NCE

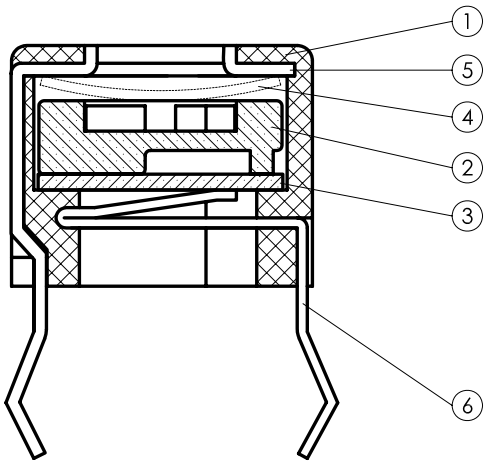
TRIMMER CAPACITORS

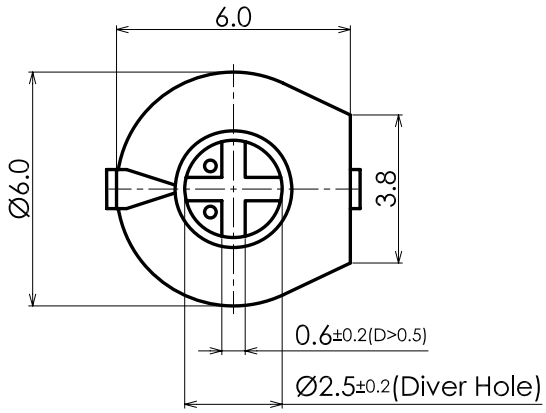
MODEL: TC03

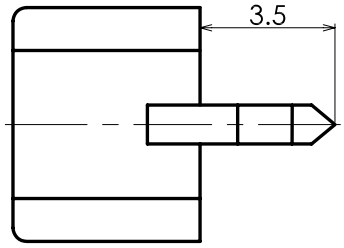
NEWCONT ELE. CO., LTD.

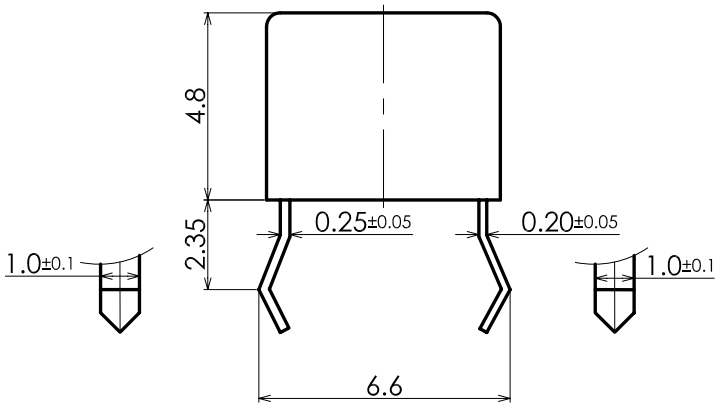
ADD: 19 Floor, Block west QIUSHI building,zhuzilinlu,
Shennandadao, Shenzhen,Guangdong,P.R.China
TEL:86-755-88316650
FAX:86-755-88316651
Http://www.newcont.com
E-mail:pvc@newcont.com

Structure drawing

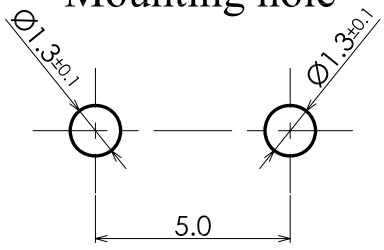








Mounting hole



No	Parts name	Materials	Tretament
1	Base	Poly terephthalic acid succinic ester	
2	Rotating Electrode	Zinc alloy	Casting
3	Dielectric	Ceramics	Sinter(820℃)
4	Spring Washer	C5191	
5	Ground Terminals	LZ08	Under cu plating 0.5um or more Surface sn plating 3.0um or more
6	Base(Inserts)	C2680	Under cu plating 0.5um or more Surface sn plating 3.0um or more

REVISIONS	APPEARANCE		Part No
	UNIT: mm	SCALE: 5/1	TC03
	DIMENSION TOLERANCE GENERAL ±0.5		COLOR
	DESIGNED BY:	WISDOM TIAN	
	DRAWN BY:	WISDOM TIAN	NCE
	CHECKED BY:	WISDOM TIAN	
	APPROVED BY:	X.L.BAO	

1. Scope

This specification applies to the ceramic type trimmer capacitor using ceramic as a dielectric.

2. Main characteristics

Table 1

Part No.	Capacitance(pF)		Temperature coefficient(ppm/℃)	Q factor (1MHz,Cmax)	Marking color
	Min	Max			
TC03Z050F169B00	≤2.0	$5.0^{+50\%}_{0}$	NP0±300	≧500	White
TC03Z100F169B00	≤3.0	$10.0^{+50\%}_{0}$	NP0±300	≧500	Blue
TC03R200F169B00	≤6.0	$20.0^{+50\%}_{0}$	N750±300	≧500	Red
TC03R300F169B00	≤7.5	$30.0^{+50\%}_{0}$	N750±300	≧500	Green
TC03SL450F169B00	≤13.0	$42.0^{+50\%}_{0}$	N1200±500	≧300	Yellow
TC03DL600F169B00	≤17.0	$60.0^{+50\%}_{0}$	N2200±500	≧300	Brown

Part number:

(Global Part Number)

TC	-	03	-	Z	-	050	-	F	-	169	-	B00
①		②		③		④		⑤		⑥		⑦

① Ceramic trimmer capacitors

② 6mm Size

③ Temperature characteristics

④ Cmax

⑤ Terminal type(F——Top Adjustment ,N——Rear Adjustment)

⑥ Rotor type(169-----"十"type)

⑦ Packaging type (A00---TYPE,BOO---BULK)

3. Characteristics

Standard atmospherics conditions:

Unless otherwise specified, the standard range of atmospherics conditions for making measurements and tests are as follows:

Ambient temperature : 5℃ to 35℃ ;
Relative humidity : 45% to 85% ;
Air pressure : 86kPa to 106kPa.

If there is any doubt about the results. measurement shall be made within the following limits:

Ambient temperature : 20℃±2℃ ;
Relative humidity : 60% to 70% ;
Air pressure : 86kPa to 106kPa.

Operating temperature range:

The operating temperature range is the range of ambient temperature of which the trimmer capacitor can be operated continuously within rated voltage.

-25℃ to +85℃

Storage temperature range:

The Storage temperature range is the range of ambient temperature at which the trimmer capacitor can be Stored without damage, conditions are as specified elsewhere in these specification.

-25℃ to +85℃

3-1 Mechanical characteristics:

	Items	Conditions	Specification
1	Rotational torque	When the spindle is rotated at a rate of 10 r/pm	1.96~14.7mN.m
2	Difference between the maximum and minimum value of rotational torque	Difference between the maximum value and the minimum value when the shaft is rotated at a rate of 10 rpm	4.9mN.m or less
3	Terminal strength	A static load of 0.049Nshall be applied to the terminal for 10 sec.	Without excessive looseness of terminals
		Terminals shall be inclined through an angle of 45° in the vertical plane and then returned to its initial position . This cycle shall be made for twice	
4	Shaft load	A load of 0.785 N shall be applied perpendicular to the shaft for 10s.	There shall be no damage to the construction

3-2 Electrical characteristics

	Items	Conditions	Specification
1	Rated voltage		100 V D.C.
2	Nominal capacitance	Maximum capacitance(Measured at 1MHz)	Table 1 shall be satisfied.
		Minimum capacitance(Measured at 1MHz)	Table 1 shall be satisfied.
3	Q	Measured at 1MHz, capacitance of 80% to 90% of maximum value .	Table 1 shall be satisfied.

<table>
<tr><th></th><th>Items</th><th>Conditions</th><th>Specifications</th></tr>
<tr><td>4</td><td>Insulation resistance</td><td>A voltage of rated voltage V D.C. shall be applied for 1 min, after which measurement shall be made</td><td>10000 MΩ or more</td></tr>
<tr><td>5</td><td>Dielectric strength</td><td>Rated voltage V D.C. for 1 min , trip current: 2 m A</td><td>Without damage</td></tr>
<tr><td>6</td><td>Capacitance drift after adjustment</td><td>Rotation shall be made for 5 cycles for 180 degree at a rate of 20 r/min.
Difference between the capacitance value immediately after the shaft is stopped at the position of the maximum capacitance value and the value after 1or 24 hour later.(measured at 1 MHz)</td><td>Refer to table 1</td></tr>
<tr><td>7</td><td>Jump-off and sudden change of capacitance</td><td>Within the total capacitance range</td><td>Without jump-off and sudden change of capacitance</td></tr>
<tr><td>8</td><td>Electrostatic noise</td><td colspan="2">Construction and treatment shall be made so as the electrostatic noise does not occur when rotating.</td></tr>
<tr><td rowspan="2">9</td><td rowspan="2">Temperature characteristics and change in capacitance</td><td>Test condition :
Capacitance shall be 80% to 90% of the maximum value.
<table>
<tr><th>Step</th><th>Temperature</th><th>Duration</th></tr>
<tr><td>1</td><td>20℃±2℃</td><td rowspan="5">60min</td></tr>
<tr><td>2</td><td>-25℃±2℃</td></tr>
<tr><td>3</td><td>20℃±2℃</td></tr>
<tr><td>4</td><td>85℃±2℃</td></tr>
<tr><td>5</td><td>20℃±2℃</td></tr>
</table>
<u>Temperature coefficient</u>
$=(C2-C1)/C1(T2-T1)X10^{6}(ppm/℃)$
however:
C1= capacitance at step3
C2= capacitance at step2/or step4
T1= measuring temperature at step3
T2= measuring temperature at step2/or step4</td><td>Table 1 shall be satisfied</td></tr>
<tr><td><u>Change in capacitance</u>
For difference of maximum capacitance at steps 1,3 or 5, refer to the value at step 3</td><td>5% within</td></tr>
</table>

3-3 Endurance characteristics:

Test capacity shall be 80% to 90% of the maximum value excluding clauses 3-3-1, 3-3-3 and 3-3-12.

	Items	Conditions	Specification
1	Solder ability	Refer to STM-1254-01 "Test Methods for Electronic components, Lead-Free Soldering Parts Design Standards Part 1: Solder ability Test for TMDs, Lead-Free Soldering." Preconditioning is for (A) h. In case of sealing packages which are not exposed to the air. It is for 4 h. In case of silver alloy-finished refer to Sub-clause 5-2). STM-1254-01 (A): □16·■8 h	(1)solder wetting time shall be (A) s or less. (A):■3·□ s (2)A new uniform coating of solder shall cover a minimum of (A)% of the surface being immersed. Or. Theoretical wetting rate shall be (B)% or more. (A):■90·□ % (B):■50·□ %
2	Resistance to soldering heat	Refer to STM-1254-01 "Test Methods for Electronic components, Lead-Free Soldering Parts Design Standards Part 4: Solder Heat Resistance Test for TMDs. Lead-free Soldering" Solder bath method Solder temperature: 260±3℃ Immersion time: 5^{+1}_{0} s Number of cycles: 2 cycles Immersion depth: up to the surface of board Thickness of heat shunt (printed wiring board): 1.6mm Dimensions of component holes in the heat shunt (printed wiring board) shall be in accordance with those specified in this specification. Soldering iron method Bit temperature: 380±10℃ Application time of soldering iron: 3^{+1}_{0} s However. Excessive pressure shall not be applied to the terminal. For other procedures. Refer to IEC 60068-2-20	There shall be no damage on appearance. Electrical characteristics and mechanical characteristics shall be satisfied.
3	Resistance to flux penetration	The printed wiring board shall be fully immersed in the flux for 3 to 5 s and then taken out of the flux . the capacitor shall be inserted completely into the board as soon as the board is removed from the flux . either the flux bath method or the foaming method shall be used to apply flux to the board . in either case , flux should not come into contact with the component side surface and fluxing time shall be 3 to 4 s. Note :after fluxing , if preheating is necessary before mounting ,then the surface of the solder side shall be heated to 75℃ to 90℃ for 1 min or less. Using an automatic soldering system or a hand dipping system. The board shall be soldered up the component side surface (but the solder shall not come into contact with the component side)for 5±1 s at 250℃ to 260℃,the board shall be subjected to standard atmospheric conditions for 24 h or more after the soldering .tests shall then be carried out as specified below. ① visual inspection of appearance . ② measurement of characteristics as specified. ③ Visual inspection of contacts and any specified portion on or within the test component after it has been removed from the board and disassembled, this inspection is to see if flux has penetrated into the test component. Solder: Refer to IEC pub . 68-2-20 Appendix B. Flux: Gx-7 Asahi chemical research laboratory , MH-820V Tamura Kaken co., ltd. Or equivalent flux shall be used. Flux used shall consist 15% by weight of resin . specific gravity (at 20℃) of Gx-7 is 0.823 and MH-820 is 0.824. Printed wiring board : A board specified by NEMA (XPC) or an equivalent board .board shall be single-sided and its normal thickness shall be (A)mm with copper foil thickness of 35um, the position of mounting holes for test component shall correspond exactly to the terminal configuration so that terminals fit exactly into the holes. Hole size shall be as specified . if not specified, hole size shall exceed the diameter (or exterior dimensions in the case of non-circular terminal) of terminals by 0.2 to 0.4 mm, unless otherwise specified , the conductor land size shall exceed the diameter (or dimension) of holes by 2 to 4 mm.(A):1.0mm	Electrical characteristics and mechanical characteristics shall be satisfied.

<table>
<tr><th></th><th>Items</th><th>Conditions</th><th>Specification</th></tr>
<tr><td>4</td><td>Vibration</td><td>Only endurance conditioning by a frequency sweep shall be made .the entire frequency range , from 10Hz to 50Hz and return to 10Hz , shall be transverse in 1 min.
Amplitude (total excursion) : 1.5 mm
This motion shall be applied for a period of 2 hours in each of 3 mutually perpendicular axis (a total of 6 hours) for other procedures., refer to IEC pub. 68-2-6</td><td>(1)change in capacitance :within ±2% or ±0.5PF.but≦10PF, within±0.25PF.
(2)Other item: Table 2 shall be satisfied.</td></tr>
<tr><td>5</td><td>Shock</td><td>Peak acceleration : 735 m/s2 (75G) Duration of pulse : 6 ms Three successive shock shall be applied in both directions of mutually perpendicular axis (a total of 18 shock). For other procedures., refer to IEC pub. 68-2-27</td><td>Table 2 shall be satisfied.</td></tr>
<tr><td>6</td><td>Cold</td><td>The capacitor shall be stored at a temperature of -25±3℃ for 48±4hours,and then it shall be subjected to the controlled recovery conditions for 1 hour after which measurement shall be made.
For other procedures., refer to IEC pub. 68-2-1, test Ab, (Forced air circulation may be used)</td><td>Table 2 shall be satisfied.</td></tr>
<tr><td>7</td><td>Dry heat</td><td>The capacitor shall be stored at a temperature of 70±2℃ for 96±4hours, and then it shall be subjected to the controlled recovery condition for 1 hour after which measurement shall be made. for other procedures., refer to IEC pub. 68-2-2, test Bb ,(Forced air circulation may be used)</td><td>Table 2 shall be satisfied.</td></tr>
<tr><td>8</td><td>Damp heat</td><td>The capacitor shall be stored at a temperature of 40±2℃,humidity of 90% to 95% for 96±4hours, and then it shall be subjected to the controlled recovery condition for 1 hour after which measurement shall be made. for other procedures., refer to IEC pub. 68-2-3.</td><td>(1)Q:300 or more .
(2)Other Item: Table 2 shall be satisfied.</td></tr>
<tr><td>9</td><td>Temperature cycles</td><td>The capacitor shall be subject to 5 continuous cycles, such as shown in table below . And then it shall be subjected to the controlled recovery conditions for 1 hour, after which measurement shall be made. for other procedures., refer to IEC pub. 418-1”capacitance drift”
<table>
<tr><th>Step</th><th>Temperature</th><th>Duration(min)</th></tr>
<tr><td>1</td><td>-25℃±2℃</td><td>30</td></tr>
<tr><td>2</td><td>Standard atmospheric conditions</td><td>10~15</td></tr>
<tr><td>3</td><td>85℃±2℃</td><td>30</td></tr>
<tr><td>4</td><td>Standard atmospheric conditions</td><td>10~15</td></tr>
</table></td><td>Table 2 shall be satisfied.</td></tr>
<tr><td>10</td><td>Damp heat with load</td><td>Twice as much of the rated voltage shall be applied continuously to the capacitor at a temperature of 40±2℃ and a relative humidity of 90 to 95% for 96±4 hour, and then it shall be subjected to the controlled recovery conditions for 1 hour, after which measurement shall be made.
For other procedures , refer to IEC pub. 68-2-3</td><td>(1)Q:300 or more .
(2)Other Item: Table 2 shall be satisfied.</td></tr>
<tr><td>11</td><td>Electrical endurance</td><td>Twice as much of the rated voltage shall be applied continuously to the capacitor at a temperature of 70±2℃ for 96±4 hour, and then it shall be subjected to the controlled recovery conditions for 1 hour, after which measurement shall be made.
For other procedures , refer to IEC pub. 418-1.</td><td>(1).Insulation resistance:1000MΩ or more.
(2).Other items: Table 2 shall be satisfied.
(3).Q:300 or more</td></tr>
<tr><td>12</td><td>Short – time heat resistance</td><td>The capacitor shall be kept at a temperature of 160±2℃ for two minutes, then it shall be kept to the standard atmospheric conditions for 1 hours, after which measurement shall be made.</td><td>Clause 3.2 shall be satisfied. Appearance in table 2 shall be satisfied.</td></tr>
<tr><td>13</td><td>Operating endurance</td><td>The capacitor shall be subjected to 20 cycles(10 cycles for each left and right) at a speed of 10 r/min.</td><td>Table 2 shall be satisfied.</td></tr>
</table>

Table 2

	Items	Conditions	Specification
1	Appearance		There shall be no deformation, excessive looseness, or damage
2	Rotational torque	Refer to clauses 3-1-1and 3-1-2	Clauses 3-1-1 and 3-1-2 should be satisfied
3	Change in capacitance	Refer to clauses 3-2-2	Relative to previously (±5%)within specified value
4	Q	Refer to clauses 3-2-3	Clauses 3-2-3 should be satisfied
5	Insulation resistance	Refer to clauses 3-2-4	Clauses 3-2-4 should be satisfied
6	Dielectric strength	Refer to clauses 3-2-5	Clauses 3-2-5 should be satisfied

※ Change in capacitance =(C2-C1)/C1X100(%)

C1=value measured before test

C2=value measured after test

4.Marking

The following items shall be marked indelibly and legibly on the capacitor or on each unit pack.

4-1 Products name.

4-2 Type name or part number.

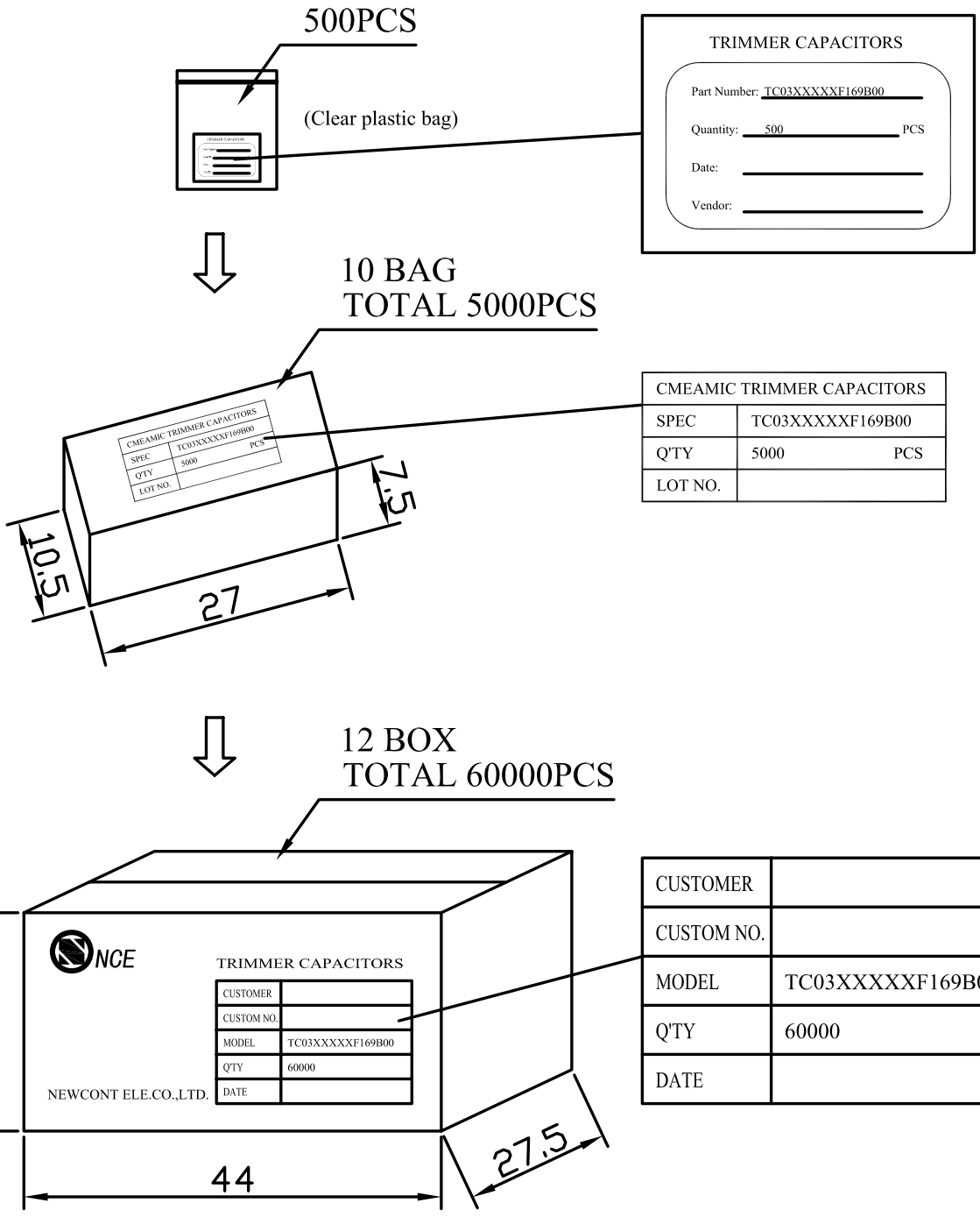
4-3 Month and year of or production code (including lot No.)

4-4 Manufacturer's name (abbreviated manufacturer's name permitted) or trademark.

4-5 Country of origin, china.

5. Package

	Components	Materials	Supplier	Q'TY
1	Inner packaging	PE	Changde Zhengda Plastics Factory	10/500
2	Packaging case	Paper	Changde Jiehao Packing-Color Printing Co.,Ltd.	1/5000



CMEAMIC TRIMMER CAPACITORS		
SPEC	TC03XXXXXF169B00	
Q'TY	5000	PCS
LOT NO.		

CUSTOMER	
CUSTOM NO.	
MODEL	TC03XXXXXF169B00
Q'TY	60000
DATE	

REVISIONS	APPEARANCE		MODEL
	UNIT: cm	SCALE: 2/1	TC03(F)
	DIMENSION TOLERANCE GENERAL ± 0.3		CODE NUMBER
	DESIGNED BY:	Tian Zhi	---
	DRAWN BY:	Tian Zhi	NCE
	CHECKED BY:	Bao Xian Long	
	APPROVED BY:	Bao Xian Long	

NOTICE ON MATERIALS AND MANUFACTURING PROCESS

Don't change written contents and append them

1. This part should not contain any substance which are specified in SS-00259-01※1
2. Clarify by delivery specifications about the existence of use of the substance which are Specified in SS-00259-01※1 .
3. In order to make sorting of plastic waste easy , symbols is marked on the plastic part.For details on marking symbols, refer to STM- 1195-01※2.

   Marking may be omitted in the following cases:

   . Not enough space to apply the marking

   . Marking would interfere with performance or functional requirements

   . Marking technically not feasible due to the specific production method
4. Purchase recycled resins and wire rods only from the business partners that Sony approves as green partners.

※1 SS-00259-01: Management Standards for the Restrictively-used Substances included in Parts and Devices.

※2 STM-1195-01: Markings of plastics parts and packaging Materials part 1:Markings of plastic parts

Remarks : When the supplier does not have SS-00259-01※1 and STM- 1195-01※2 ,ask the Local purchasing department for sending them.