

Aluminum Electrolytic Capacitors

NRE-HL Series

LONG LIFE, LOW IMPEDANCE, HIGH TEMPERATURE, RADIAL LEADS,
POLARIZED ALUMINUM ELECTROLYTIC CAPACITORS

FEATURES

- LONG LIFE AT 105°C (4000 ~ 10,000 hrs.)
- HIGH CAPACITANCE (UP TO 18,000μF)
- LOW IMPEDANCE

**RoHS
Compliant**
includes all homogeneous materials

*See Part Number System for Details

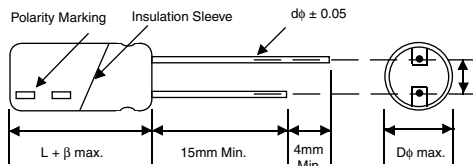


CHARACTERISTICS

Rated Voltage Range		6.3 ~ 100Vdc							
Rated Capacitance Range		6.8 ~ 18,000μF							
Operating Temperature Range		-40°C ~ +105°C							
Capacitance Tolerance		±20% (M)							
Max. Leakage Current After 2 Minutes		0.01CV or 3μA whichever is greater							
Maximum Tanδ @ 120Hz/20°C (Add 0.02 for values above 1,000μF)		6.3	10	16	25	35	50	63	100
		0.22	0.19	0.16	0.14	0.12	0.10	0.09	0.08
Low Temperature Stability (Impedance Ratio @ 120Hz)		Z -25°C/+20°C		Z -40°C/+20°C					
		4	3	2	2	2	2	2	2
		8	6	4	3	3	3	3	3
Load Life @ 105°C		Allowable Change							
Case Size	6.3V ~ 10V	16V ~ 100V	Appearance		No Notable Changes (except sleeving)				
5mm ~ 6.3mm	4,000 hrs	5,000 hrs	Capacitance Change		Within ±25% of initial measured value				
8mm ~ 10mm	6,000 hrs	7,000 hrs	Tan δ		Less than 200% of specified value				
12.5mm ~ 18mm	8,000 hrs	10,000 hrs	Leakage Current		Less than the specified maximum value				
Shelf Life After storage for 1,000 hours @ 105°C		Appearance		No Notable Changes (except sleeving)					
		Capacitance Change		Within ±25% of initial measured value					
		Tan δ		Less than 200% of specified value					
		Leakage Current		Less than the specified maximum value					

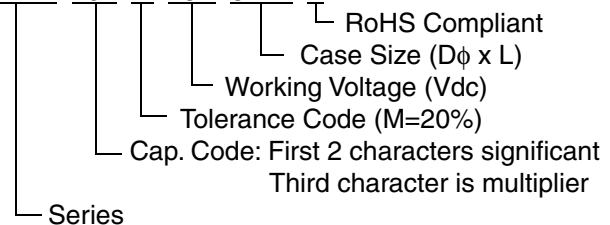
LEAD SPACING AND DIAMETER (mm)

Case Dia. (Dφ)	5	6.3	8	10	12.5	16	18
Lead Space (F)	2.0	2.5	3.5	5.0		7.5	
Lead Dia. (dφ)	0.5		0.6			0.8	
Dim. β	1.5			2.0			



PART NUMBERING SYSTEM

NREHL 101 M 25V 8X11 F



RIPPLE CURRENT FREQUENCY CORRECTION FACTOR

Capacitance Value	120Hz	1KHz	10KHz	100KHz
6.8μF ~ 33μF	0.42	0.70	0.90	1.00
39μF ~ 270μF	0.50	0.73	0.92	1.00
330μF ~ 680μF	0.55	0.77	0.94	1.00
820μF ~ 1800μF	0.60	0.80	0.96	1.00
2200μF ~ 18000μF	0.70	0.85	0.98	1.00

PRECAUTIONS

Please review the notes on correct use, safety and precautions found on pages T10 & T11 of NIC's Electrolytic Capacitor catalog.
Also found at www.niccomp.com/precautions
If in doubt or uncertainty, please review your specific application - process details with NIC's technical support personnel: tpmg@niccomp.com



STANDARD PRODUCTS, CASE SIZES AND SPECIFICATIONS

W.V. (Vdc)	Cap. (μ F)	Code	Case Size D ϕ x L(mm)	Lead Space (mm)	Max. Impedance		Max. Ripple Current at 100KHz/105°C (mA rms)
					100KHz/20°C	100KHz/-10°C	
6.3	150	151	5 x 11	2.0	0.58	2.30	210
	330	331	6.3 x 11	2.5	0.22	0.87	340
	680	681	8 x 11.5	3.5	0.13	0.52	640
	820	821	10 x 12.5	5.0	0.080	0.32	865
	1000	102	8 x 16	3.5	0.087	0.35	840
	1200	122	8 x 20	3.5	0.069	0.27	1050
	1200	122	10 x 16	5.0	0.060	0.24	1210
	1500	152	10 x 20	5.0	0.046	0.18	1400
	1800	182	12.5 x 16	5.0	0.049	0.16	1450
	2200	222	10 x 23	5.0	0.042	0.17	1650
	2700	272	10 x 28	5.0	0.031	0.12	1910
	2700	272	16 x 16	7.5	0.042	0.12	1940
	3300	332	12.5 x 20	5.0	0.035	0.12	1900
	3900	392	12.5 x 25	5.0	0.027	0.089	2230
	3900	392	18 x 16	7.5	0.043	0.11	2210
	4700	472	12.5 x 30	5.0	0.024	0.078	2650
	5600	562	12.5 x 35	5.0	0.020	0.065	2880
	5600	562	16 x 20	7.5	0.027	0.078	2530
	6800	682	12.5 x 40	5.0	0.017	0.056	3350
	6800	682	16 x 25	7.5	0.021	0.060	2930
6800	682	18 x 20	7.5	0.026	0.067	2860	
8200	822	16 x 31.5	7.5	0.017	0.050	3450	
10000	103	16 x 35.5	7.5	0.015	0.044	3610	
10000	103	18 x 25	7.5	0.019	0.049	3140	
12000	123	16 x 40	7.5	0.013	0.038	4080	
12000	123	18 x 31.5	7.5	0.015	0.040	4170	
15000	153	18 x 35.5	7.5	0.014	0.038	4220	
18000	183	18 x 40	7.5	0.012	0.032	4280	
10	100	101	5 x 11	2.0	0.58	2.3	210
	220	221	6.3 x 11	2.5	0.22	0.87	340
	470	471	8 x 11.5	3.5	0.13	0.52	640
	680	681	8 x 16	3.5	0.087	0.35	840
	680	681	10 x 12.5	5.0	0.080	0.32	865
	1000	102	8 x 20	3.5	0.069	0.27	1050
	1000	102	10 x 16	5.0	0.060	0.24	1210
	1200	122	10 x 20	5.0	0.046	0.18	1400
	1500	152	10 x 23	5.0	0.042	0.17	1650
	1500	152	12.5 x 16	5.0	0.049	0.16	1450
	2200	222	10 x 28	5.0	0.031	0.12	1910
	2200	222	12.5 x 20	5.0	0.035	0.12	1900
	2200	222	16 x 16	7.5	0.042	0.12	1940
	2700	272	18 x 16	7.5	0.043	0.11	2210
	3300	332	12.5 x 25	5.0	0.027	0.089	2230
	3900	392	12.5 x 30	5.0	0.024	0.078	2650
	3900	392	16 x 20	7.5	0.027	0.078	2530
	4700	472	12.5 x 35	5.0	0.020	0.065	2880
	5600	562	12.5 x 40	5.0	0.017	0.056	3350
	5600	562	16 x 25	7.5	0.021	0.060	2930
	5600	562	18 x 20	7.5	0.026	0.067	2860
	6800	682	16 x 31.5	7.5	0.017	0.050	3450
	6800	682	18 x 25	7.5	0.019	0.049	3140
	8200	822	16 x 35.5	7.5	0.015	0.044	3610
	8200	822	18 x 31.5	7.5	0.015	0.040	4170
	10000	103	16 x 40	7.5	0.013	0.038	4080
10000	103	18 x 35.5	7.5	0.014	0.038	4220	
12000	123	18 x 40	7.5	0.012	0.032	4280	

STANDARD PRODUCTS, CASE SIZES AND SPECIFICATIONS

W.V. (Vdc)	Cap. (μ F)	Code	Case Size D ϕ x L(mm)	Lead Space (mm)	Max. Impedance		Max. Ripple Current at 100KHz/105°C (mA rms)
					100KHz/20°C	100KHz/-10°C	
16	56	560	5 x 11	2.0	0.58	2.3	210
	120	121	6.3 x 11	2.5	0.22	0.87	340
	330	331	8 x 11.5	3.5	0.13	0.52	640
	470	471	8 x 16	3.5	0.87	0.35	840
	470	471	10 x 12.5	5.0	0.080	0.32	865
	680	681	8 x 20	3.5	0.069	0.27	1050
	680	681	10 x 16	5.0	0.060	0.24	1210
	1000	102	10 x 20	5.0	0.046	0.18	1400
	1000	102	12.5 x 16	5.0	0.049	0.16	1450
	1200	122	10 x 23	5.0	0.042	0.17	1650
	1500	152	10 x 28	5.0	0.031	0.12	1910
	1500	152	12.5 x 20	5.0	0.035	0.12	1900
	1500	152	16 x 16	7.5	0.042	0.12	1940
	2200	222	12.5 x 25	5.0	0.027	0.12	2230
	2200	222	18 x 16	7.5	0.043	0.11	2210
	2700	272	12.5 x 30	5.0	0.024	0.078	2650
	2700	272	16 x 20	7.5	0.027	0.078	2530
	3300	332	12.5 x 35	5.0	0.020	0.065	2880
	3900	392	12.5 x 40	5.0	0.017	0.056	3350
	3900	392	16 x 25	7.5	0.021	0.060	2930
	3900	392	18 x 20	7.5	0.026	0.067	2860
	4700	472	16 x 31.5	7.5	0.017	0.050	3450
	4700	472	18 x 25	7.5	0.019	0.049	3140
	5600	562	16 x 35.5	7.5	0.015	0.044	3610
5600	562	18 x 31.5	7.5	0.015	0.040	4170	
6800	682	16 x 40	7.5	0.013	0.038	4080	
8200	822	18 x 35.5	7.5	0.014	0.038	4220	
10000	103	18 x 40	7.5	0.012	0.032	4280	
25V	47	470	5 x 11	2.0	0.58	2.3	210
	100	101	6.3 x 11	2.5	0.22	0.87	340
	220	221	8 x 11.5	3.5	0.13	0.52	640
	330	331	8 x 16	3.5	0.87	0.35	840
	330	331	10 x 12.5	5.0	0.080	0.32	865
	470	471	8 x 20	3.5	0.069	0.27	1050
	470	471	10 x 16	5.0	0.060	0.24	1210
	680	681	10 x 20	5.0	0.046	0.18	1400
	680	681	12.5 x 16	5.0	0.049	0.16	1450
	820	821	10 x 23	5.0	0.042	0.17	1650
	1000	102	10 x 28	5.0	0.031	0.12	1910
	1000	102	12.5 x 20	5.0	0.035	0.12	1900
	1000	102	16 x 16	7.5	0.042	0.12	1940
	1200	122	18 x 16	7.5	0.043	0.11	2210
	1500	152	12.5 x 25	5.0	0.027	0.089	2230
	1800	182	12.5 x 30	5.0	0.024	0.078	2650
	1800	182	16 x 20	7.5	0.027	0.078	2530
	2200	222	12.5 x 35	5.0	0.020	0.065	2880
	2200	222	18 x 20	7.5	0.026	0.067	2860
	2700	272	12.5 x 40	5.0	0.017	0.056	3350
	2700	272	16 x 25	7.5	0.021	0.060	2930
	3300	332	16 x 31.5	7.5	0.017	0.050	3450
	3300	332	18 x 25	7.5	0.019	0.049	3140
	3900	392	16 x 35.5	7.5	0.015	0.044	3610
3900	392	18 x 31.5	7.5	0.015	0.040	4170	
4700	472	16 x 40	7.5	0.013	0.038	4080	
4700	472	18 x 35.5	7.5	0.014	0.038	4220	
5600	562	18 x 40	7.5	0.012	0.032	4280	

STANDARD PRODUCTS, CASE SIZES AND SPECIFICATIONS

W.V. (Vdc)	Cap. (μ F)	Code	Case Size D ϕ x L(mm)	Lead Space (mm)	Max. Impedance		Max. Ripple Current at 100KHz/105°C (mA rms)
					100KHz/20°C	100KHz/-10°C	
35V	33	330	5 x 11	2.0	0.58	2.3	210
	56	560	6.3 x 11	2.5	0.22	0.87	340
	150	151	8 x 11.5	3.5	0.13	0.52	640
	220	221	8 x 16	3.5	0.87	0.35	840
	220	221	10 x 12.5	5.0	0.080	0.32	865
	270	271	8 x 20	3.5	0.069	0.27	1050
	330	331	10 x 16	5.0	0.060	0.24	1210
	470	471	10 x 20	5.0	0.046	0.18	1400
	470	471	12.5 x 16	5.0	0.049	0.16	1450
	560	561	10 x 23	5.0	0.042	0.17	1650
	680	681	10 x 28	5.0	0.031	0.12	1910
	680	681	12.5 x 20	5.0	0.035	0.12	1900
	680	681	16 x 16	7.5	0.042	0.12	1940
	1000	102	12.5 x 25	5.0	0.027	0.12	2230
	1000	102	18 x 16	7.5	0.043	0.11	2210
	1200	122	12.5 x 30	5.0	0.024	0.078	2650
	1200	122	16 x 20	7.5	0.027	0.078	2530
	1500	152	12.5 x 35	5.0	0.020	0.065	2880
	1800	182	12.5 x 40	5.0	0.017	0.056	3350
	1800	182	16 x 25	7.5	0.021	0.060	2930
	1800	182	18 x 20	7.5	0.026	0.067	2860
	2200	222	16 x 31.5	7.5	0.017	0.050	3450
	2200	222	18 x 25	7.5	0.019	0.049	3140
	2700	272	16 x 35.5	7.5	0.015	0.044	3610
	2700	272	18 x 31.5	7.5	0.015	0.040	4170
	3300	332	16 x 40	7.5	0.013	0.038	4080
	3300	332	18 x 35.5	7.5	0.014	0.038	4220
	3900	392	18 x 40	7.5	0.012	0.032	4280
50V	22	220	5 x 11	2.0	0.70	2.8	180
	56	560	6.3 x 11	2.5	0.30	1.2	295
	100	101	8 x 11.5	3.5	0.17	0.68	555
	120	121	8 x 16	3.5	0.12	0.48	730
	150	151	10 x 12.5	5.0	0.12	0.48	760
	180	181	8 x 20	3.5	0.091	0.36	910
	220	221	10 x 16	5.0	0.084	0.34	1050
	270	271	10 x 20	5.0	0.060	0.24	1220
	270	271	12.5 x 16	5.0	0.061	0.20	1260
	330	331	10 x 23	5.0	0.055	0.22	1440
	470	471	10 x 28	5.0	0.043	0.17	1690
	470	471	12.5 x 20	5.0	0.045	0.15	1660
	470	471	16 x 16	7.5	0.055	0.17	1690
	560	561	12.5 x 25	5.0	0.034	0.11	1950
	560	561	18 x 16	7.5	0.054	0.15	1930
	680	681	12.5 x 30	5.0	0.030	0.10	2310
	820	821	12.5 x 35	5.0	0.025	0.083	2510
	820	821	16 x 20	5.0	0.034	0.10	2210
	1000	102	12.5 x 40	5.0	0.021	0.069	2920
	1000	102	16 x 25	7.5	0.025	0.075	2555
	1000	102	18 x 20	7.5	0.036	0.097	2490
	1200	122	16 x 31.5	7.5	0.022	0.066	3010
	1200	122	18 x 25	7.5	0.026	0.070	2740
	1500	152	16 x 35.5	7.5	0.019	0.057	3150
	1800	182	16 x 40	7.5	0.016	0.048	3710
	1800	182	18 x 31.5	7.5	0.021	0.057	3635
	2200	222	18 x 35.5	7.5	0.017	0.046	3680
	2700	272	18 x 40	7.5	0.014	0.038	3800

STANDARD PRODUCTS, CASE SIZES AND SPECIFICATIONS

W.V. (Vdc)	Cap. (μ F)	Code	Case Size D ϕ x L(mm)	Lead Space (mm)	Max. Impedance		Max. Ripple Current at 100KHz/105°C (mA rms)
					100KHz/20°C	100KHz/-10°C	
63V	15	150	5 x 11	2.0	1.8	7.3	62
	33	330	6.3 x 11	2.5	1.0	4.1	126
	56	560	8 x 11.5	3.5	0.50	2.2	260
	82	820	8 x 16	3.5	0.36	1.7	335
	82	820	10 x 12.5	5.0	0.34	1.4	325
	120	121	8 x 20	3.5	0.26	1.3	408
	120	121	10 x 16	5.0	0.25	1.2	400
	180	181	10 x 20	5.0	0.17	0.76	518
	180	181	12.5 x 16	5.0	0.18	0.86	527
	220	221	10 x 23	5.0	0.16	0.67	595
	270	271	10 x 28	5.0	0.12	0.57	740
	270	271	12.5 x 20	5.0	0.13	0.52	765
	270	271	16 x 16	7.5	0.11	0.52	895
	330	331	12.5 x 25	5.0	0.096	0.36	875
	390	391	18 x 16	7.5	0.096	0.40	1030
	470	471	12.5 x 30	5.0	0.080	0.34	1010
	470	471	16 x 20	7.5	0.077	0.32	1130
	560	561	12.5 x 35	5.0	0.070	0.30	1140
	560	561	16 x 25	5.0	0.062	0.23	1350
	680	681	12.5 x 40	7.5	0.060	0.25	1280
	680	681	18 x 20	7.5	0.072	0.27	1300
	820	821	16 x 31.5	7.5	0.049	0.18	1650
	820	821	18 x 25	7.5	0.052	0.19	1560
1000	102	16 x 35.5	7.5	0.040	0.15	1900	
1000	102	18 x 31.5	7.5	0.042	0.15	1720	
1200	122	16 x 40	7.5	0.036	0.13	2130	
1200	122	18 x 35.5	7.5	0.036	0.13	1890	
1500	152	18 x 40	7.5	0.032	0.12	2470	
100V	6.8	6R8	5 x 11	2.0	1.8	7.3	62
	15	150	6.3 x 11	2.5	1.0	4.1	126
	27	270	8 x 11.5	3.5	0.50	2.2	260
	39	390	8 x 16	3.5	0.36	1.7	335
	47	470	10 x 12.5	5.0	0.34	1.4	325
	56	560	8 x 20	3.5	0.26	1.3	408
	68	680	10 x 16	5.0	0.25	1.2	400
	82	820	10 x 20	5.0	0.17	0.76	518
	82	820	12.5 x 16	5.0	0.18	0.86	527
	100	101	10 x 23	5.0	0.16	0.67	595
	120	121	10 x 28	5.0	0.12	0.57	740
	120	121	12.5 x 20	5.0	0.13	0.52	765
	150	151	16 x 16	7.5	0.11	0.52	895
	180	181	12.5 x 25	5.0	0.096	0.36	875
	180	181	18 x 16	7.5	0.096	0.40	1030
	220	221	12.5 x 30	5.0	0.080	0.34	1010
	220	221	16 x 20	5.0	0.077	0.32	1130
	270	271	12.5 x 35	5.0	0.070	0.30	1140
	270	271	16 x 25	5.0	0.062	0.23	1350
	330	331	12.5 x 40	7.5	0.060	0.25	1280
	330	331	18 x 20	7.5	0.072	0.27	1300
	390	391	16 x 31.5	7.5	0.049	0.18	1650
	390	391	18 x 25	7.5	0.052	0.19	1560
470	471	16 x 35.5	7.5	0.040	0.15	1900	
470	471	18 x 31.5	7.5	0.042	0.15	1720	
560	561	16 x 40	7.5	0.036	0.13	2130	
680	681	18 x 35.5	7.5	0.036	0.13	1890	
820	821	18 x 40	7.5	0.032	0.12	2470	