

SICE-SP-R027

SPECIFICATION

REV. Date

2015.11.10

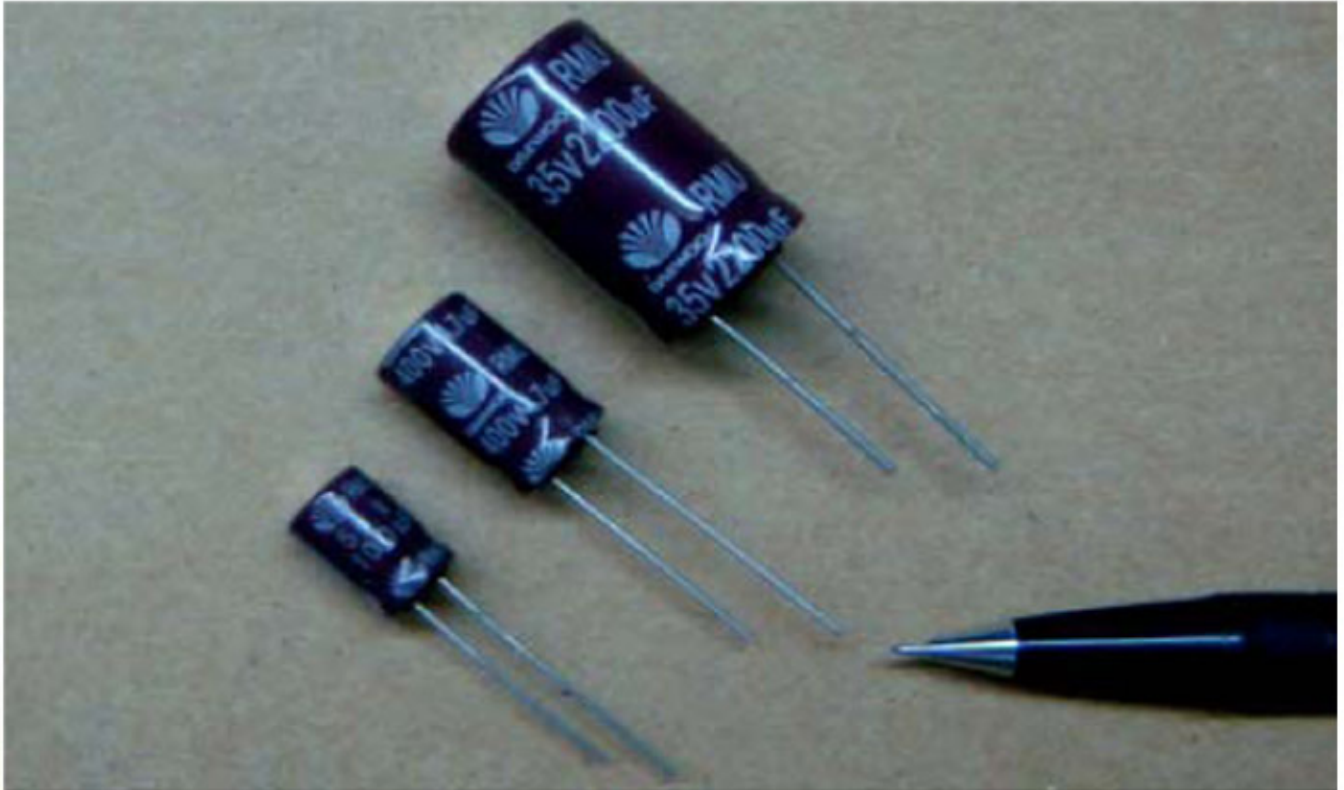


DAEWOO ELECTRONIC
EQUIPMENT VIETNAM Co., Ltd.

ELECTROLYTIC CAPACITORS
RMU SERIES



DACHS



SUPPLIER'S DAEWOO

Maker	Checker	Approval



CUSTOMER'S DACHS

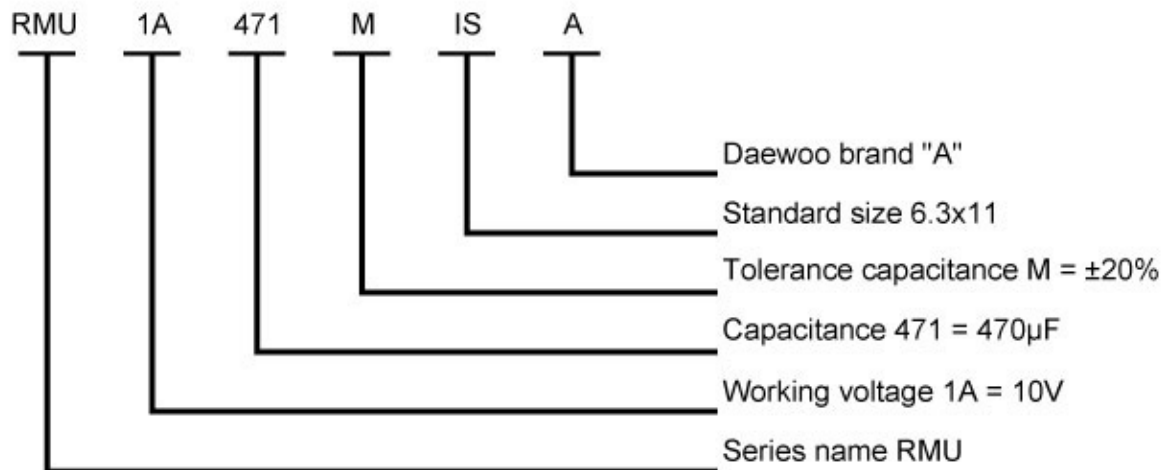
Maker	Checker	Approval

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 RMU Series that our company is going to deliver your company.

1. Composition Type: Ex: RMU1A471MISA "6.3x11"



2. Operating temperature range:

6.3 ~ 250VV: -40°C to +105°C (-40°F to +221°F)

35 ~ 450VV: -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)
-----------------------	-----------------

3.2 Leakage current (L.C)

6.3 ~ 100V	$I \leq 0.01CV + 3\mu A$ (2Min)
160 ~ 250V	$I \leq 0.01CV + 10\mu A$ (3Min)
350 ~ 450V	$I \leq 0.02CV + 30\mu A$ (5Min)

I = DC Leakage current (µA)

C = Nominal capacitance (µF)

V = Rated Voltage (VV.DC)



3.3 Tangent of Loss Angle (Tan δ).

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

Tan δ (max., at 20°C, 120Hz)	W.V (V)	6,3	10	16	25	35	50	6,3	100	160~250	350~450
	Tan δ	0,28	0,24	0,20	0,16	0,14	0,12	0,10	0,08	0,15	0,20

When capacitance is over 1000 μ F, Tan δ shall be added 0.02 to the listed value with increase of every each 1000 μ F.

4. Test.

4.1 Damp heat.



The capacitor shall be stored at a temperature of 40 \pm 2°C and relative humidity of 90% to 95% for 240 \pm 8hours. 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 \pm 20% of the initial value.
Tan δ	Within value specified above.
Leakage current	Within value specified above.

4.1 Load life.

After applying rated working voltage for 2000 (ϕ 5, ϕ 6.3, ϕ 8: 1000hours) hours at +105°C and then being stabilized at \pm 20°C, capacitors shall meet following limits.

Capacitance change	Within \pm 20% of the initial measured value.
Tan δ	\leq 200% of initial specified value.
Leakage current	\leq The initial specified value.

SICE-SP-R027		APPROVAL DATA FOR ELECTROLYTIC CAPACITOR			REV. Date	2015.11.10
 DAEWOO ELECTRONIC EQUIPMENT VIETNAM Co., Ltd.	REV. No	0	Page	3 of 11		

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 Max	Within $\pm 20\%$ of the initial measured value.
Tan δ	$\leq 150\%$ of the initial specified value.
Leakage current	\leq The initial specified value.

4.4 Impedance ratio at low temperature.

When capacitor are stored at the temperature of $-40^{\circ}\text{C} \pm 2^{\circ}$ $-25^{\circ}\text{C} \pm 2^{\circ}$ 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)	6,3	10	16	25	35	50~100	160~250	350~450
Z-25°C/Z20°C	5	4	3	2	2	2	3	6
Z-40°C/Z20°C	10	8	6	4	3	3	4	-

4.5 Resistance to soldering heat.

For other procedures than those specified below soldering iron method.

+ Temperature: $260 \pm 5^{\circ}\text{C}$

+ Application time of soldering iron: 10 sec

Capacitance change Max	Within $\pm 20\%$ of the initial value.
Tan δ	Within values specified above .
Leakage current	Within values specified above .



5. Recommended cleaning solvents.

Methanol, isopropanol, isobutanol, 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.

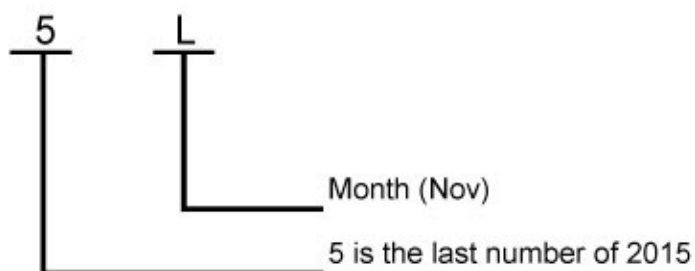
The following items shall be marked indelibly and legibly on the spoci-fled location.

- 1). Brand: 
- 2). Series Designation: RMU
- 3). Rated Voltage (DC): 10V
- 4). Capacitance (μF): 470 μF
- 5). Capacitance Tolerance: (M): $\pm 20\%$
- 6). Maximum Operating Temperature: 105 $^{\circ}\text{C}$
- 7). Lot No :5L
- 8). Sleeve Colour: MAROON

7. Lot Number

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

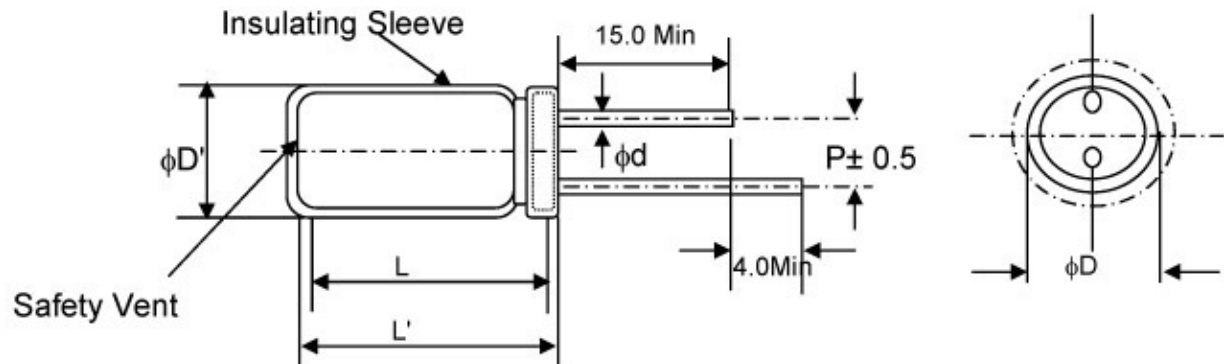
Ex: Nov 2015



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



* Standard lead style:

ϕD	5,0	6,3	8,0	10,0	12,5	16,0	18,0
P	2,0	2,5	3,5	5,0		7,5	
ϕd	0,5		0,6			0,8	

$$D' = [D + 0.5] \text{Max}$$

$$L' = [L + 1.0] \text{Max. at } D \leq 8.0$$

$$L' = [L + 1.5] \text{Max. at } D \geq 10.0$$



9. RIPPLE CURRENT COEFFICIENT

* Frequency

Cap(μ F) \diagdown Freq(Hz)	50	120	400	1K	10K	50 ~ 100K
Cap \leq 10	0,8	1,0	1,30	1,45	1,65	1,70
10 < Cap \leq 100	0,8	1,0	1,23	1,36	1,48	1,53
100 < Cap \leq 1000	0,8	1,0	1,16	1,25	1,35	1,38
1000 < Cap	0,8	1,0	1,11	1,17	1,25	1,28

* Temperature

Temperature	$\leq 70^{\circ}\text{C}$	85°C	105°C
Factor	1,95	1,65	1,00

SICE-SP-R027		APPROVAL DATA FOR ELECTROLYTIC CAPACITOR				REV. Date	2015.11.10
 DAEWOO ELECTRONIC EQUIPMENT VIETNAM Co., Ltd.	REV. No		0	Page	6 of 11		

10. RMU SERIES

Dimension & Maximum permissible ripple current[mA(rms)at 105°C, 120Hz]

φD x L (mm)

W.V(V) Cap(μF)	6.3(0J)		10(1A)		16(1C)		25(1E)		35(1V)		50(1H)		63(1J)		100(2A)	
	SIZE	I _R	SIZE	I _R	SIZE	I _R	SIZE	I _R	SIZE	I _R	SIZE	I _R	SIZE	I _R	SIZE	I _R
0,47											5x11	7	5x11	16	5x11	18
1,0	5x11	7	5x11	7	5x11	8	5x11	8	5x11	12	5x11	14	5x11	20	5x11	24
2,2	5x11	18	5x11	18	5x11	22	5x11	24	5x11	28	5x11	23	5x11	24	5x11	28
3,3	5x11	19	5x11	20	5x11	24	5x11	20	5x11	24	5x11	27	5x11	28	5x11	30
4,7	5x11	24	5x11	22	5x11	26	5x11	26	5x11	28	5x11	32	5x11	32	5x11	34
10	5x11	26	5x11	28	5x11	30	5x11	32	5x11	36	5x11	46	5x11	50	6.3x11	52
22	5x11	38	5x11	40	5x11	42	5x11	44	5x11	48	5x11	70	5x11	73	6.3x11	89
33	5x11	46	5x11	50	5x11	54	5x11	58	5x11	72	5x11	88	6.3x11	108	8x11.5	123
47	5x11	64	5x11	68	5x11	76	5x11	84	5x11	91	6.3x11	112	6.3x11	126	10x12.5	182
100	5x11	142	5x11	143	5x11	113	6.3x11	137	6.3x11	149	8x11.5	202	10x12.5	220	10x20	305
220	5x11	144	5x11	153	6.3x11	190	8x11.5	255	8x11.5	270	10x12.5	343	10x16	407	12.5x20 16x25	540 555
330	6.3x11	201	6.3x11	204	8x11.5	274	8x11.5	306	10x12.5	372	10x16	460	10x20	520	12.5x25	670
470	6.3x11	233	6.3x11	248	8x11.5	328	10x12.5	423	10x16	488	10x20	583	12.5x20	740	16x25	921
680	8x11.5	340	8x11.5	383	10x12.5	429	10x16	556	10x20	618	12.5x20	820	12.5x25	956	16x35.5	1230
1000	8x11.5	405	10x12.5	496	10x16	585	10x20	729	12.5x20	920	12.5x25	1096	16x25	1230	18x40	1480
1500	10x16	569	10x16	653	10x20	720	12.5x20	911	12.5x25	1092	16x31.5	1279	16x35.5	1500		
2200	10x20	760	10x20	820	12.5x20	957	12.5x25	1173	16x25	1380	16x35.5	1660	18x35.5	1820		
3300	10x20	885	12.5x20	1070	12.5x25	1244	16x25	1486	16x35.5	1770	18x35.5	2010				
4700	12.5x20	1166	12.5x25	1310	16x25	1520	16x31.5	1835	18x35.5	2160						
6800	12.5x25	1410	16x25	1626	16x31.5	1904	18x35.5	2254								
10000	16x25	1687	16x35.5	2060	18x35.5	2315										
15000	16x35.5	2100	18x35.5	2360												
22000	18x40	2500														

W.V(V) Cap(μF)	160(2C)		200(2D)		250(2E)		350(2V)		400(2G)		450(2W)	
	SIZE	I _R	SIZE	I _R	SIZE	I _R	SIZE	I _R	SIZE	I _R	SIZE	I _R
1,0	6.3x11	11	6.3x11	11	6.3x11	12	6.3x11	12	8x11.5	12	8x11.5	11
2,2	6.3x11	19	6.3x11	19	6.3x11	20	8x11.5	24	8x11.5	24	10x12.5	23
3,3	6.3x11	27	6.3x11	27	8x11.5	31	8x11.5	32	10x12.5	36	10x12.5	34
4,7	6.3x11	33	8x11.5	39	8x11.5	39	10x12.5	46	10x16	46	10x16	42
10	10x12.5	66	10x12.5	69	10x12.5	69	10x16	75	10x20	78	12.5x20	76
22	10x16	112	10x16	112	10x20	120	12.5x20	128	12.5x25	140	12.5x25	138
33	10x20	142	10x20	150	12.5x20	165	12.5x25	183	16x25	195	16x25	190
47	12.5x20	198	12.5x20	202	12.5x25	220	16x25	232	16x.25	245	16x35.5	240
100	12.5x25	325	16x25	345	16x31.5	375	16x35.5	382	18x40	395	18x40	390
220	16x31.5	570	18x35.5	585	18x40	600						
330	18x35.5	754	18x40	610								

I_R : Maxium permissible ripple current [mA(rms) at 105°C, 120Hz]



11. Packing methode

11.1 Cutting products shall be packed in a vinyl bag then put un inner box.

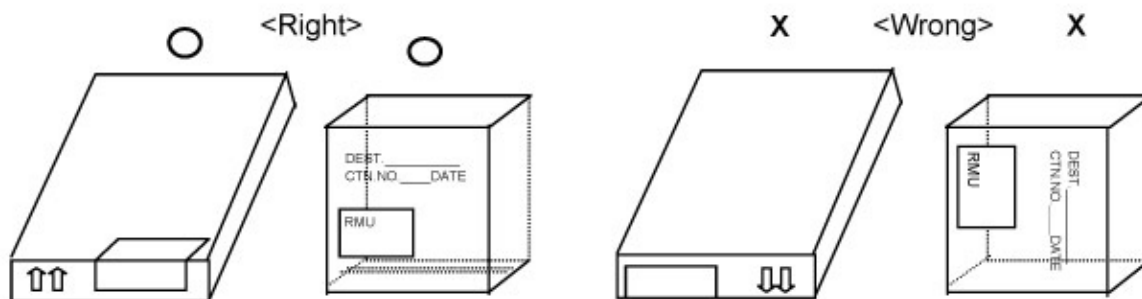
There shall be a single part number in a inner carton.



11.2 Polarity identifications on a cardboard box shall match the polarity of products.

11.3 Inner carton box shall be handled as follows.

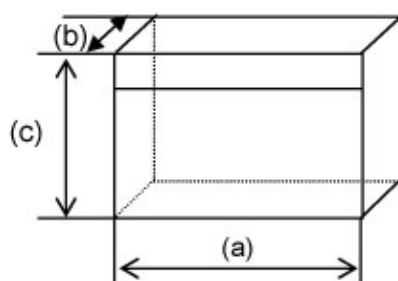
- * No more than 10 inner carton boxes shall be piled.
- * In case of putting the boxes lengthways, the indication of porarity shall face up.
- * The products shall be handled with care.



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

Various part number can be packed in a outer carton.

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

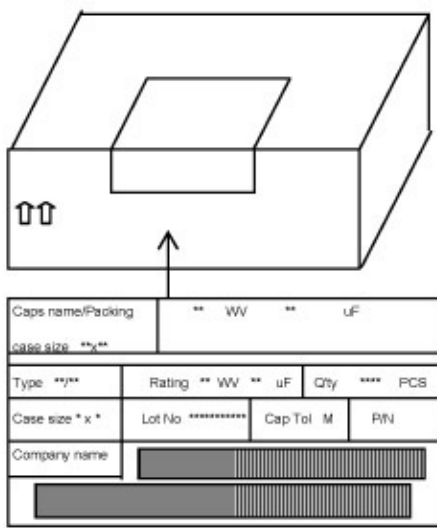


Case size		(a)	(b)	(c)
ϕD	L			
$\phi 5\sim 8$	11~11.5	350	260	310
$\phi 10$	16~20	350	260	310
$\phi 12.5$	20~25	350	260	310
$\phi 16$	25~35.5	350	260	310
$\phi 18$	20~40	350	260	310

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



* Inner box packing standard:

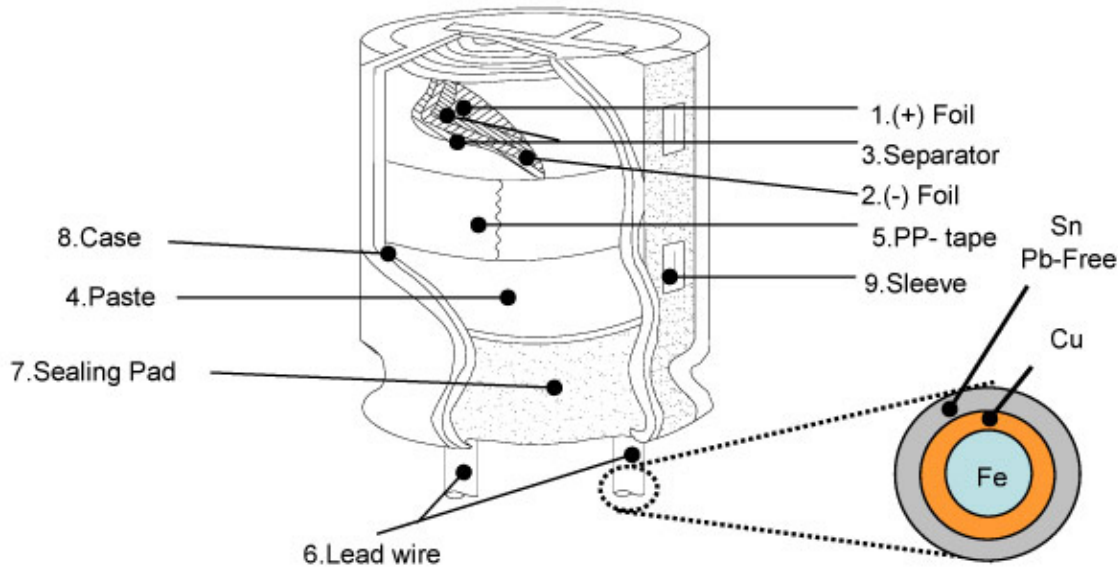


11.6 Packing standard quantity:


Product diameter [mm]	Inner carton quantity min. Packing quantity [Pcs]	Outer carton quantity [Pcs]
φ5	7000	14000
φ6.3	6000	12000
φ8	3600	7200
φ10	2400	4800
φ12.5	1200	2400
φ16	500	1000
φ18	400	800



12.CONSTRUCTION RADIAL TYPE CAPACITORS.





No	Raw Materials			Contents(ppm=mg/kg)						ICP Data
	Part Name	Vendor	Material	cd	pb	Hg	Cr6+	PBB	PBDE	
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	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 wire	LITON	Al,Fe+Sn	0	0	0	0	0	0	#6
7	Rubber	LIEN EKI	Rubber	0	0	0	0	0	0	#7
8	Case	OAKLEY	Aluminium	0	0	0	0	0	0	#8
9	Sleeve	MOODEUNG	PVC	0	0	0	0	0	0	#9
10	Sleeve Ink	MOODEUNG	INK	0	0	0	0	0	0	#10
11	Box Packing	TRUONG HUNG	Kraft	0	0	0	0	0	0	#11
TOL				0	16	0	0	0	0	
SAMSUNG Eco-Partner Standard				5	100	800	800	100	100	

SICE-SP-R027		APPROVAL DATA FOR ELECTROLYTIC CAPACITOR			REV. Date	2015.11.10
 DAEWOO ELECTRONIC EQUIPMENT VIETNAM Co., Ltd.	REV. No				0	Page

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, 50 μ m)	* All series of CE	* Etching(-) * PURITY : 98.4%
Lead wire	- LITON	- CHINA	* Lead-wire welding and press	* 04 type only	* Sn 100% coated
Case	- OAKLEY	- CHINA	- 04 ~ 18 Al-case press	* All series of CE	
Sleeve	- MOODEUNG	- KOREA	* PVC tube	* 04, Snap-in all	
Paper	- KAN	- CHINA	* 100% from CHINA	* All series of CE	
Rubber	- LIEN EKI	- MALAYSIA	* Normal and butyl Rubber	* All series of CE	
Paste	- CAPCHEM	- CHINA	* Adipic Acid, Boric Acid	* All series CE	
Adhesive Tapex	- TAPEX	- KOREA	* Element winding film	* 04, Snap-in all	

SICE-SP-R027	APPROVAL DATA FOR ELECTROLYTIC CAPACITOR			REV. Date	2015.11.10
 DAEWOO ELECTRONIC EQUIPMENT VIETNAM Co., Ltd.					
	REV. No	0	Page		

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(Tributhyl 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	Polyethylene terephthalate (PET)		X	
13	Organic bromine compound except PBB and PBDE	X		
14	Manufacturing Process : Ozone Depleting Substances	X		
15	Manufacturing Process : Chlorined organic solvent	X		