

# LARGE ALUMINUM ELECTROLYTIC CAPACITORS



Upgrade

# HL

Long Life Series

- Long life than HK series
- Load life of 5000 hours at 105°C
- Complied to the RoHS directive



Solvent Proof  
WV ≤ 100V



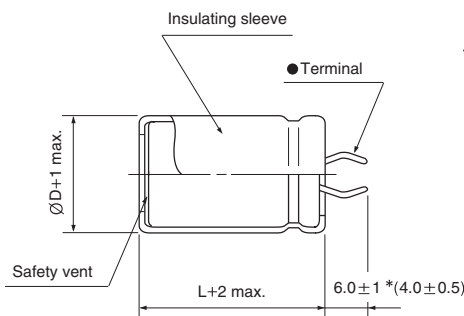
Long Life



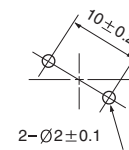
Item	Characteristics															
Operating temperature range	WV < 350 : -40 ~ +105°C, WV ≥ 350 : -25 ~ +105°C															
Capacitance tolerance	± 20% at 120Hz, 20°C															
Leakage current max.	$I = 3\sqrt{CV}$ (µA) (after 5 minutes)															
Dissipation factor max. (at 120Hz, 20°C)	Capacitance > 1000µF : tanδ increases by 0.01 for each 1000µF from below value.															
	<table border="1"> <thead> <tr> <th>WV</th> <th>10</th> <th>16</th> <th>25, 35</th> <th>50, 63</th> <th>80, 100</th> <th>160 ~ 400</th> <th>450, 500</th> </tr> </thead> <tbody> <tr> <td>tanδ</td> <td>0.50</td> <td>0.40</td> <td>0.35</td> <td>0.25</td> <td>0.20</td> <td>0.15</td> <td>0.20</td> </tr> </tbody> </table>	WV	10	16	25, 35	50, 63	80, 100	160 ~ 400	450, 500	tanδ	0.50	0.40	0.35	0.25	0.20	0.15
WV	10	16	25, 35	50, 63	80, 100	160 ~ 400	450, 500									
tanδ	0.50	0.40	0.35	0.25	0.20	0.15	0.20									
Load life (after application of the rated voltage for 5000 hours at 105°C)	Leakage current	Less than specified value														
	Capacitance change	Within ±25% of initial value														
	tanδ	Less than 250% of specified value														
Shelf life (at 105°C)	After 1000 hours no load test, leakage current, capacitance and tanδ are same as load life value. The measurement shall be performed at 20°C by the KS C IEC 60384 - 4															

## DRAWING

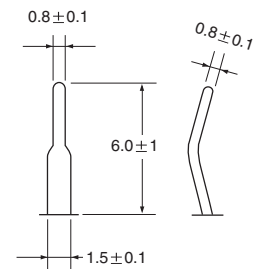
Unit : mm



## PC Board Mounting Holes



## Terminal



\* Shorter terminal(4.0±0.5) is also available upon request.  
Terminal length of height 20mm products is applied shorter terminal to standard terminal type.

## FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

WV	Frequency(Hz)	50Hz	120Hz	300Hz	1kHz	10kHz ≤
~ 100	~ 100	0.85	1.00	1.06	1.15	1.20
	160 ~ 250	0.85	1.00	1.20	1.25	1.45
350 ~		0.85	1.00	1.15	1.20	1.40

LARGE TYPES

# LARGE ALUMINUM ELECTROLYTIC CAPACITORS

**HL** series

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

WV μF / ØD	10				16				25			
	22	25.4	30	35	22	25.4	30	35	22	25.4	30	35
5600									22×25 1.50			
6800									22×30 1.90	25.4×25 1.90		
8200					22×25 1.80				22×35 2.10	25.4×30 2.10	30×25 2.10	
10000					22×30 2.20	25.4×25 2.20			22×40 2.30	25.4×35 2.30	30×25 2.20	
12000	22×30 2.10				22×35 2.40	25.4×30 2.40			22×40 2.50	25.4×35 2.50	30×30 2.60	
15000	22×30 2.30	25.4×25 2.30			22×40 2.70	25.4×35 2.70	30×30 2.70			25.4×40 2.80	30×35 2.90	35×30 2.90
18000	22×35 2.70	25.4×30 2.70			22×45 2.80	25.4×40 3.00	30×30 3.00	35×25 3.00		25.4×50 3.10	30×40 3.10	35×30 3.10
22000	22×40 2.90	25.4×35 2.90	30×30 2.90			25.4×40 3.10	30×35 3.30	35×30 3.30			30×45 3.50	35×35 3.50
27000	22×45 3.30	25.4×40 3.30	30×30 3.30	35×25 3.30			30×40 3.60	35×30 3.60			30×50 3.80	35×40 3.70
33000		25.4×45 3.50	30×35 3.50	35×30 3.50			30×45 4.00	35×35 4.00				35×45 4.10
39000			30×40 3.80	35×30 3.70			30×50 4.30	35×40 4.30				35×50 4.40
47000			30×45 4.00	35×35 3.90				35×45 4.60				
56000				35×40 4.50								

WV μF / ØD	35				50				63			
	22	25.4	30	35	22	25.4	30	35	22	25.4	30	35
1200									22×25 1.30			
1500									22×30 1.50	25.4×25 1.50		
1800					22×25 1.30				22×35 1.60	25.4×30 1.60	30×25 1.60	
2200					22×30 1.40				22×40 1.80	25.4×30 1.80	30×30 1.80	
2700					22×30 1.60	25.4×25 1.60			22×45 2.00	25.4×35 2.00	30×30 2.00	
3300	22×25 1.50				22×35 1.80	25.4×30 1.80			22×50 2.20	25.4×40 2.20	30×35 2.20	35×25 2.20
3900	22×30 1.60				22×40 1.90	25.4×30 1.90	30×25 1.90			25.4×45 2.40	30×35 2.40	35×30 2.40
4700	22×35 1.80	25.4×25 1.80			22×40 2.00	25.4×35 2.10	30×30 2.10	35×25 2.10		25.4×50 2.60	30×40 2.60	35×35 2.60
5600	22×35 2.00	25.4×30 2.00			22×45 2.20	25.4×40 2.30	30×35 2.30	35×25 2.30			30×45 2.80	35×35 2.80
6800	22×40 2.20	25.4×35 2.20	30×25 2.20		22×50 2.40	25.4×45 2.50	30×35 2.50	35×30 2.50				35×40 3.10
8200	22×45 2.30	25.4×35 2.30	30×30 2.40	35×25 2.40			30×40 2.80	35×30 2.70				35×45 3.40
10000		25.4×40 2.50	30×35 2.60	35×25 2.50			30×45 3.00	35×35 3.00				35×50 3.80
12000		25.4×45 2.80	30×35 2.80	35×30 2.90				35×40 3.30				
15000			30×40 3.10	35×35 3.20				35×45 3.70				
18000			30×45 3.30	35×40 3.50								
22000				35×45 3.70								

WV μF / ØD	80				100			
	22	25.4	30	35	22	25.4	30	35
680					22×25 1.10			
820	22×25 1.20				22×30 1.30	25.4×25 1.30		
1000	22×30 1.30	25.4×25 1.30			22×35 1.50	25.4×30 1.50		
1200	22×35 1.50	25.4×25 1.50			22×40 1.60	25.4×35 1.60	30×25 1.60	
1500	22×40 1.60	25.4×30 1.60	30×25 1.60		22×45 1.80	25.4×40 1.80	30×30 1.80	
1800	22×45 1.80	25.4×35 1.80	30×30 1.80			25.4×45 2.00	30×35 2.00	35×25 2.00
2200	22×50 2.00	25.4×40 2.00	30×30 2.00	35×25 2.00		25.4×50 2.20	30×40 2.20	35×30 2.20
2700		25.4×45 2.20	30×35 2.20	35×30 2.20			30×45 2.40	35×35 2.40
3300			30×40 2.40	35×35 2.40				35×40 2.70
3900			30×45 2.60	35×40 2.60				35×45 2.90
4700				35×45 3.00				
5600				35×50 3.30				

← Case size ØD×L (mm)  
← Ripple current (Arms) at 105°C, 120Hz

## HL series

### ● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

WV μF / ØD	160				200				250			
	22	25.4	30	35	22	25.4	30	35	22	25.4	30	35
120									22 × 20 0.56			
150					22 × 20 0.63				22 × 25 0.68	25.4 × 20 0.69		
180					22 × 20 0.69	25.4 × 20 0.76			22 × 25 0.74	25.4 × 20 0.76		
220	22 × 20 0.76				22 × 25 0.82	25.4 × 20 0.84			22 × 25 0.82	25.4 × 25 0.90	30 × 20 0.92	
270	22 × 25 0.91	25.4 × 20 0.93			22 × 25 0.91	25.4 × 25 1.00	30 × 20 1.02		22 × 30 0.97	25.4 × 25 1.00	30 × 20 1.02	
330	22 × 25 1.01	25.4 × 20 1.03			22 × 30 1.07	25.4 × 25 1.11	30 × 20 1.13		22 × 35 1.14	25.4 × 30 1.18	30 × 25 1.21	
390	22 × 25 1.09	25.4 × 25 1.20	30 × 20 1.23		22 × 30 1.17	25.4 × 25 1.20	30 × 25 1.31		22 × 40 1.30	25.4 × 35 1.35	30 × 25 1.31	35 × 25 1.42
470	22 × 30 1.28	25.4 × 25 1.32	30 × 20 1.35		22 × 35 1.36	25.4 × 30 1.40	30 × 25 1.44		22 × 45 1.50	25.4 × 35 1.48	30 × 30 1.53	35 × 25 1.56
560	22 × 35 1.48	25.4 × 30 1.53	30 × 25 1.57		22 × 40 1.56	25.4 × 30 1.53	30 × 25 1.57	35 × 25 1.70	22 × 50 1.71	25.4 × 40 1.70	30 × 30 1.67	35 × 25 1.70
680	22 × 40 1.72	25.4 × 30 1.69	30 × 25 1.73		22 × 45 1.80	25.4 × 35 1.79	30 × 30 1.84	35 × 25 1.88		25.4 × 50 2.05	30 × 35 1.94	35 × 30 1.98
820	22 × 45 1.98	25.4 × 35 1.96	30 × 30 2.02	35 × 25 2.06		25.4 × 45 2.16	30 × 30 2.02	35 × 25 2.06			30 × 40 2.23	35 × 35 2.29
1000	22 × 50 2.28	25.4 × 40 2.28	30 × 30 2.23	35 × 25 2.28		25.4 × 50 2.48	30 × 35 2.35	35 × 30 2.41			30 × 50 2.68	35 × 40 2.65
1200		25.4 × 45 2.41	30 × 35 2.38	35 × 30 2.44			30 × 40 2.50	35 × 35 2.57				35 × 45 2.80
1500		25.4 × 50 2.81	30 × 40 2.79	35 × 35 2.73			30 × 50 3.04	35 × 40 3.00				35 × 50 3.25

WV μF / ØD	350				400				450			
	22	25.4	30	35	22	25.4	30	35	22	25.4	30	35
56	22 × 20 0.37				22 × 20 0.40	25.4 × 20 0.45			22 × 25 0.44			
68	22 × 20 0.41	25.4 × 20 0.45			22 × 25 0.48	25.4 × 20 0.49			22 × 30 0.51	25.4 × 25 0.52		
82	22 × 25 0.48	25.4 × 20 0.49			22 × 25 0.52	25.4 × 25 0.58	30 × 20 0.59		22 × 30 0.56	25.4 × 25 0.58		
100	22 × 25 0.53	25.4 × 25 0.58	30 × 20 0.60		22 × 30 0.62	25.4 × 25 0.63	30 × 20 0.66		22 × 35 0.66	25.4 × 30 0.68	30 × 25 0.70	
120	22 × 30 0.62	25.4 × 25 0.64	30 × 20 0.65		22 × 35 0.72	25.4 × 25 0.70	30 × 25 0.77		22 × 40 0.75	25.4 × 30 0.74	30 × 25 0.77	35 × 25 0.83
150	22 × 35 0.74	25.4 × 30 0.76	30 × 25 0.78		22 × 40 0.85	25.4 × 30 0.83	30 × 25 0.85		22 × 45 0.89	25.4 × 40 0.93	30 × 30 0.91	35 × 25 0.93
180	22 × 40 0.85	25.4 × 30 0.83	30 × 25 0.86		22 × 45 0.97	25.4 × 35 0.96	30 × 30 1.00	35 × 25 1.02	22 × 50 1.02	25.4 × 40 1.02	30 × 30 1.00	35 × 25 1.02
220	22 × 45 0.98	25.4 × 35 0.98	30 × 30 1.00	35 × 25 1.03	22 × 50 1.13	25.4 × 40 1.13	30 × 30 1.10	35 × 25 1.13		25.4 × 45 1.17	30 × 35 1.16	35 × 25 1.13
270	22 × 50 1.14	25.4 × 40 1.14	30 × 30 1.11	35 × 25 1.14		25.4 × 45 1.30	30 × 35 1.28	35 × 30 1.32			30 × 40 1.35	35 × 30 1.30
330		25.4 × 45 1.31	30 × 35 1.30	35 × 30 1.33		25.4 × 50 1.50	30 × 40 1.49	35 × 30 1.46			30 × 45 1.56	35 × 35 1.50
390		25.4 × 50 1.49	30 × 40 1.48	35 × 35 1.52			30 × 45 1.69	35 × 35 1.67			30 × 50 1.77	35 × 40 1.74
470			30 × 45 1.69	35 × 35 1.67			30 × 50 1.93	35 × 40 1.91				
560			30 × 50 1.92	35 × 40 1.90								

WV μF / ØD	500			
	22	25.4	30	35
47	22 × 25 0.58			
56	22 × 30 0.66	25.4 × 25 0.64		
68	22 × 30 0.73	25.4 × 25 0.72	30 × 25 0.70	
82	22 × 35 0.83	25.4 × 30 0.83	30 × 25 0.83	
100	22 × 40 0.94	25.4 × 35 0.94	30 × 25 0.91	35 × 25 0.85
120	22 × 50 1.08	25.4 × 35 1.02	30 × 30 1.04	35 × 25 1.01
150	22 × 55 1.24	25.4 × 45 1.21	30 × 35 1.19	35 × 30 1.18
180	22 × 60 1.38	25.4 × 50 1.36	30 × 40 1.34	35 × 30 1.25
220		25.4 × 55 1.52	30 × 45 1.51	35 × 40 1.51
270			30 × 50 1.69	35 × 40 1.62
330			30 × 55 1.89	35 × 45 1.81
390				35 × 55 2.08
470				35 × 60 2.28

← Case size ØD × L (mm)  
← Ripple current (Arms) at 105°C, 120Hz