

SICE-SP-R003

SPECIFICATION

REV. Date

2015.11.12

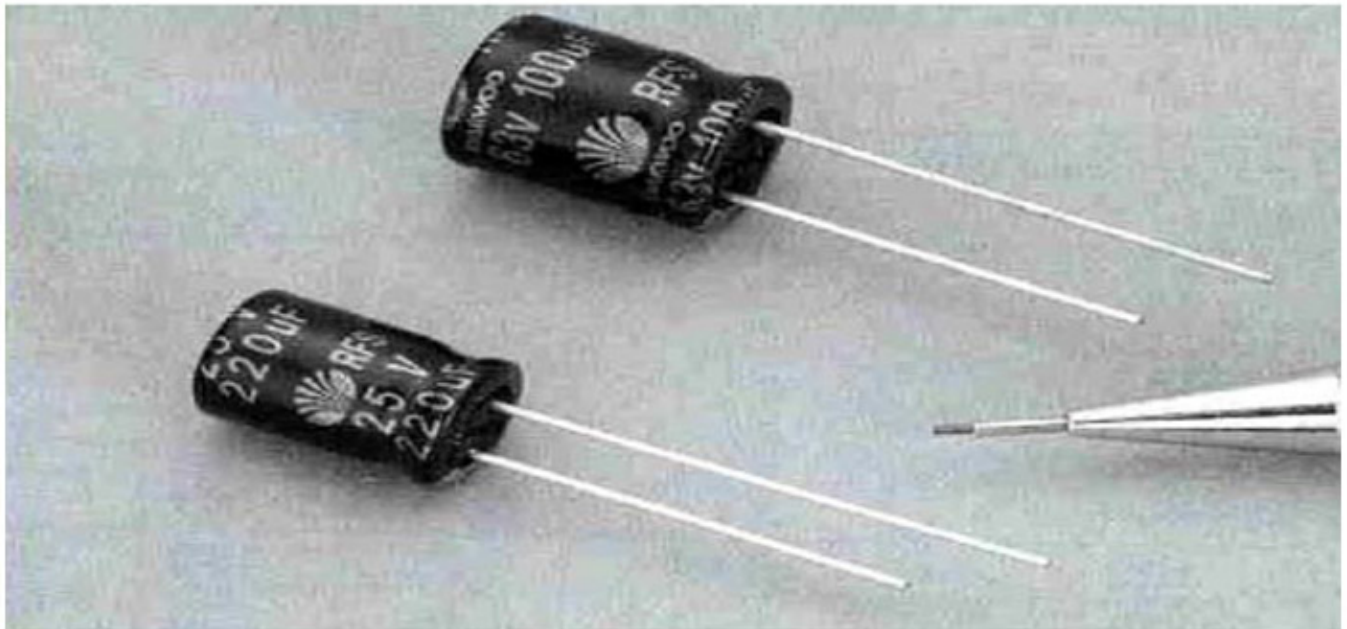


DAEWOO ELECTRONIC
EQUIPMENT VIETNAM Co., Ltd.

ELECTROLYTIC CAPACITORS
RFS SERIES



DACHS



SUPPLIER'S DAEWOO

Maker	Checker	Approval



CUSTOMER'S DACHS

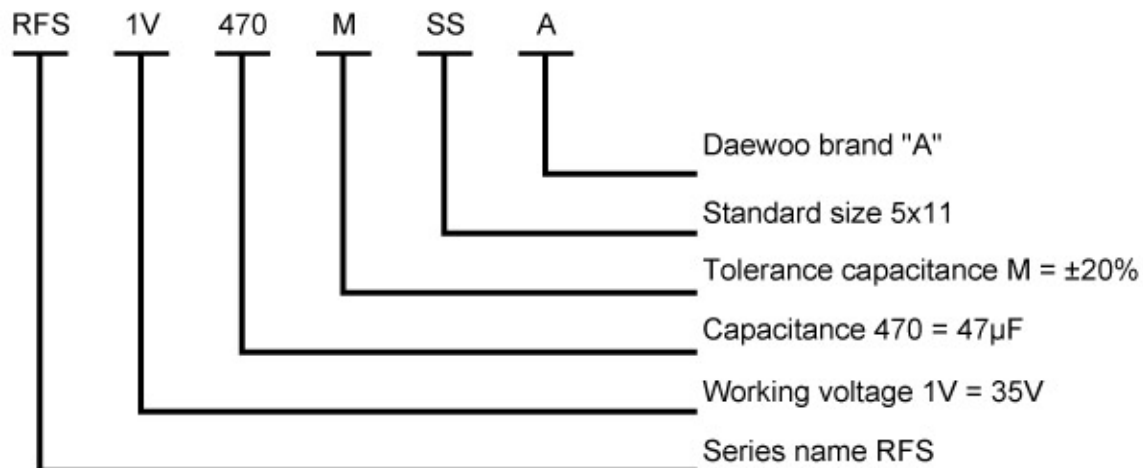
Maker	Checker	Approval

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



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

1. Composition Type: Ex: RFS1V470MSSA "5x11"



2. Operating temperature range:

6.3 ~ 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	-20% ~ +20% (M)
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3.2 Leakage current (L.C)

6.3 ~ 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)

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)	W.V(V)	6,3	10	16	25	35	50	63	100
	Tanδ	0,24	0,20	0,16	0,14	0,12	0,10	0,09	0,08

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 M	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 working voltage for 2000hours at +105°C and the being stabilized at 20°C, capacitors shall meet following limits.

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

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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 measuredvalue.
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 $-40^{\circ}\text{C} \pm 3^{\circ}\text{C}$, $-25^{\circ}\text{C} \pm 3^{\circ}\text{C}$ 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)	6.3~16	25~35	50	63~100
Z-55°C/Z20°C	3	2	2	2

4.5 Resistance to soldering heat

For other procedures than those specified below soldering iron method.

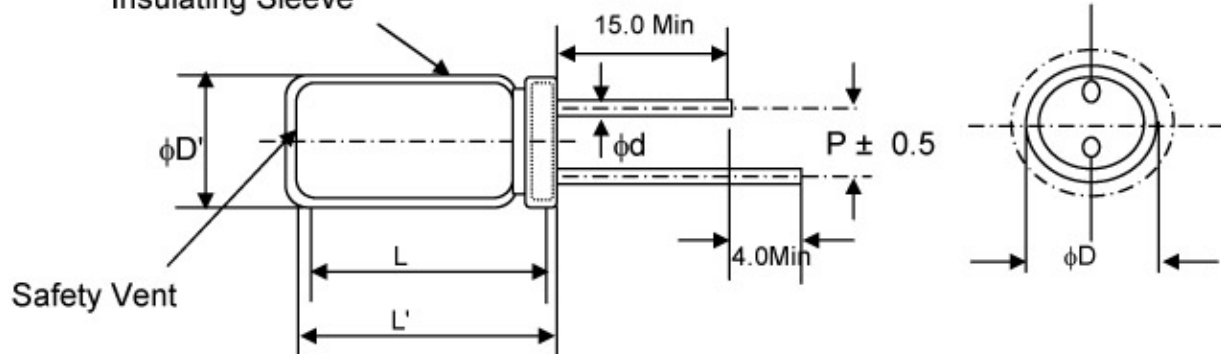
+ Temperature: $260 \pm 5^{\circ}\text{C}$

+ 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 .



8. CASE SIZE AND DIMENSION Insulating Sleeve



* 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)	Freq(Hz)	50	120	400	1K	10K	50~100
Cap \leq 4.7		0,34	0,46	0,54	0,70	0,83	1,00
4.7 < Cap \leq 47		0,45	0,57	0,68	0,80	0,87	1,00
47 < Cap \leq 330		0,55	0,70	0,76	0,88	0,90	1,00
330 < Cap \leq 1000		0,67	0,78	0,88	0,90	0,92	1,00
1000 < Cap		0,82	0,84	0,90	0,94	0,97	1,00

* Temperature

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

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10. RFS SERIES

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

W.W(V) Cap(μF)	6.3(0J)			10(1A)			16(1C)			25(1E)		
	SIZE	Z	I _R	SIZE	Z	I _R	SIZE	Z	I _R	SIZE	Z	I _R
4,7										5x11	0,78	180
10							5x11	0,78	180	5x11	0,75	180
22	5x11	0,78	180	5x11	0,78	180	5x11	0,75	180	5x11	0,72	180
33	5x11	0,78	180	5x11	0,75	180	5x11	0,72	180	5x11	0,65	180
47	5x11	0,78	180	5x11	0,72	180	5x11	0,65	180	5x11	0,50	180
100	5x11	0,78	180	5x11	0,65	180	5x11	0,50	180	6.3x11	0,33	280
150	5x11	0,45	230	5x11	0,60	200	6.3x11	0,33	220	6.3x11	0,18	380
220	6.3x11	0,33	280	6.3x11	0,33	280	6.3x11	0,20	280	8x11.5	0,16	450
330	6.3x11	0,33	280	6.3x11	0,18	450	8x11.5	0,17	470	8x11.5	0,12	600
470	6.3x11	0,20	450	8x11.5	0,18	580	8x11.5	0,12	600	10x12.5	0,091	800
680	8x11.5	0,12	660	8x11.5	0,12	660	10x12.5	0,091	850	10x16	0,069	1100
1000	10x12.5	0,12	660	10x12.5	0,10	850	10x16	0,069	1100	10x20	0,065	1400
1500	10x16	0,07	1100	10x16	0,069	1100	10x20	0,065	1400	12.5x20	0,045	1900
2200	10x20	0,065	1400	10x20	0,065	1400	12.5x20	0,049	1700	12.5x25	0,040	2100
3300	12.5x20	0,065	1600	12.5x20	0,038	1700	12.5x25	0,039	2100	16x31.5	0,028	2600
4700	12.5x20	0,058	1800	12.5x25	0,032	2100	16x25	0,028	2600	16x35.5	0,026	3000
6800	16x25	0,033	2200	16x25	0,030	2600	16x31.5	0,026	3000	18x35.5	0,024	3600
10000	16x31.5	0,029	2600	16x35.5	0,023	3000	18x35.5	0,023	3600			
15000	18x35.5	0,026	3000	18x35.5	0,023	3500						

W.W(V) Cap(μF)	35(1V)			50(1H)			63(1J)			100(2A)		
	SIZE	Z	I _R	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				5x11	3,00	44
3,3				5x11	3,38	65				5x11	3,00	58
4,7	5x11	0,78	180	5x11	2,99	90	5x11	3,00	68	5x11	3,00	74
10	5x11	0,75	180	5x11	1,82	120	5x11	1,20	110	6.3x11	1,00	130
22	5x11	0,72	180	5x11	1,56	150	6.3x11	0,70	180	8x11.5	0,60	230
33	5x11	0,65	180	6.3x11	0,56	250	6.3x11	0,50	220	8x11.5	0,40	300
47	5x11	0,60	220	6.3x11	0,50	270	6.3x11	0,45	300	10x12.5	0,30	420
100	6.3x11	0,18	350	8x11.5	0,31	340	10x12.5	0,25	390	10x20	0,20	580
150	8x11.5	0,18	450	10x12.5	0,22	490	10x16	0,15	440	12.5x20	0,15	710
220	8x11.5	0,15	600	10x16	0,16	650	10x20	0,12	700	12.5x25	0,10	890
330	10x12.5	0,091	850	10x20	0,13	810	12.5x20	0,08	980	16x25	0,080	1080
470	10x16	0,069	1100	12.5x20	0,11	1100	12.5x20	0,055	1200	16x31.5	0,065	1310
680	10x20	0,065	1400	12.5x20	0,095	1200	16x25	0,048	1300	18x35.5	0,050	1410
1000	12.5x20	0,049	1700	16x25	0,056	1600	16x31.5	0,042	1400			
1500	16x25	0,033	2100	16x31.5	0,049	2000	18x35.5	0,035	1750			
2200	16x31.5	0,028	2600	18x35.5	0,044	2300						
3300	16x35.5	0,026	3000									
4700	18x35.5	0,026	3600									

I_R : Maximum permissible ripple current [mA(rms) at 105°C, 100KHz]

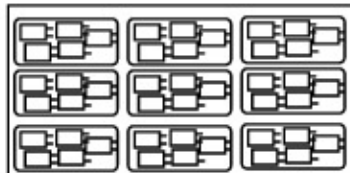
Z: Max. Impedance [Ω at 20°C, 100KHz]



11. Packing method

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

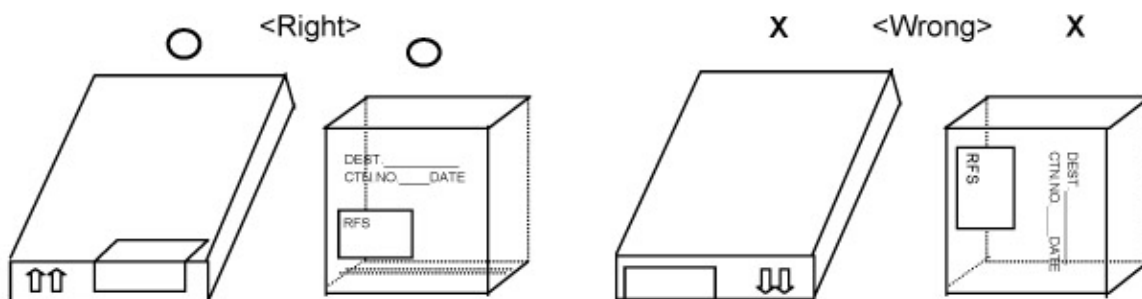
There shall be a single part number in a inner carton.



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

11.3 Inner carton box shall be handled as follows.

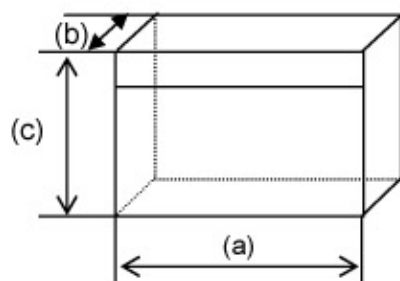
- * No more than 10 inner carton boxes shall be piled.
- * In case of putting the boxes lengthways, the indication of porarity shall face up.
- * The products shall be handled with care.



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

Various part number can be packed in a outer carton.

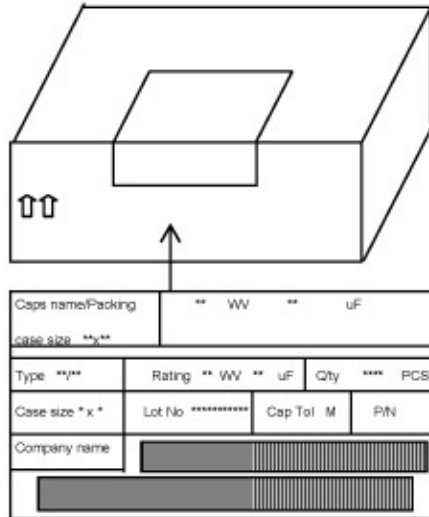
11.5 Shape & dimensions of inner carton shall be as follows.



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:

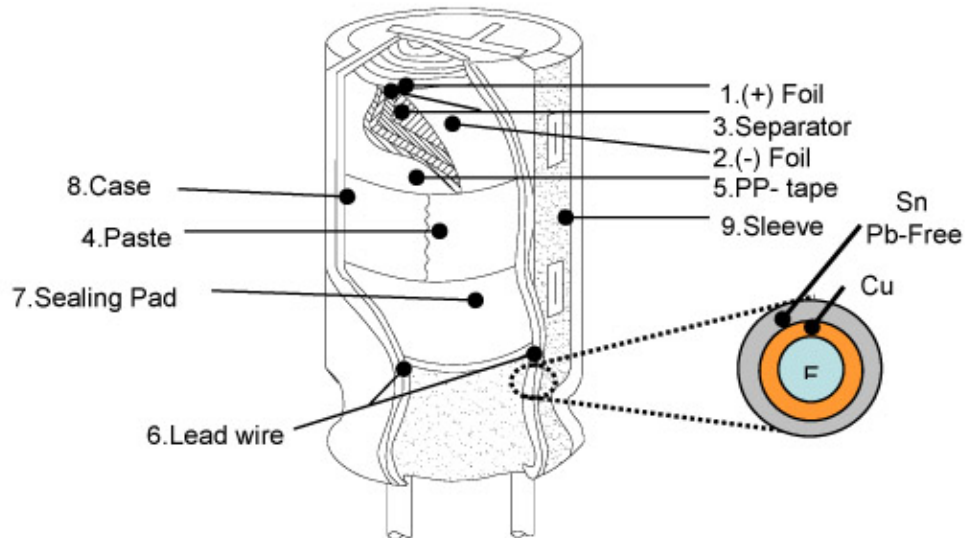


11.6 Packing standard quantity:

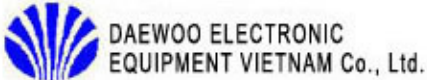
Product diameter [mm]	Inner carton quantity min. Packing quantity [Pcs]	Outer carton quantity [Pcs]
φ5	7000	14000
φ6.3	6000	12000
φ8	3600	7200
φ10	2400	4800
φ12.5	1200	2400
φ16	500	1000
φ18	400	800



12.CONSTRUCTION RADIAL TYPE CAPACITORS.



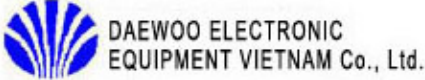

No	Raw Materials			Contents(ppm=mg/kg)						ICP Data
	Part Name	Vendor	Material	cd	pb	Hg	Cr6+	PBB	PBDE	
1	FOIL(+)	HAIXING, HFCC	Aluminium	0	0	0	0	0	0	#1
2	FOIL(-)	ELE-CON	Aluminium	0	0	0	0	0	0	#2
3	Paper	KAN	Pulp	0	0	0	0	0	0	#3
4	PASTE	CAPCHEM	MEG	0	0	0	0	0	0	#4
5	Adhesive Tape	TAPEX	Polypropylene	0	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
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	
Paste	- CAPCHEM	- CHINA	* Adipic Acid, Boric Acid	* All series CE	
Adhesive	- 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(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	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		