

SICE-SP-R030

SPECIFICATION

REV. Date

2015.11.12

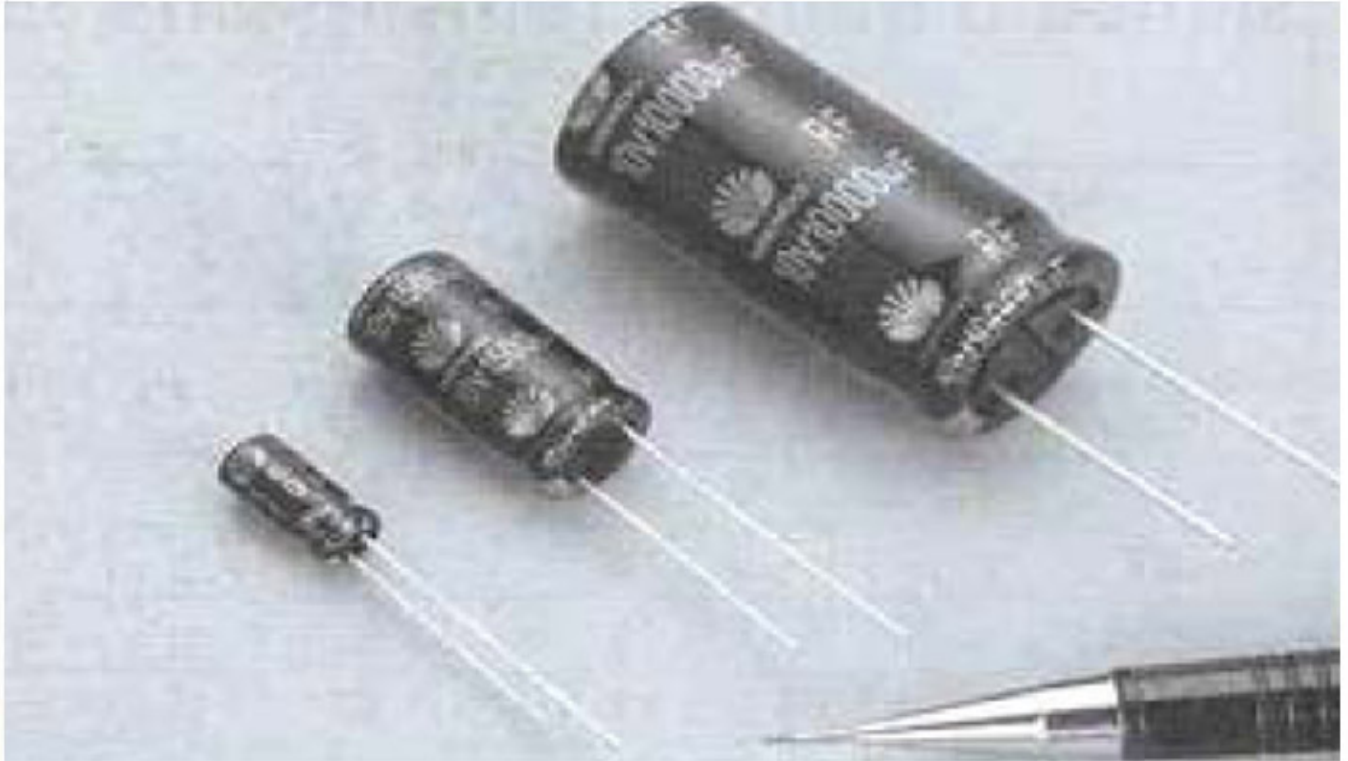


DAEWOO ELECTRONIC
EQUIPMENT VIETNAM Co., Ltd.

ELECTROLYTIC CAPACITORS
RF# SERIES



DACHS



SUPPLIER'S DAEWOO

Maker	Checker	Approval



CUSTOMER'S DACHS

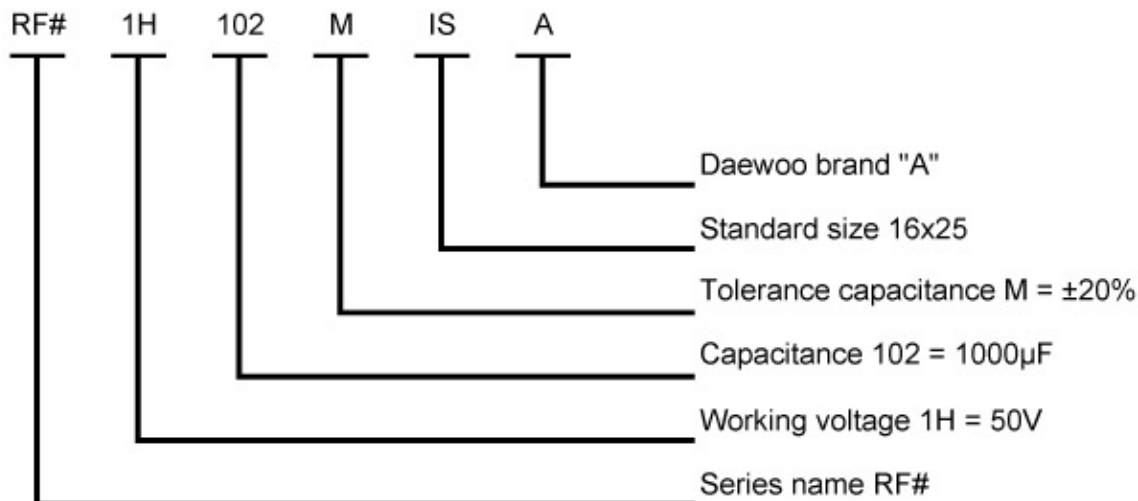
Maker	Checker	Approval

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 capacitors RF# series that our company is going to deliver your company.

1. Composition Type: Ex: RF#1H102MISA "16x25"



2. Operating temperature range:

6.3WV ~ 50WV: -55°C to $+105^{\circ}\text{C}$ (-67°F to $+221^{\circ}\text{F}$)

3. Electrical characteristic:

3.1 Capacitance.

The capacitance is measured at a frequency of 120Hz at a temperature of $20^{\circ}\text{C} \pm 2^{\circ}\text{C}$ ($68^{\circ}\text{F} \pm 3.6^{\circ}\text{F}$) with a maximum of 0.5 Vrms applied.

Capacitance tolerance	(M): $-20\% \sim +20\%$
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3.2 Leakage current (L.C)

6.3V ~ 50V	$I \leq 0.01CV$ or $2\mu\text{A}$ (2min) Whichever is greater
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I = DC Leakage current (μA)

C = Nominal capacitance (μF)

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)	6,3	10	16	25	35	50
	0,24	0,20	0,16	0,14	0,12	0,10

When capacitance is over 1000µF, Tanδ shall be added 0.02 to the listed value with increase of every each 1000µF.

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 ± 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 Max	Within ± 20% of the initial value.
Dissipation factor	Within value specified above.
Leakage current	Within value specified above.

4.2 Load life

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

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

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4.3 Shelf life

After storage for 1000hours 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 intial measured value.
Dissipation factor	$\leq 200\%$ of the initial specified value
Leakage current	$\leq 200\%$ of the initial specified value

4.4 Impedance ratio at low temperature

When capacitor are stored at the temperature of $-40^{\circ}\text{C} \pm 3^{\circ}\text{C}$ 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	16~35	50
Z-55°C/Z20°C	3	3	2



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.
Dissipation factor	Within values specified above
Leakage current	Within values specified above

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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

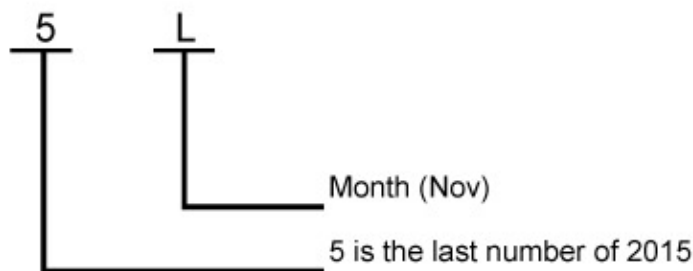
The following items shall be marked indelibly and legibly on the spoci-fled location.

- 1). Brand: 
- 2). Series Designation: RF#
- 3). Rated Voltage (DC): 50V
- 4). Capacitance (μF): 1000μF
- 5). Capacitance Tolerance: (M): ±20%
- 6). Maximum Operating Temperature: 105°C
- 7). Lot No: 5L
- 8). Sleeve Colour: BLACK

7. Lot Number

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

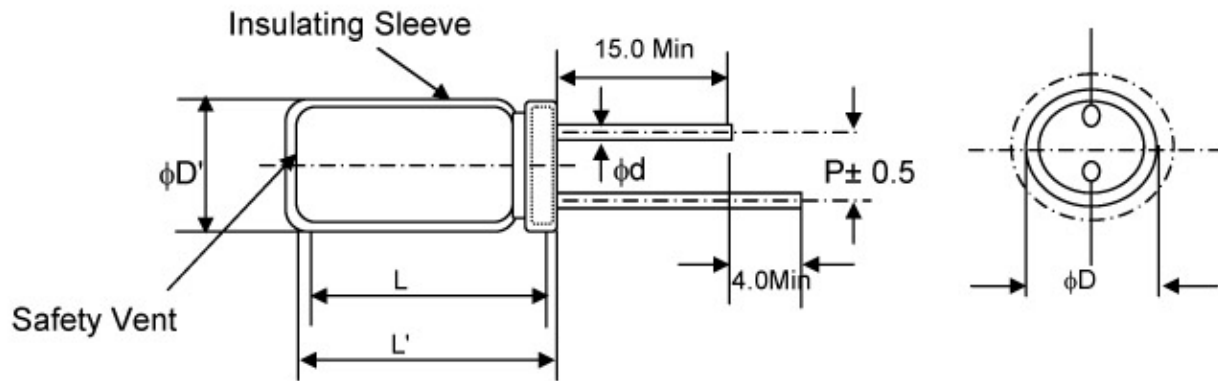
Ex: Nov 2015



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(μF) \backslash Freq(Hz)	50	120	400	1K	10K	50~100K
Cap ≤ 4.7	0,34	0,46	0,54	0,70	0,83	1,0
$4.7 < \text{Cap} \leq 47$	0,45	0,57	0,68	0,80	0,87	1,0
$47 < \text{Cap} \leq 330$	0,55	0,70	0,76	0,88	0,90	1,0
$330 < \text{Cap} \leq 1000$	0,67	0,78	0,88	0,90	0,92	1,0
$1000 < \text{Cap}$	0,82	0,84	0,90	0,94	0,97	1,0

* Temperature

Temperature	$\leq 70^\circ\text{C}$	85°C	105°C
Factor	1,65	1,4	1,0

10. **RF# SERIES**

Standard Rating [Dimension, Impedance, Ripple current]

 $\phi D \times L$ (mm)

Cap(μ F)	W.V(V)	6.3(0J)			10(1A)			16(1C)		
		SIZE	Z	I_R	SIZE	Z	I_R	SIZE	Z	I_R
10								5x11	0,78	180
22		5x11	0,78	180	5x11	0,78	180	5x11	0,78	180
33		5x11	0,78	180	5x11	0,78	180	5x11	0,78	180
47		5x11	0,78	180	5x11	0,78	180	5x11	0,78	180
100		5x11	0,78	180	5x11	0,78	180	6.3x11	0,33	280
150		6.3x11	0,33	280	6.3x11	0,33	280	6.3x11	0,33	280
220		6.3x11	0,33	280	6.3x11	0,33	280	8x11.5	0,18	450
330		6.3x11	0,33	280	8x11.5	0,18	450	8x11.5	0,18	450
470		8x11.5	0,18	450	8x11.5	0,18	450	10x12.5	0,12	660
680		10x12.5	0,12	660	10x12.5	0,12	660	10x16	0,091	850
1000		10x12.5	0,12	660	10x16	0,11	850	10x20	0,069	1100
1500		10x20	0,070	1100	10x20	0,069	1100	12.5x20	0,065	1400
2200		12.5x20	0,065	1400	12.5x20	0,065	1400	12.5x25	0,049	1700
3300		12.5x20	0,065	1400	12.5x25	0,038	1700	16x25	0,033	2100
4700		16x25	0,033	2100	16x25	0,032	2100	16x31.5	0,028	2600
6800		16x25	0,033	2100	16x31.5	0,028	2600	18x35.5	0,026	3000
10000		16x31.5	0,029	2600	18x35.5	0,023	3000	18x40	0,023	3600
15000		18x35.5	0,026	3000	18x40	0,023	3600			

Cap(μ F)	W.V(V)	25(1E)			35(1V)			50(1H)		
		SIZE	Z	I_R	SIZE	Z	I_R	SIZE	Z	I_R
0,47								5x11	6,50	25
1,0								5x11	4,55	40
2,2								5x11	3,90	55
3,3								5x11	3,38	65
4,7		5x11	0,78	180	5x11	0,78	180	5x11	2,99	90
10		5x11	0,78	180	5x11	0,78	180	5x11	1,82	120
22		5x11	0,78	180	5x11	0,78	180	5x11	1,56	150
33		5x11	0,78	180	5x11	0,78	180	6.3x11	0,56	250
47		5x11	0,78	180	6.3x11	0,33	280	6.3x11	0,56	250
100		6.3x11	0,33	280	8x11.5	0,18	450	8x11.5	0,31	340
150		8x11.5	0,18	450	8x11.5	0,18	450	10x12.5	0,22	490
220		8x11.5	0,18	450	10x12.5	0,12	660	10x16	0,16	650
330		10x12.5	0,12	660	10x16	0,091	850	10x20	0,13	810
470		10x16	0,091	850	10x20	0,069	1100	12.5x20	0,11	1100
680		10x20	0,069	1100	12.5x20	0,065	1400	12.5x25	0,085	1200
1000		12.5x20	0,065	1400	12.5x25	0,049	1700	16x25	0,056	1600
1500		16x25	0,033	2100	16x25	0,033	2100	16x31.5	0,049	2000
2200		16x25	0,033	2100	16x31.5	0,028	2600	18x35.5	0,044	2300
3300		16x31.5	0,028	2600	18x35.5	0,026	3000			
4700		18x35.5	0,026	3000	18x40	0,023	3600			
6800		18x40	0,023	3600						

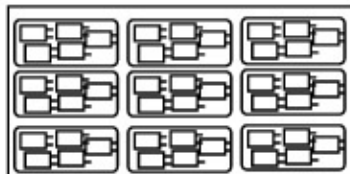
 I_R : Maximum permissible ripple current [mA (rms) at 105°C, 100KHz]ESR: Max. ESR [Ω at 20°C, 100KHz]



11. Packing method

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

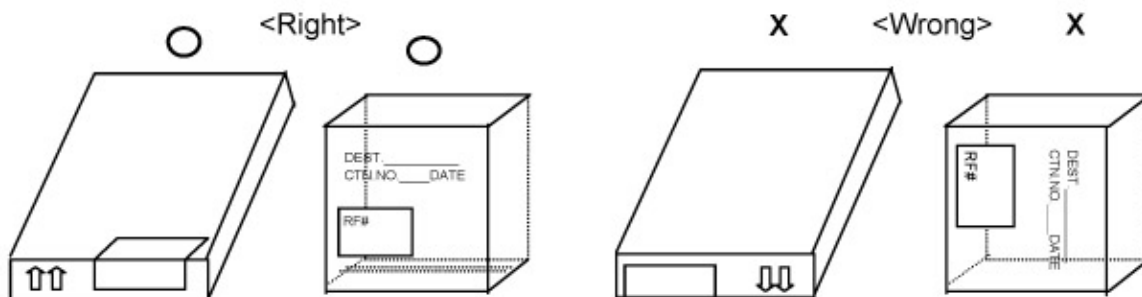
There shall be a single part number in a inner carton.



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

11.3 Inner carton box shall be handled as follows.

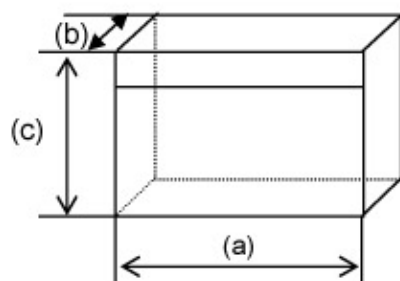
- * No more than 10 inner carton boxes shall be piled.
- * In case of putting the boxes lengthways, the indication of porarity shall face up.
- * The products shall be handled with care.



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

Various part number can be packed in a outer carton.

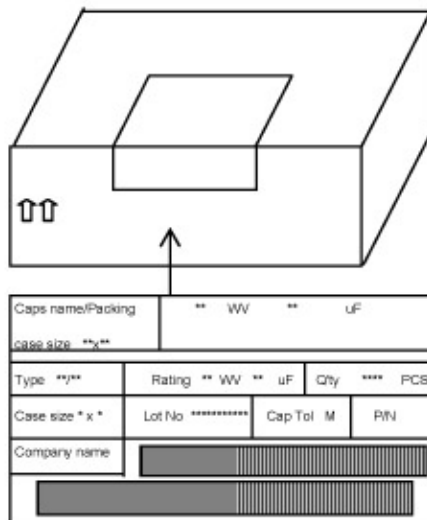
11.5 Shape & dimensions of inner carton shall be as follows.



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 :

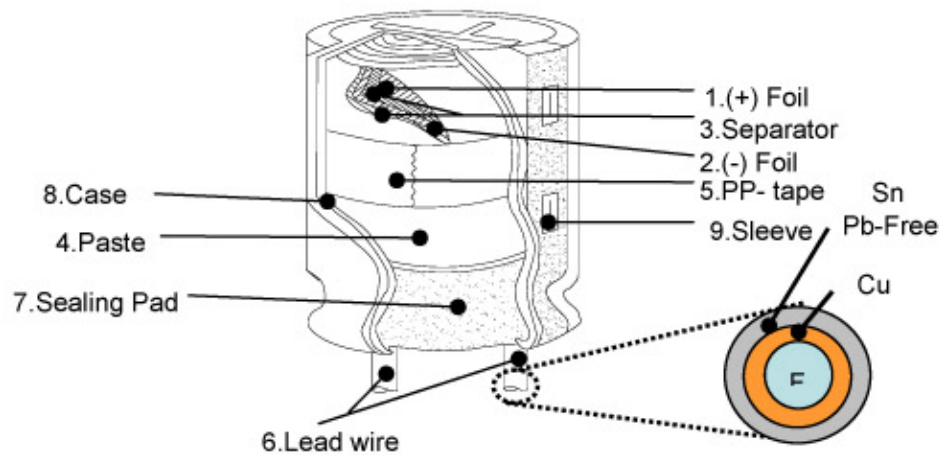


11.6 Packing quantity:


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	0	0	0	0	0	
SAMSUNG Eco-Partner Standard				5	100	800	800	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, 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		

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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	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		