

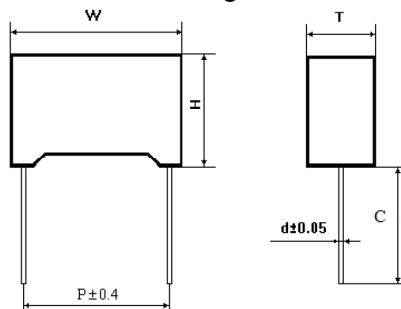


SPECIFICATION FOR APPROVAL

Product Name	Box-type Metallized polyester Film A.C. Capacitor for capacitive divider
Product Type	C29
Product Code	
Customer	
Customer Code	
Issue Date	2015-9

Metallized polyester film A.C. capacitor for capacitive divider

Outline Drawing



$W \pm 0.4$ $H \pm 0.4$ $T \pm 0.4$

Features

- This is specifically designed for applications in serial with the main, i.e.: capacitive divider, for example, LED driver etc.
- Metallized polyester with series construction
- Good self-healing properties, withstanding surge voltage stressing
- Long stability of capacitance
- Good properties in damp environment
- Excellent active and passive flame resistant abilities

Specifications

Reference Standard		GB/T 6346.14 (IEC60384-14)	
Climatic Category/Passive Flammability Category		55/105/56/B	
Rated temperature		85°C	
Operating Temperature Range		-55°C ~ +105°C (+85°C to +105°C: decreasing factor 1.25% per°C for U_R)	
Rated Voltage (U_R)		275Vac, 50/60Hz	300Vac, 50/60Hz
Maximum continuous DC voltage		450Vdc	560Vdc
Capacitance Range		0.033μF ~ 10.0μF	0.022μF ~ 10.0μF
Voltage Proof	Between Terminals	860Vdc (2s)	1180Vdc (2s)
	Between Terminals To Case	2 050Vac (1min)	2 100Vac (1min)
Capacitance Tolerance		±5%(J), ±10%(K), ±20%(M)	
Insulation Resistance		$R \geq 30\,000\text{M}\Omega$, $C_N \leq 0.33\mu\text{F}$ $R C_N \geq 10\,000\text{s}$, $C_N > 0.33\mu\text{F}$ (20°C, 100V, 1min)	
Dissipation Factor	$0.022\mu\text{F} \leq C_N \leq 0.1\mu\text{F}$	$\leq 75 \times 10^{-4}$ (1kHz, 20°C)	$\leq 110 \times 10^{-4}$ (10kHz, 20°C)
	$0.10\mu\text{F} < C_N \leq 0.47\mu\text{F}$	$\leq 75 \times 10^{-4}$ (1kHz, 20°C)	$\leq 120 \times 10^{-4}$ (10kHz, 20°C)
	$0.47\mu\text{F} < C_N \leq 10.0\mu\text{F}$	$\leq 75 \times 10^{-4}$ (1kHz, 20°C)	$\leq 150 \times 10^{-4}$ (10kHz, 20°C)

■ Part number system

The 18 digits part number is formed as follow:

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
C	2	9															

Digit 1 to 3 Series code

C29

Digit 4 to 5 A.C. rated voltage

P2=275V Q1=300V

Digit 6 to 8 Rated capacitance value

for example : 104=10×10⁴ pF =0.10uF

Digit 9 Capacitance tolerance

J=±5% K=±10% M=±20%

Digit 10 Pitch

4=10.0mm 6=15.0mm 9=22.5mm B=27.5mm F=37.5mm

Digit 11 Internal use

Digit 12 to 15 Lead form and packaging mode code

Digit 16 to 18 Internal use

Table 1 lead dimensions and packing mode code

Digit 12		Digit 13		Digit 14		Digit 15	
code	explanation	code	explanation	code	explanation	code	explanation
A	Ammo-pack	6	F=15.0mm	0	Straight	5	P3=25.4mm;H=18.5mm (P=15mm)
C	straight lead “C” in the figure above	code	explanation			0	Length tolerance ±0.5mm Or standard length
		00	standard lead length (18mm~26mm)				
		45	lead length 4.5mm				

■ Dimensions(mm)

275Vac							300Vac						
C _N (μF)	W	H	T	P	d	Part number	C _N (μF)	W	H	T	P	d	Part number
0.033	13.0	9.0	4.0	10.0	0.6	C29P2333-40****+++	0.022	13.0	9.0	4.0	10.0	0.6	C29Q1223-40****+++
0.039	13.0	9.0	4.0	10.0	0.6	C29P2393-40****+++	0.027	13.0	11.0	5.0	10.0	0.6	C29Q1273-40****+++
0.047	13.0	11.0	5.0	10.0	0.6	C29P2473-40****+++	0.033	13.0	11.0	5.0	10.0	0.6	C29Q1333-40****+++
0.056	13.0	11.0	5.0	10.0	0.6	C29P2563-40****+++	0.039	13.0	11.0	5.0	10.0	0.6	C29Q1393-40****+++
0.068	13.0	11.0	5.0	10.0	0.6	C29P2683-40****+++	0.047	13.0	11.0	5.0	10.0	0.6	C29Q1473-40****+++
0.082	13.0	12.0	6.0	10.0	0.6	C29P2823-40****+++	0.056	13.0	12.0	6.0	10.0	0.6	C29Q1563-40****+++
0.10	13.0	12.0	6.0	10.0	0.6	C29P2104-40****+++	0.068	13.0	12.0	6.0	10.0	0.6	C29Q1683-40****+++
0.10	17.5	11.0	5.0	15.0	0.6	C29P2104-60****+++	0.068	17.5	11.0	5.0	15.0	0.6	C29Q1683-60****+++
0.12	17.5	11.0	5.0	15.0	0.6	C29P2124-60****+++	0.082	17.5	11.0	5.0	15.0	0.6	C29Q1823-60****+++
0.15M	17.5	11.0	5.0	15.0	0.6	C29P2154M60****+++	0.10	17.5	12.0	6.0	15.0	0.6	C29Q1104-60****+++
0.15	17.5	12.0	6.0	15.0	0.6	C29P2154-60****+++	0.15	17.5	13.5	7.5	15.0	0.6	C29Q1154-60****+++
0.18	17.5	12.0	6.0	15.0	0.6	C29P2184-60****+++	0.22	17.5	14.0	8.0	15.0	0.6	C29Q1224-60****+++
0.22	17.5	13.5	7.5	15.0	0.6	C29P2224-60****+++	0.27	17.5	14.5	8.5	15.0	0.6	C29Q1274-60****+++
0.27	17.5	13.5	7.5	15.0	0.6	C29P2274-60****+++	0.33	17.5	16.0	10.0	15.0	0.8	C29Q1334-60****+++
0.33	17.5	14.5	8.5	15.0	0.6	C29P2334-60****+++	0.39	17.5	16.0	10.0	15.0	0.8	C29Q1394-60****+++
0.39M	17.5	14.5	8.5	15.0	0.6	C29P2394M60****+++	0.47M	17.5	16.0	10.0	15.0	0.8	C29Q1474M60****+++
0.39	17.5	16.0	10.0	15.0	0.8	C29P2394-60****+++	0.47	17.5	19.0	11.0	15.0	0.8	C29Q1474-60****+++
0.47	17.5	16.0	10.0	15.0	0.8	C29P2474-60****+++	0.15	26.5	15.0	6.0	22.5	0.8	C29Q1154-90****+++
0.27	26.5	15.0	6.0	22.5	0.8	C29P2274-90****+++	0.22	26.5	15.0	6.0	22.5	0.8	C29Q1224-90****+++
0.33	26.5	15.0	6.0	22.5	0.8	C29P2334-90****+++	0.33	26.5	16.0	7.0	22.5	0.8	C29Q1334-90****+++
0.39	26.5	15.0	6.0	22.5	0.8	C29P2394-90****+++	0.39	26.5	16.0	7.0	22.5	0.8	C29Q1394-90****+++
0.47M	26.5	15.0	6.0	22.5	0.8	C29P2474M90****+++	0.47	26.5	17.0	8.5	22.5	0.8	C29Q1474-90****+++
0.47	26.5	16.0	7.0	22.5	0.8	C29P2474-90****+++	0.56	26.5	17.0	8.5	22.5	0.8	C29Q1564-90****+++
0.56	26.5	16.0	7.0	22.5	0.8	C29P2564-90****+++	0.68	26.5	18.5	10.0	22.5	0.8	C29Q1684-90****+++
0.68	26.5	17.0	8.5	22.5	0.8	C29P2684-90****+++	0.82	26.5	18.5	10.0	22.5	0.8	C29Q1824-90****+++
0.82	26.5	17.0	8.5	22.5	0.8	C29P2824-90****+++	1.0	26.5	20.0	11.0	22.5	0.8	C29Q1105-90****+++
1.0	26.5	18.5	10.0	22.5	0.8	C29P2105-90****+++	1.5	26.5	23.0	13.5	22.5	0.8	C29Q1155-90****+++
1.2	26.5	22.0	12.0	22.5	0.8	C29P2125-90****+++	1.8	26.5	24.5	15.5	22.5	0.8	C29Q1185-90****+++
1.5M	26.5	22.0	12.0	22.5	0.8	C29P2155M90****+++	2.2	26.5	29.5	14.5	22.5	0.8	C29Q1225-90****+++
1.5	26.5	23.0	13.5	22.5	0.8	C29P2155-90****+++	0.47	32.0	18.0	9.0	27.5	0.8	C29Q1474-B0****+++
1.8	26.5	23.0	13.5	22.5	0.8	C29P2185-90****+++	0.56	32.0	18.0	9.0	27.5	0.8	C29Q1564-B0****+++
2.2	26.5	24.5	15.5	22.5	0.8	C29P2225-90****+++	0.68	32.0	18.0	9.0	27.5	0.8	C29Q1684-B0****+++
0.82	32.0	18.0	9.0	27.5	0.8	C29P2824-B0****+++	0.82	32.0	18.0	9.0	27.5	0.8	C29Q1824-B0****+++
1.0	32.0	18.0	9.0	27.5	0.8	C29P2105-B0****+++	1.0	32.0	20.0	11.0	27.5	0.8	C29Q1105-B0****+++
1.2	32.0	20.0	11.0	27.5	0.8	C29P2125-B0****+++	1.5	32.0	22.0	13.0	27.5	0.8	C29Q1155-B0****+++
1.5	32.0	20.0	11.0	27.5	0.8	C29P2155-B0****+++	2.2	32.0	28.0	14.0	27.5	0.8	C29Q1225-B0****+++
1.8	32.0	22.0	13.0	27.5	0.8	C29P2185-B0****+++	3.3	32.0	30.0	16.0	27.5	0.8	C29Q1335-B0****+++
2.2M	32.0	22.0	13.0	27.5	0.8	C29P2225MB0****+++	3.9	32.0	33.0	18.0	27.5	0.8	C29Q1395-B0****+++
2.2	32.0	25.0	13.0	27.5	0.8	C29P2225-B0****+++	4.7M	32.0	33.0	18.0	27.5	0.8	C29Q1475MB0****+++
3.3	32.0	30.0	16.0	27.5	0.8	C29P2335-B0****+++	4.7	32.0	37.0	22.0	27.5	0.8	C29Q1475-B0****+++
3.9	32.0	32.0	18.0	27.5	0.8	C29P2395-B0****+++	1.0	41.0	22.0	11.0	37.5	1.0	C29Q1105-F0****+++
4.7	32.0	32.0	18.0	27.5	0.8	C29P2475-B0****+++	1.5	41.0	22.0	11.0	37.5	1.0	C29Q1155-F0****+++
2.2	41.0	22.0	11.0	37.5	1.0	C29P2225-F0****+++	2.2	41.0	24.0	13.0	37.5	1.0	C29Q1225-F0****+++
2.7	41.0	24.0	13.0	37.5	1.0	C29P2275-F0****+++	3.3	42.0	28.0	14.0	37.5	1.0	C29Q1335-F0****+++
3.3	42.0	28.0	14.0	37.5	1.0	C29P2335-F0****+++	3.9	41.0	30.0	16.0	37.5	1.0	C29Q1395-F0****+++
3.9	42.0	28.0	14.0	37.5	1.0	C29P2395-F0****+++	4.7	41.0	32.0	17.0	37.5	1.0	C29Q1475-F0****+++
4.7	41.0	30.0	16.0	37.5	1.0	C29P2475-F0****+++	5.6	41.0	33.5	18.5	37.5	1.0	C29Q1565-F0****+++
5.6	41.0	32.0	17.0	37.5	1.0	C29P2565-F0****+++	6.8	41.0	37.0	22.0	37.5	1.0	C29Q1685-F0****+++
6.8	41.0	33.5	18.5	37.5	1.0	C29P2685-F0****+++	8.2	41.5	37.5	27.5	37.5	1.0	C29Q1825-F0****+++
8.2	41.0	37.0	22.0	37.5	1.0	C29P2825-F0****+++	10.0	41.0	43.0	28.0	37.5	1.0	C29Q1106-F0****+++
10.0	41.0	41.0	26.0	37.5	1.0	C29P2106-F0****+++							

Note: 1. "J"=capacitance tolerance code, J=±5%, K=±10%, M=±20%

2. "****"=lead form and packing code (refer to table 1).

Test Method And Performance

No.	Item	Performance	Test Method (GB/T14472, IEC 60384-14)
1	4.5 Solderability	Good quality of tinning	Solder temperature: 245°C ±5°C Immersion time: 2.0s±0.5s
2	4.3 Terminal strength	There shall be no visible damage	Tense: 0.50<d≤0.80, 10N 0.80<d≤1.25, 20N Bend: 0.50<d≤0.80, 5N 0.80<d≤1.25, 10N The terminals shall be bent 2 times in each direction
3	4.4 Resistance to solder heat	There shall be no visible damage $\Delta C/C \leq \pm 5\%$ (relative to the initial value)	Solder temperature: 260°C ±5°C Immersion time: 10s±1s
4	4.20 Solvent resistance of the marking	The marking shall be legible	Solvent: Industrial isopropanol. Solvent temperature: 23°C ±5°C Dipping time: 5min±0.5min Condition: scrub Scrub material: absorbent cotton Reverting time: No
5	4.2 Initial measurement	Capacitance, Tgδ	
	4.6 Rapid change of temperature	There shall be no evidence of deterioration.	T _A =-55°C, T _B =+105°C 5 cycles Duration: t=30min
	4.7 Vibration	There shall be no evidence of deterioration.	Amplitude 0.75mm or acceleration 100m/s ² (whichever is the smaller severity), f: 10Hz to 500Hz. Three directions, 2h for each direction, total 6h.
	4.8 Bump	There shall be no evidence of deterioration.	4 000 times, Acceleration: 400m/s ² , Pulse duration, 6ms
	Final measurement	There shall be no visible damage $\Delta C/C \leq \pm 5\%$ (relative to the initial value)	
6	4.11 Climate sequence	Initial measurement	
		Dry heat	+105°C, 16h
		Damp heat, Cyclic	Test Db, Severity: b, the first cycle
		Cold	-55°C, 2h
		Damp heat, cyclic other	Test Db, Severity b, the other cycles
		Final measurement	There shall be no visible damage, legible marking $\Delta C/C \leq \pm 5\%$ (relative to the initial value) Increase of tgδ: C _N ≤1μF: ≤0.008 (10kHz) C _N >1μF: ≤0.005 (1kHz) Dielectric strength : there shall be no permanent breakdown or flashover I.R.: ≥ 50% of the rated value

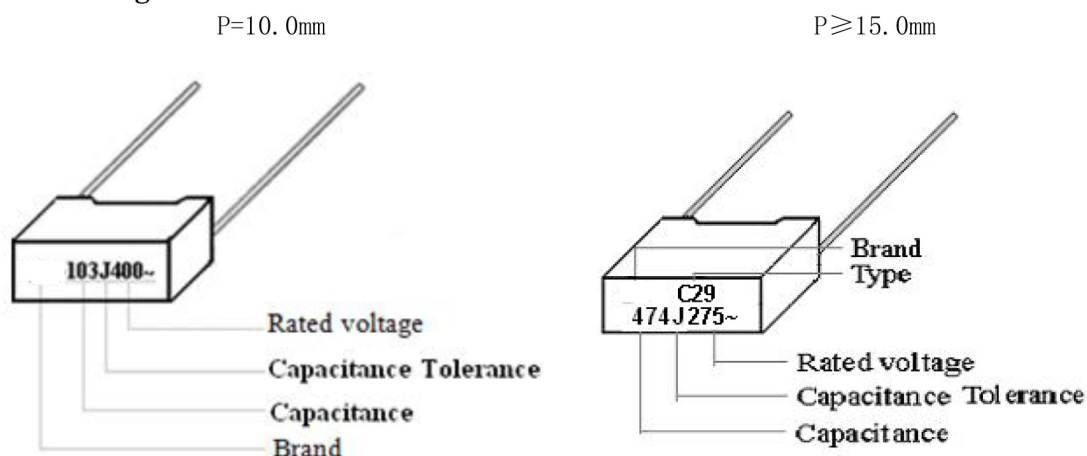
No.	Item	Performance	Test Method (GB/T14472, IEC 60384-14)
7	4.12 Damp heat steady state	There shall be no visible damage, legible marking $\Delta C/C \leq \pm 5\%$ (relative to the initial value) Increase of $\tan \delta$: $C_N \leq 1 \mu F$: ≤ 0.008 (10kHz) $C_N > 1 \mu F$: ≤ 0.005 (1kHz) Dielectric strength : there shall be no permanent breakdown or flashover I.R.: $\geq 50\%$ of the rated value	Temperature: $40^\circ\text{C} \pm 2^\circ\text{C}$ Humidity: $93 \pm 3\%$ RH Duration: 56 days
8	4.13 Impulse voltage	There are three or more waveforms which indicate that no self-heating breakdown have occurred when it is monitored by the monitor	Each individual capacitor shall be subjected to 24 impulses of the same polarity (when any three successive impulses are shown by the monitor to have a wave form indicating that no self-heating breakdown have taken place the impulses can be stopped), the time between impulses shall not be less than 10s, and the peak value of the voltage impulse: 1.2kV (suitable for $C_N \leq 1 \mu F$; When $C_N > 1 \mu F$, the capacitor can endure pulse voltage value is $1.2 / \sqrt{C_N}$ kV)
9	4.14 Endurance	There shall be no visible damage, legible marking $\Delta C/C \leq \pm 10\%$ (relative to the initial value) Increase of $\tan \delta$: $C_N \leq 1 \mu F$: ≤ 0.008 (10kHz) $C_N > 1 \mu F$: ≤ 0.005 (1kHz) Dielectric strength : There shall be no breakdown or flashover I.R. : $\geq 50\%$ of the rated value	$+85^\circ\text{C}$, $1.25U_R$ V.a.c., 2 000h
10	4.15 Charging and discharging	$\Delta C/C \leq \pm 10\%$ (relative to the initial value) Increase of $\tan \delta$: $C_N \leq 1 \mu F$: ≤ 0.008 (10kHz) $C_N > 1 \mu F$: ≤ 0.005 (1kHz) I.R.: $\geq 50\%$ of the rated value	Times: 10 000 Duration of charging: 0.5s Duration of discharging: 0.5s Charging voltage: $\sqrt{2} U_R$ V.d.c. Charging resistance: $220/C_N (\Omega)$ or the current $\leq 1.0\text{A}$ (whichever is the minor) Discharging resistance: $R = \frac{\sqrt{2} U_R}{C_N \times \frac{dU}{dt}} (\Omega)$ C_N : Capacitance (μF) dU/dt (V/us) : 100V/ μs
11	4.17 Passive flammability	The flaming time of each capacitor shall not go beyond 10s after it is taken apart from the flame. Drop of each capacitor caused by flame shall not fire the tissue below.	Needle flame test The category of flammability: B Expose time: 1 time Capacitor Volume Exposing time $250 < V(\text{mm}^3) \leq 500$ 20s $500 < V(\text{mm}^3) \leq 1750$ 30s $V(\text{mm}^3) > 1750$ 60s

No.	Item	Performance	Test Method (GB/T14472, IEC 60384-14)
12	4.18 Active flammability	The cheese cloth around the capacitor shall not burn with a flame.	The specimens shall be individually wrapped in at least 1, but not more than 2, complete layers of cheesecloth, the cheesecloth shall be untreated pure cotton cloth. Each sample shall be subjected to 20 discharges, the interval between successive discharges shall be 5s. $U_i = 1.2kV_0^{+7\%}$ U_R be applied and be maintained for 120_0^{+10} s after the last discharge.

■ Quality ensuring test (before shipment):

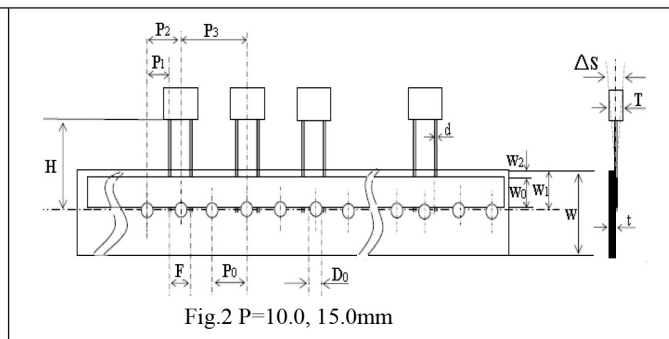
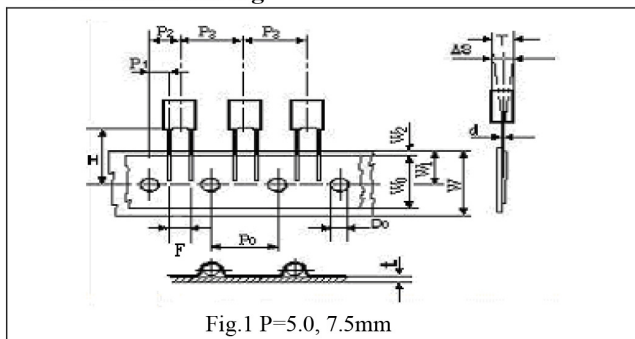
Inspection item (each batch)	Inspection level (GB/T 2828.1, ISO2859-1)	
	IL	AQL
Appearance inspection	II	1.5%
Dimensions		
Capacitance	II	0.65%
Tangent of the loss angle		
Dielectric strength		
Insulation resistance		
Solderability	S-3	2.5%

■ Marking



■ Taping specification for box-type capacitors

▲ Outline Drawing



▲ Taping Dimensions(mm)

Technology index title	Code	Dimensions				
		P=5.0	P=7.5	P=10.0	P=15.0	Tolerance
Taping type	—	Fig 1	Fig 1	Fig2	Fig 2	—
Part number Digit12-15	Ammo-pack	A201	A301	A405	A605	
Taping pitch	P ₃	12.7	12.7	25.4	25.4	±1.0
Feed hole pitch	P ₀	12.7	12.7	12.7	12.7	±0.3
Center of wire	P ₁	3.85	2.6	7.7	5.2	±0.7
Center of body	P ₂	6.35	6.35	12.7	12.7	±1.3
Pitch of taping wire	F**	5.0	7.5	10.0	15.0	+0.6 -0.1
Component alignment	△S	0	0	0	0	±2.0
Height of component from tape center	H***	18.5	18.5	18.5	18.5	±0.5
Carrier tape width	W	18.0	18.0	18.0	18.0	+1.0 -0.5
Hold down tape width	W ₀	6min	10min	10min	10min	—
Hole position	W ₁	9.0	9.0	9.0	9.0	±0.5
Hold down tape sition	W ₂	3max	3max	3max	3max	—
Feed hole dia.	D ₀	4.0	4.0	4.0	4.0	±0.2
Tape thickness	t	0.7	0.7	0.7	0.7	±0.2

▲ Packing Quantity

Pitch (mm)	Box thickness T(mm)	Ammo-pack (pcs/box)	
		Domestic	Export
5.0	2.5	2500	2 000
	3.5	1 700	1 500
	4.5	1 400	1 300
	5.0	1 200	1 000
7.5	6.0	1 000	800
	3.5	1 700	1 500
	4.0	1 500	1 350
	5.0	1 200	1 050
10.0/15.0	6.0	1 000	850
	4.0	750	650
	5.0	600	500
15.0	6.0	500	450
	7.5	400	350
	8.5	350	300
	10.0	300	250
	11.0	250	220

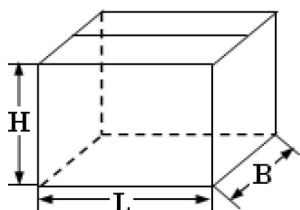
Note: * P₀=15mm is also available;

**F can be other lead spacing;

***H=16.5mm is available;

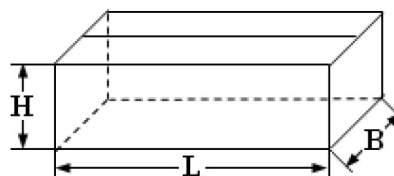
■ Packing box sizes(mm)

1. Out packing box for bulk



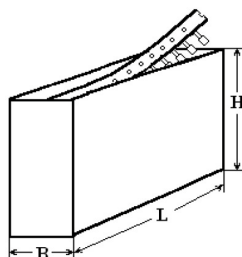
L:375±5
B:375±5
H:265±5

2. Inner packing box for bulk



L:355±3
B:175±3
H:118±3

3. Box sizes for Ammo-pack



L:330±3
B:48±3
H:260±3