			30x50	35x45				35x45									
			3,30	3,30				3,35									
2200				35x50				35x50									
				3,75				3,75									

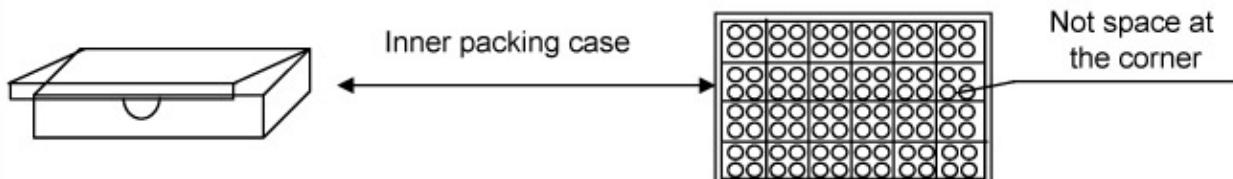
W.V Cap (μF)	315(2F)				350(2V)				400(2G)				450(2W)					
	φ 22	φ 25	φ 30	φ 35	φ 22	φ 25	φ 30	φ 35	φ 22	φ 25	φ 30	φ 35	φ 22	φ 25	φ 30	φ 35		
56													22x25					
													0,44					
68									22x25				22x30	25x25				
									0,50				0,50	0,50				
82									22x30	25x25			22x35	25x30				
									0,57	0,57			0,57	0,57				
100	22x25				22x25				22x35	25x30			22x40	25x30	30x25			
	0,68				0,69				0,70	0,70			0,72	0,72	0,72			
120	22x30	25x25			22x30	25x25			22x40	25x30	30x25		22x45	25x35	30x30			
	0,75	0,75			0,75	0,75			0,77	0,76	0,76		0,77	0,77	0,77			
150	22x35	25x30			22x35	25x30			22x45	25x35	30x30		22x50	25x40	30x30			
	0,80	0,80			0,82	0,82			0,84	0,84	0,84		0,85	0,85	0,85			
180	22x40	25x30	30x25		22x45	25x35	30x25		22x50	25x40	30x30	35x25		25x45	30x35			
	0,91	0,91	0,90		0,94	0,92	0,92		0,94	0,94	0,94	0,94		0,95	0,94			
220	22x45	25x35	30x30		22x50	25x40	30x30	35x25		25x45	30x35	35x30		25x50	30x40	35x30		
	1,00	1,00	1,02		1,04	1,04	1,02	1,02		1,08	1,08	1,08		1,10	1,10	1,10		
270	22x50	25x40	30x35	35x25	25x45	30x35	35x30		25x50	30x40	35x30			30x45	35x35			
	1,12	1,12	1,32	1,12	1,15	1,15	1,15	1,15		1,22	1,22	1,22			1,25	1,25		
330		25x45	30x40	35x30	25x50	30x40	35x35			30x45	35x35			30x50	35x40			
		1,32	1,44	1,32	1,35	1,35	1,35	1,35					1,40	1,40		1,43	1,43	
390			30x45	35x35		30x45	35x40			30x50	35x40						35x45	
			1,66	1,44		1,50	1,50			1,55	1,55						1,60	
470			30x50	35x40			35x45				35x45			35x45			35x50	
			1,85	1,65			1,72						1,75				1,75	
560				35x45			35x50					35x50						
				1,85			1,95					2,00						
680				35x50														
				2,10														

I_R : Maximum permissible ripple current [A(rms) at 105°C, 120Hz]
Case size [φ DxL (mm)]

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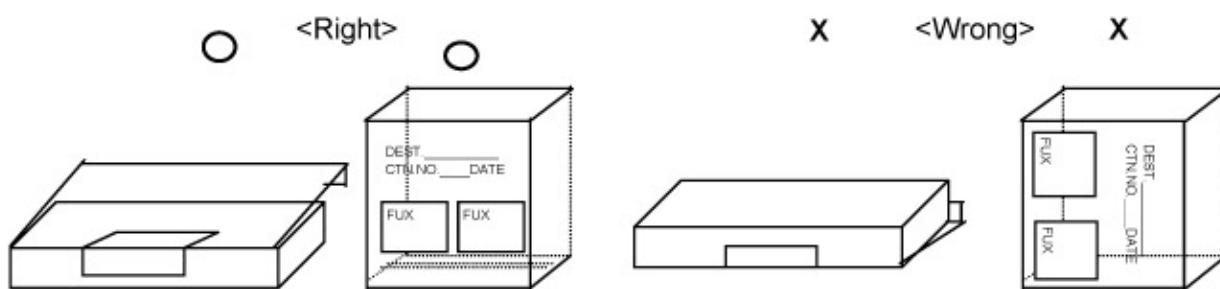
11. Packing methode

11.1 There shall be a single part number in a inner carton .



11.2 Inner carton box shall be handled as follows.

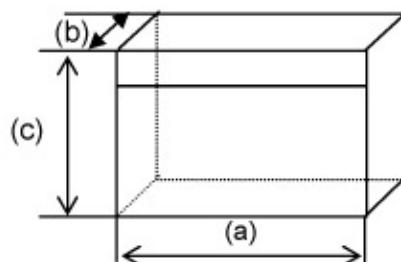
- * No more than 10 inner carton boxes shall be piled.
- * In case of putting the boxes lengthways, the indication of polarity shall face down.
- * The products shall be handled with care.



11.3 The inner cartons shall be packed in a cardboard box for transportation.

Various part number can be packed in a outer carton.

11.4 Shape & dimensions of inner carton shall be as follows.



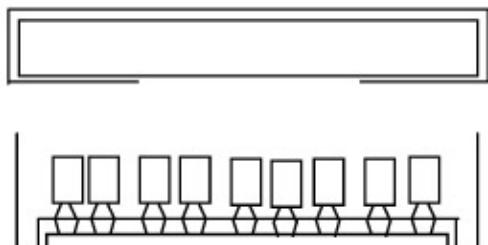
Case size		(a)	(b)	(c)
ΦD	L			
Φ 22	25~50	360	260	340
Φ 25	25~50	360	260	340
Φ 30	25~50	360	260	340
Φ 35	25~50	360	260	340

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* Note: The dimensions listed above may be changed without notice. The carton shall be suitable for the auto-insert machines after change.

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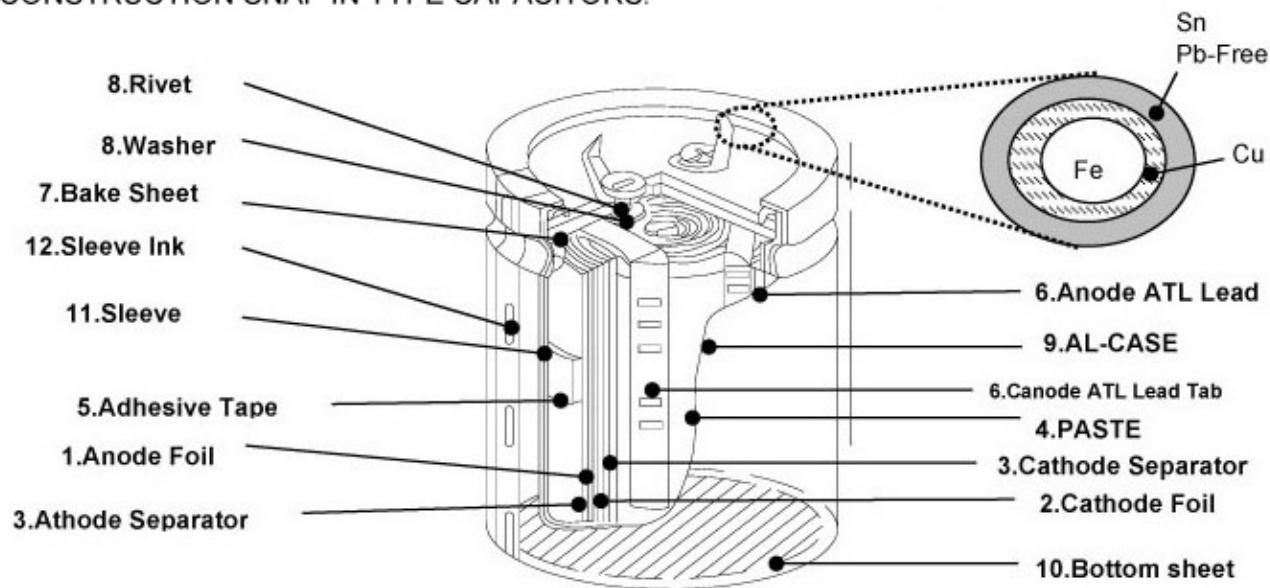
11.5. Packing methode



Product size [mm]		Inner carton quantity min. Packing quantity [Pcs]	Outer carton quantity [Pcs]
φ D	L		
φ 22	25~40	130	650
	45~50	130	520
φ 25	25~40	88	440
	45~50	88	352
φ 30	25~40	63	315
	45~50	63	252
φ 35	25~40	48	240
	45~50	48	192

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12.CONSTRUCTION SNAP IN TYPE CAPACITORS.



Type	No	Raw Materials			Contents(ppm=mg/kg)						ICP Data
		Part Name	Vendor	Material	cd	pb	Hg	Cr6+	PBB	PBDE	
SNAP-IN	1	Foil(+)	HAIXING, HFCC	Aluminium	0	0	0	0	0	0	#1
	2	Foil(-)	ELE-CON	Aluminium	0	0	0	0	0	0	#2
	3	Con-Paper	KAN	Pulp	0	0	0	0	0	0	#3
	4	Paste	CAPCHEM	MEG	0	0	0	0	0	0	#4
	5	Adhesive Tape	TAPEX	Polypropylene	0	0	0	0	0	0	#5
	6	Lead-Tab	ELE-CON	Aluminium	0	0	0	0	0	0	#6
	7	Terminal	NINGHAI	PP	0	0	0	0	0	0	#7
	8	Washer, Rivet	NINGHAI	Iron + Sn 100%	0	0	0	0	0	0	#8
	9	Case	OAK-LEY	Aluminium	0	0	0	0	0	0	#9
	10	Bottom-Sheet	NINGHAI	Polypropylene	0	0	0	0	0	0	#10
	11	Sleeve	MOODEUNG	PVC	0	0	0	0	0	0	#11
	12	Sleeve Ink	MOODEUNG	INK	0	0	0	0	0	0	#12
Total					0	11	0	0	0	0	
SAMSUNG Eco-Partner Standard					5	100	100	100	100	100	

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RAW MATERIAL SUPPLIERS LIST						
Items	Company name	Country	Contents		Using of CE	Remark
Anode Foil	- HFCC	- CHINA	* Low and high gain Anode Foil		* All series of CE	* Forming(+)
	- HAIXING	- CHINA	* High voltage (160Fv up) Foil			
Cathode Foil	- ELE-CON	- CHINA	* Cathode Foil (20, 40, 50µm)		* All series of CE	* Etching(-) * PURITY : 98.4%
Lead	- ELE-CON	- CHINA	* Lead-wire welding and press		* 04 type only	* Sn 100% coated
Case	- OAK-LEY	- CHINA	- 18 up snap-in type press		* Snap-in type	
Sleeve	- MOODEUNG	- KOREA	* PVC tube		* 04, Snap-in all	
Paper	- KAN	- CHINA	* 100% from NKK		* All series CE	
Paste	- CAPCHEM	- CHINA	* Adipic Acid, Boric Acid		* All series CE	
Adhesive	- TAPEX	- KOREA	* Element winding film		* 04, Snap-in all	
Terminal	- NINGHAI	- CHINA	* Sn 100% coated		* Snap-in type	
Washer	- NINGHAI	- CHINA	* Press Washer		* Snap-in type	* Al 99.9% up

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CONFIRMATION AND ACTION PLAN TABLE

No	Banned Substances and total abolish	PART OR RAW MATERIAL MANUFACTURER		ACTION PLAN TO ELIMINATE IF STILL USING
		NOT USE	USE	
1	Cadmium and cadmium compounds	X		
2	PBB and PBDE	X		
3	Chlorinated paraffins (chlorine flame retarding materials/plasticizers)	X		
4	Polychlorinated biphenyl (PCB) category	X		
5	Polychlorinated naphthalene category	X		
6	Organic tin compounds(Tributyl tin category/Triphenyl tin category)	X		
7	Asbestos	X		
8	Azo compounds	X		
9	Lead and its compounds	X		
10	Mercury and its inorganic compounds	X		
11	Hexavalent chromium compounds	X		
12	Polyvinylchloride (PVC)		X	
13	Organic bromine compound except PBB and PBDE	X		
14	Manufacturing Process : Ozone Depleting Substances	X		
15	Manufacturing Process : Chlorined organic solvent	X		