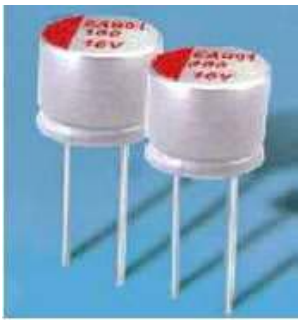
Conductive Polymer Aluminum Solid Capacitor (Radial Type)

PEEP Series

MERITEK

FEATURES

- Standard radial lead type,
- High ripple current capability
- High voltage
- Super Low ESR
- 3000 hours at 105°C



RoHS

PART NUMBERING SYSTEM

PEEP 35V 101 M 0606

Meritek Series

Rated Voltage

Volt.	6.3V	35V
Code	6R3	35V

Capacitance

Cap.	100uf	2000uf
Code	101	202

Tolerance

Tol.	±10%	±20%
Code	K	M

Case size – (D) Diameter x (L) Length in mm

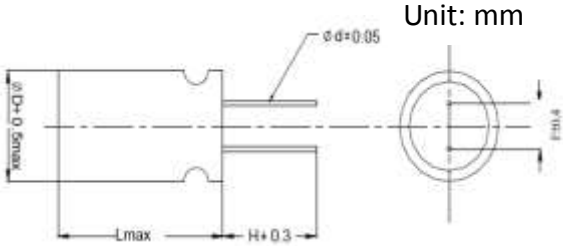
ELECTRICAL SPECIFICATIONS

Item	Characteristic
Operation Temperature Range	-55 ~ +105°C
Rated Voltage	6.3 ~ 35VDC
Surge Voltage	Rated Voltage × 1.15
Capacitance Tolerance	±20% (M)

DIMENSIONS

Unit: mm

Size Code	0508	0509	0606	0609	0610	0611	0809	0812	1012
Ød + 0.5 MAX	5.0	5.0	6.3	6.3	6.3	6.3	8.0	8.0	10.0
L MAX	5.0	9.0	6.0	9.0	10.0	11.0	9.0	12.0	12.0
Ød ± 0.05	0.5	0.5	0.45	0.6	0.6	0.6	0.6	0.6	0.6
F ± 0.4	2.0	2.0	2.5	2.5	2.5	2.5	3.5	3.5	5.0
H ± 0.3	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2



STANDARD RATINGS

WV/VDC (SV)	Cap. (µF)	Size Code	Leakage Current (µA)	ESR (mΩ/20°C,100K~300KHz)	Rated Ripple Current (mA/105°C,100KHz)
6.3 (7.2)	270	0508	340	12	3500
	390	0509	500	8	4050
	560	0609	705	8	4700
	680	0609	857	8	4700
	680	0809	857	7	6100
	820	0610	1033	8	4700
	820	0812	1033	7	6100
	1000	0611	1260	8	4700
	1000	0809	1260	7	6100
	1000	0812	1260	7	6100
	1500	0812	1890	7	6100
	1500	1012	1890	7	6640

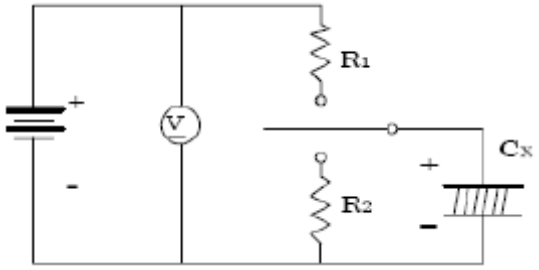
STANDARD RATINGS (CONTINUED)

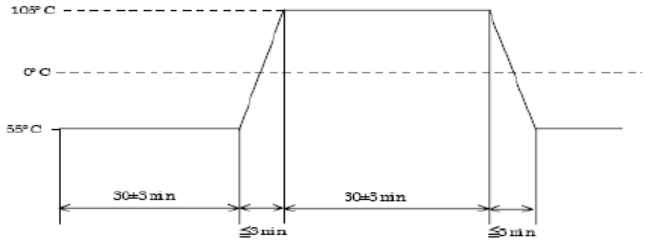
WV/VDC (SV)	Cap. (μF)	Size Code	Leakage Current (μA)	ESR (mΩ/20°C,100K~300KHz)	Rated Ripple Current (mA/105°C,100KHz)
6.8 (7.8)	270	0508	367	12	3500
	390	0509	530	11	3800
	1000	0611	1360	8	5500
7.5 (8.6)	270	0508	405	12	3500
	390	0509	585	11	3800
	500	0509	750	12	3500
10 (11.5)	820	0812	1640	8	6100
	1000	0812	2000	8	6100
6.3 (7.2)	100	0606	320	24	2490
	270	0609	864	15	3800
	270	0809	864	10	5000
	330	0809	1056	10	5000
	470	0809	1505	16	4000
	470	0812	1505	10	5230
	560	0812	1792	14	4950
	680	1012	2176	10	6100
	820	1012	2624	10	6100
	1000	1012	3200	12	5400
20 (23)	390	0811	1560	14	4970
	470	0812	1880	14	4970
25 (28.7)	220	0812	1100	16	4650
25 (28.7)	22	0606	154	35	2400
	100	0812	700	25	2890

RELIABILITY

<table>
<tr><th>Item</th><th>Standard</th></tr>
<tr><td>Leakage Current</td><td>DC rated voltage shall be applied between anode and cathode lead wire terminations of a capacitor through 1k protective resistance, and the leakage current shall be less than or equal to the value listed in table 5 after 2 minutes with the voltage reaching the rated value at 20±2°C.</td></tr>
<tr><td>tanφ</td><td>0.1 MAX. measured at 120Hz ±10% at 20±2°C.</td></tr>
<tr><td>ESR</td><td>
<table>
<tr><th>Compensation</th><th>Signal Level</th><th>Frequency</th><th>Measurement Point</th></tr>
<tr><td>Short and Open compensation would be required. Short correction is performed using the shorting plate made of 0.5 thickness copper plate with gold coating.</td><td>500mV</td><td>100KHz</td><td>Point of lead wire within 1mm from the body</td></tr>
</table>
</td></tr>
<tr><td>Impedance at High and Low Temperature</td><td>Impedance at 100kHz at -55±3ºC or -25±3ºC shall meet the values listed in the table below.
<table>
<tr><th>Impedance Ratio</th><th>Performance</th></tr>
<tr><td>Z (-55ºC)/Z(+20ºC)</td><td>≤1.25</td></tr>
<tr><td>Z (-105ºC)/Z(+20ºC)</td><td>≤1.25</td></tr>
</table>
</td></tr>
<tr><td>Pull Strength of Lead Wire Terminations</td><td>With the body of a capacitor fixed, the load listed in the table below shall be applied to the lead wire termination in its draw out direction, gradually up to the specified value and held for 10±1 seconds. After this test, that capacitor shall not appear any change defective in use.
<table>
<tr><th>Case diameter (mm)</th><th>Load Strength (N)</th><th>Load Strength (kgf)</th></tr>
<tr><td>Ø6.3</td><td>5</td><td>0.51</td></tr>
<tr><td>Ø8</td><td>10</td><td>1.0</td></tr>
<tr><td>Ø10</td><td>10</td><td>1.0</td></tr>
</table>
</td></tr>
</table>

RELIABILITY (CONTINUED)

<table>
<tr><th>Item</th><th>Standard</th></tr>
<tr><td>Damp Heat (Steady State)</td><td>A capacitor shall be subjected to a temperature of 60±2^{0}C and relative humidity of 90 to 95% without voltage applied for a period of 1000+24/-0 hours. Then that capacitor shall be taken out from the above condition to a temperature of 20^{0}C and it shall meet the characteristics in the table below.
<table>
<tr><td>Characteristics</td><td>Performance</td></tr>
<tr><td>Appearance</td><td>No significant damage</td></tr>
<tr><td>Cap. Change</td><td>≤ ±20% of the initial value</td></tr>
<tr><td>tanφ</td><td>≤ ±150% of the initial value</td></tr>
<tr><td>ESR</td><td>≤ ±150% of the initial value</td></tr>
<tr><td>Leakage Current</td><td>≤ the initial specified value</td></tr>
</table></td></tr>
<tr><td>Endurance</td><td>A capacitor shall be subjected to a temperature of 105±2^{0}Cwith test voltage applied for a period of 3,000+72/-0 hours and take out from the above condition to a temperature of 20^{0}C. After this test, that capacitor shall meet the characteristics in the table below. Besides, the applied voltage shall increase up from 0V to test voltage step by step (maximum 5 minutes), and the impedance of the source shall be equal to about 3Ω/V.
<table>
<tr><td>Characteristics</td><td>Performance</td></tr>
<tr><td>Appearance</td><td>No significant damage</td></tr>
<tr><td>Cap. Change</td><td>≤ ±20% of the initial value</td></tr>
<tr><td>tanφ</td><td>≤ ±150% of the initial value</td></tr>
<tr><td>ESR</td><td>≤ ±150% of the initial value</td></tr>
<tr><td>Leakage Current</td><td>≤ the initial specified value</td></tr>
</table></td></tr>
<tr><td rowspan="2">Surge Voltage</td><td>The following specifications in Table 16 shall be satisfied when the capacitors are restored to +20^{0}C after the surge voltage is applied at a cycle of 360 seconds which consists charge for 30±5 seconds through a protective resistor of 1kΩ and discharge for 330 seconds, for 1000 cycles at 105±2^{0}C.
<table>
<tr><td>Characteristics</td><td>Performance</td></tr>
<tr><td>Appearance</td><td>No significant damage</td></tr>
<tr><td>Cap. Change</td><td>≤ ±20% of the initial value</td></tr>
<tr><td>tanφ</td><td>≤ ±150% of the initial value</td></tr>
<tr><td>ESR</td><td>≤ ±150% of the initial value</td></tr>
<tr><td>Leakage Current</td><td>≤ the initial specified value</td></tr>
</table></td></tr>
<tr><td> 

V: DC Voltmeter
R1: Protective resistor 1KΩ
R2: Discharging resistor 1KΩ
CX: Capacitor under test
Surge Voltage Circuit</td></tr>
<tr><td rowspan="2">Rapid Temperature Change</td><td>The characteristics of a capacitor kept under the temperature cycle indicated in the figure below for 5 cycles and followed the voltage shall meet the characteristics in the table below.
<table>
<tr><td>Characteristics</td><td>Performance</td></tr>
<tr><td>Appearance</td><td>No significant damage</td></tr>
<tr><td>Cap. Change</td><td>≤ ±10% of the initial value</td></tr>
<tr><td>tanφ</td><td>≤ the initial specified value</td></tr>
<tr><td>ESR</td><td>≤ the initial specified value</td></tr>
<tr><td>Leakage Current</td><td>≤ the initial specified value</td></tr>
</table></td></tr>
<tr><td> 
</td></tr>
</table>

RELIABILITY (CONTINUED)

<table>
<tr><th>Item</th><th>Standard</th></tr>
<tr><td>Bending Strength of Lead Wire Terminations</td><td>Bending strength load listed in the table below shall be hung at the end of the lead wire termination, and the body of a capacitor shall be bent 90o and return to its original position. This operation shall be performed around 2 to 3 seconds. Then the body shall be bent 90°at the opposite direction and return to its original position at same speed. At this test, that capacitor shall no appear any change defective in use.
<table>
<tr><th>Case diameter (mm)</th><th>Load Strength (N)</th><th>Load Strength (kgf)</th></tr>
<tr><td>Ø6.3</td><td>2.5</td><td>0.255</td></tr>
<tr><td>Ø8</td><td>5</td><td>0.51</td></tr>
<tr><td>Ø10</td><td>5</td><td>0.51</td></tr>
</table></td></tr>
<tr><td>Solderability</td><td>A lead wire termination shall be dipped for 2±0.5 seconds in the flux of ethanol or isopropylalcohol solution (25±2%) of colophonium. Then that lead wire terminations shall be immersed to a solder (H60A, H60S or H63A) of 235±5^{0}C and up to the point 1.5 to 2.0mm from the body and kept for 2±0.5 seconds, and pulling it out. After this test, at least 95% of circumferential surface of the dipped portion of termination shall be covered with new solder.</td></tr>
<tr><td>Resistance to Soldering Heat</td><td>A Capacitor shall be inserted to a printed circuit board having a thickness of 1.6mm up to the point 1.5 to 2.0mm from the body. Then the lead wire termination shall be dipped for 5 to 10 seconds in the flux of ethanol solution (25±2%) of colophonium. And then the lead wire termination shall be immersed to the solder (H60A, H60S or H63A) of 260±5^{0}C and up to the point of the Printed circuit board and kept for 10±1 seconds, and pulling it out. After this test, characteristics shall meet the value in the table below.
<table>
<tr><td>Characteristics</td><td>Performance</td></tr>
<tr><td>Cap. Change</td><td>Within 5% of the initial value</td></tr>
<tr><td>tanφ</td><td>Not exceed the standard rating</td></tr>
<tr><td>Leakage Current</td><td>Not exceed the standard rating</td></tr>
<tr><td>Visual</td><td>No remarkable abnormality</td></tr>
</table></td></tr>
<tr><td>Resistance to Solvent</td><td>A Capacitor shall be immersed for 30±5 seconds in isopropylalcohol at 20 to 25^{0}C and then pull it out. After this test, marking and visual shall meet the requirement in the table below.
<table>
<tr><td>Characteristics</td><td>Performance</td></tr>
<tr><td>Marking</td><td>Easily readable</td></tr>
<tr><td>Appearance</td><td>Not appear any abnormality</td></tr>
</table></td></tr>
</table>

INSTRUCTIONS

1. Cautions on use of capacitors

a. Polarity

Solid electrolytic capacitors are polarized capacitors. Use capacitors after verifying their positive and negative polarities. If these capacitors are installed in the reverse polarity, its life may shorten because of increasing leakage current or short circuit.

b. Types of circuits in which capacitors are prohibited from being used PEHA series may be heated by soldering to increase in its leakage current slightly. This may have some influence on the characteristics capacitors in the following circuits.

(1) Time constant circuit
(2) Coupling circuit
(3) High impedance voltage holding circuit
(4) Connections of two or more capacitors in series for higher withstand voltage.

c. Over voltage

If PEHA series is applied a voltage higher than the rated voltage for an instantaneous period, it may be defected due to short circuit. Note that the voltage over the rated voltage must not be applied to capacitors.

d. Repeat of rapid charging and discharging

If PEHA series is used in a rapid charging and discharging circuit or receive the flow of excess rush current, its life may shorten by large leakage current or short circuit. The charging and discharging current through PEHA series should be less than 10A.

e. Soldering

Capacitors should be soldered under the soldering conditions defined in the delivery specifications. Some improper soldering condition may cause the leakage current of capacitors to increase or other parameters to change.

f. Use of capacitors for industrial equipment

When capacitors are used for industrial equipment, the circuits should be designed to have sufficient margins in the ratings of capacitors including capacitance and impedance. Without sufficient margins in the characteristics, the reliability of the capacitors may be reduced by their shorter life. Always contact us if you want to use capacitors for equipment affecting human lives such as space, aviation, atomic power, and medical devices. Never use capacitors for the used without our prior approval.

2. Notes on circuit designs for capacitors

a. Rating and Performance

Use capacitors within the rating and performance ranges defined in the brochures and delivery specification of capacitors after checking the operating and installation environments.

b. Operating temperature

If PEHA series is used at a temperature higher than the upper specified temperature (105ºC), its life may be remarkably shortened or the leakage current may increase to cause defective.

c. Ripple current

Never make current larger than the rated ripple current through PEHA series. If excess ripple current flows through PEHA series, internal heat may be generated largely to make its life shortened or cause it to be defected due to short circuit.

d. Leakage current

Depending on the soldering conditions, the leakage current of PEHA series may increase slightly. The application of DC voltage enables the capacitors to be repaired by itself. This leads the leakage current to be smaller gradually. The leakage current can be reduced fast if the DC voltage, which is less than the rating voltage, is applied at the temperature close to the upper specified temperature.

e. Applied voltage

(1) To secure the reliability of capacitors, it is recommended that the voltage applied to them should be less than 80% of the rated voltage.

(2) The peak value of the ripple voltage superimposed with the DC voltage should be less than rated voltage.

f. Failure mode

PEHA series contains a conductive polymer as material of cathode electrode. Therefore, like other solid electrolyte capacitors, the life ends mostly due to random failure mode, mainly short circuit. If a current continuously flow through the capacitor due to short circuit, the capacitor would be overheated higher than 300^0C and then aluminum case of the capacitor would be removed by increasing internal pressure due to the vaporization of materials.

g. Insulation

(1) Plastic coated case of capacitors is not secured to insulate. Do not use capacitors in PEHAs requiring insulation.

(2) Isolate the case of PEHA series from the positive and negative terminals and adjacent circuit patterns.

h. Design of printed circuit board

Take note on the following subjects when capacitors are installed on printed circuit boards:

(1) Verify that the lead spacing fit hole pitches on printed circuit board.

(2) Do not place heating components on boards to be close to capacitors or in the backside of them.

(3) If capacitors are mounted on a double-sided PC board, design the board so that extra or through holes may not be opened below them.

i. Parallel connection

If PEHA series is connected with another type of a capacitor in parallel, larger ripple current may flow through one of capacitors. Take the current balance among them into account in circuit designs.

j. Using temperature and frequency

The electric characteristics of capacitors depend on the variations of the ambient temperature and frequency. Check the variations in designing circuits.

3. Notes on installation of capacitors

a. Notes on pre-installation of capacitors

(1) Do not reuse capacitors installed in a unit with the power supply turned on for another unit. No used capacitors shall be reused excluding those removed to measure their electric characteristics in periodical inspection.

(2) If PEHA series stored for a long period may often increase in its leakage current, connect a resistor of approximately 1KΩ to the capacitors for voltage treatment.

b. Notes at installation of capacitors

(1) Install capacitors in a unit after confirming that their ratings (rated capacitance and rated voltages) meet the conditions of the unit.

(2) Install capacitors in the correct polarities.

(3) Take care not to drop capacitors on floors. Do not use capacitors dropped on floors.

(4) Do not deform capacitors to install them in units.

(5) Install PEHA series on a printed circuit board after confirming that its lead pitch is equivalent to the corresponding hole pitch.

(6) At the picking, mounting, and locating by an automatic inserter or the cutting of the leads of PEHA series by an automatic mounter, some stress may be applied to the PEHA series. Take note on the shock.

(7) Do not apply any excess force with the terminals of capacitors.

c. Heating

In preheating or heating for adhesion and fixing of other electronic components, the temperature put to capacitors should be less than 120^0C. The total heating period should be shorter the 90 seconds.

d. Soldering by soldering iron

(1) Capacitors should be soldered under the conditions as follows:
The iron tip at the temperature of 400±10ºC or less may be put to each lead of PEHA series for <3±1 sec.

(2) Lead wire terminations of capacitors may be required to be processed because terminals is not equivalent to that of corresponding holes on the printed circuit board. Process terminations so that no stress may be applied to capacitors themselves before soldering.

(3) Do not make the tip pf a soldering iron be in contact with capacitors themselves.

(4) The leakage current of soldered capacitor may increase slightly depending on several conditions including pre-heating, soldering temperature and period, and board material and thickness, soldering temperature and period, and board material and thickness. However, the leakage current decreases gradually by the self-repair characteristic of capacitors when they are used with voltage application.

e. Flow soldering

(1) Do not dip capacitor themselves into melted solder in soldering. Only provide soldering for the board surface in the backside of the surface on which the capacitors are mounted.

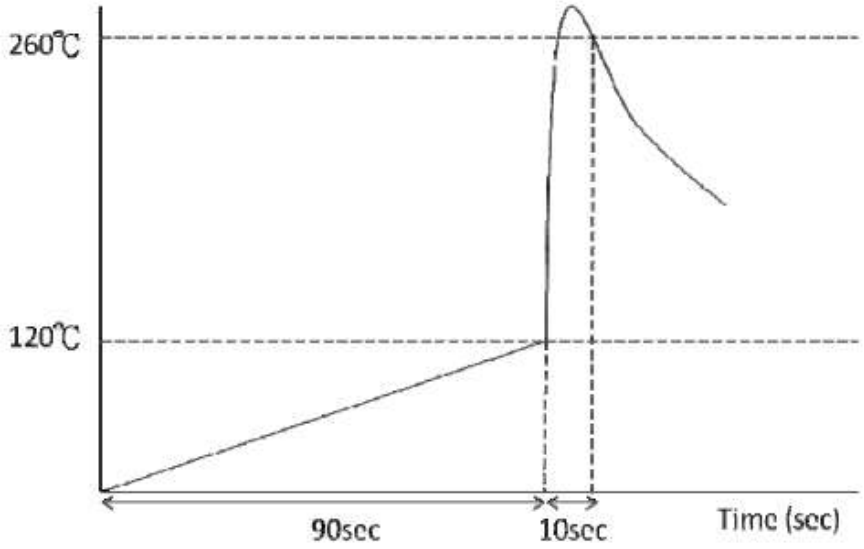
(2) Solder capacitors under the soldering conditions as follows.

(i) Pre-heat condition: atmosphere temperature 120^0C or less for up to 90 sec.

(ii) Soldering condition: solder temperature 260^0C or less for up to 10 sec.

(3) Note that flux may not adhere to any substances except lead wires.

(4) Do not make any other components fallen at capacitors in soldering.



Flow Curve

f. Handling of capacitors after soldering
   (1) Do not incline, bend, and twist capacitors.
   (2) Do not grab capacitors as a handle to carry the printed circuit board.
   (3) Do not hit objects against capacitors. When printed circuit boards are piled up, do not make them and/or other components be in contact with capacitors.
   (4) Do not drop printed circuit boards with capacitors installed.

g. Cleaning of printed circuit board
   As long As the cleaning agents prescribed in the catalogue or specification sheets are used, the cleaning does not give the capacitors any damage. For CFCs substitutions and other cleaning agents, consult us before actual use.

h. Fixing and coating materials
   Contact us for fixing and coating materials appropriate for capacitors and their heat curing conditions.

4. Notes on use of capacitors in unit

a. Never make your fingers contact with the lead wire terminations of capacitors.

b. Do not make lead wire terminations of PEHA series to be in contact with each other through a conductor. Do not put conductive liquid such as acid and alkali solutions on capacitors.

c. Confirm that the unit including capacitors is placed in proper conditions. Do not place the unit in the following PEHAs:
   (1) PEHA in which they are directly exposed to water, brine, oil or in condensation status.
   (2) PEHA filled with poisonous gases including hydrogen sulfide, sulfurous acid, nitrous acid, chlorine and ammonia.
   (3) PEHA to which ultraviolet and /or radial rays are radiated

d. Provide aging for a unit containing capacitors within the period defined for them.

e. It is recommended to use a unit containing capacitors in the normal temperature range of 15^0C to 35^0C and the normal humidity range of 75% or less.

5. Action at emergency

a. At the occurrence of short circuit in PEHA series, some heat is generated from it if the short-current rather small. If the short current exceeds the above value, the capacitor is heated excessively. If so, turn off the power of the unit without your face and hands being close to the capacitors.

b. Never lick the electrolyte of conductive polymer in capacitors. If the electrolyte is put on your skin, wash it away carefully with soap.

c. The materials of seal rubber used for capacitors are flammable. If an adjacent component is burned, seal rubber of the capacitors may burn. Take sufficient note on the installation procedures and locations of capacitors and the pattern designs of printed circuit boards.

6. Storage

a. Store capacitors in an PEHA in the temperature range between 15^0C to 35^0C and the relative humidity of 75% or less without direct sunshine. In addition, store them in the package states if possible.

b. Capacitors should be stored for up to one year to maintain their good soldering features and characteristics.

c. Capacitors are recommended that you shall open the bag just before use and capacitors shall be used up. If some quantity was not need, please seal it with adhesive tape.

d. Never store capacitors in any PEHA in which they are directly exposed to water, brine, oil or in condensation status.

e. Never store capacitors in any PEHA filled with poisonous gases including hydrogen sulfide, sulfurous acid, nitrous acid, chlorine, and ammonia.

f. Never store capacitors in any PEHA to which ultraviolet and/or radial rays are radiated.

7. Exhaustion of capacitors

Capacitors are composed of organic compounds, resins, and metals. Request an industrial dispose company to dispose of used capacitors.

8. Package

The capacitors should be packed in the following quantities listed in the table below.

Case Size	PE bag	Inner box	Outer box
Ø6x6	500 pcs	12 bags (6000 pcs)	5 inner boxes (30000 pec)
Ø6x9	500 pcs	8 bags (4000 pcs)	5 inner boxes (20000 pec)
Ø8x9	500 pcs	6 bags (3000 pcs)	5 inner boxes (15000 pec)
Ø8x12	500 pcs	4 bags (2000 pcs)	5 inner boxes (10000 pec)
Ø10	500 pcs	4 bags (2000 pcs)	5 inner boxes (10000 pec)

Quantity of Package