

Oil-Filled AC Film Capacitors for High Intensity Discharge (HID) Lighting Applications

Aerovox makes a complete line of oil impregnated, AC capacitors for use in HID and other High Voltage Ballast applications. Constructed with specially formulated metallized polypropylene film, these capacitors are designed to operate in the high temperature environments found in typical HID lighting fixtures.

Manufactured in both the USA and China, Aerovox offers a complete line of HID capacitors available in industry standard round and oval sizes for operating voltages to 660 VAC. Operating temperature ratings of 90°C and 100°C are produced for 60,000 hour operation. Dual ratings are available.



Oil Filled Round & Oval Metal Case

KEY FEATURES

- Manufactured to EIA-456-A
- Capacitors manufactured in USA and China
- Steel or aluminum can construction
- UL-810 fault current protection
- RoHS Compliant
- Capacitance from 5 µF to 56 µF
- Voltage ranges from 240 VAC to 660 VAC
- Operating temperature to 100°C

CONSTRUCTION

Aerovox oil filled AC Lighting capacitors are constructed using controlled manufacturing processes and high quality materials. The capacitor section is made with metallized polypropylene film, wound on a core¹ with precision winding machines to a capacitance tolerance of $\pm 3\%$. The capacitor section is endsprayed with zinc, providing a connection to the film and a solid surface to connect the electrodes.

The capacitor section is then connected to a pressure sensitive interrupter plate on a cover assembly consisting of the cover, terminals and the interrupter plate. The interrupter is the safety device in the capacitor

which results in an open circuit failure mode should the capacitor go into thermal overload. The can and cover are connected by a double roll seam, providing the seal necessary for proper operation. Aerovox uses our patented, environmentally friendly Epoxidized Soybean Oil (ESO) as the dielectric fluid for optimum heat transfer and corona suppression. Under proprietary vacuum impregnation and heating cycles, the ESO fills the final capacitor assembly. The oil fill hole is then solder sealed and a discrete resistor is welded to the terminals. 100% of our capacitors undergo a rigorous 8 point final inspection to assure compliance with specifications.

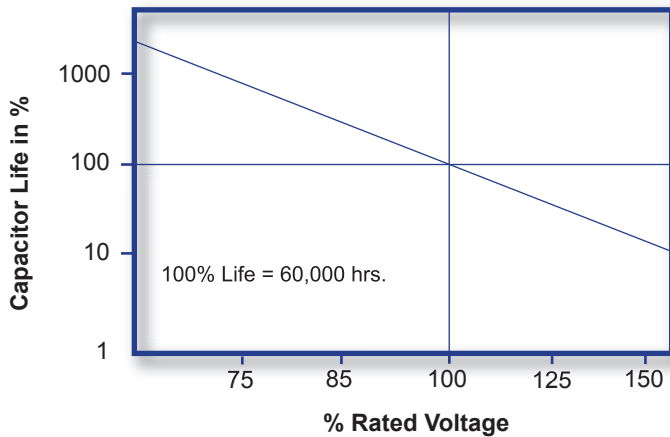
¹Capacitors made at Aerovox USA will have an internal resistor core

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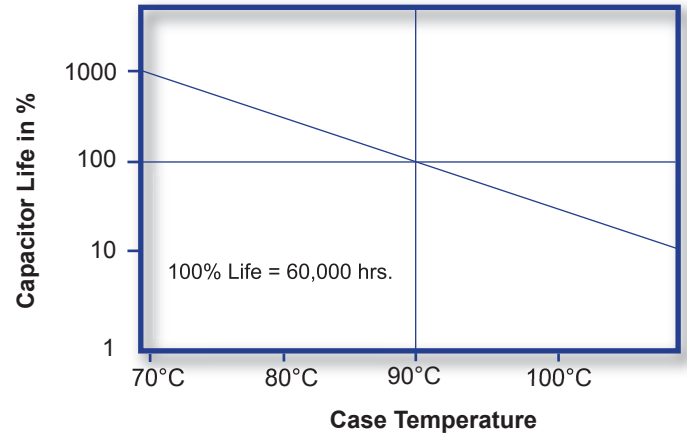
PERFORMANCE

Capacitors in this brochure are designed to meet performance testing outlined in Electrical Industry Association (EIA) standard #RS-456A. Test programs are run continuously at Aerovox to monitor production and for design improvements. Ongoing tests include: Accelerated Life Testing (ALT, for 2000 hours at 125% voltage rating and temperature rating +10°C), fault current, and mechanical testing. Aerovox testing programs accumulate over 500 million component hours each year.

Typical Life vs. Operating Voltage



Typical Life vs. Case Temperature



Capacitor life is impacted by operating temperature and voltage as illustrated in the associated charts. A standard guide to the effect of temperature on capacitor life is that for every 6.5°C rise in temperature, there will be a 50% reduction in operating life. Due to the high operating temperature associated with HID lighting, Aerovox manufactures capacitors rated for 90°C and 100°C.

SAFETY FEATURES

Aerovox protected capacitors are designed to operate in environments where there is a requirement for an internal protective device. Protective devices cause open circuits at the end of capacitor life, versus short circuits that can be caused by capacitors without protective devices. The pressure sensitive interrupter provides this protection, and has been approved by internationally recognized testing agencies like UL and CSA. Testing includes fault-current requirements on interrupter mechanisms per UL specification 810.

Installation guidelines for use of these capacitors requires that there be 0.5 inches of free space above the capacitor terminals to allow the cover of the capacitor to bow upward in case of failure, allowing the interrupter mechanism to function properly.

Agency Listings of Aerovox Capacitors:

- U.L. Files E51176 (Includes Canadian designation)
- U.L. File E303347 (Aerovox China)
- C.S.A. File 058450 (certain models)

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PART NUMBERING SYSTEM

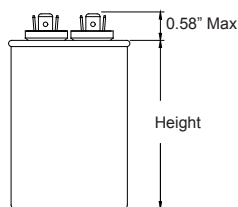
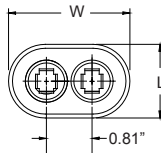
Aerovox has two different active part numbering systems: one system uses a 4 digit number with an extension of -MF for oval, and -RMF for round capacitors;

the second system is a descriptive part number made of several different components such as can size, voltage rating, etc. The descriptors are explained below:

Z	73	S	40	26	M	N
Type	Can Size	Impregnant	Voltage Rating	Capacitance Code	Section Type	Aerovox China
Z = MPP Film	73 = 1.75" Rd 74 = 2.00" Rd 76 = 2.50" Rd 91 = 1.25" Oval 92 = 1.50" Oval 93 = 1.75" Oval 94 = 2.00" Oval	S=Epoxidized Soybean Oil	33 = 330 VAC 40 = 400 VAC	26 = 26 μ F 40 = 40 μ F	M = As Indicated N = Odd Rating W = Dual Rating	
					100°C Full Life B = Rating as Indicated J = Odd Voltage/Cap F = Dual Capacitor	
					100°C Reduced Life P = Rating as Indicated H = Odd Voltage/Cap T = Dual Capacitor	

OVAL OIL-FILLED CASE SIZES

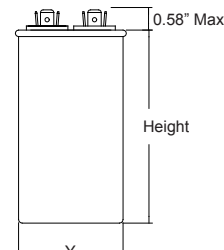
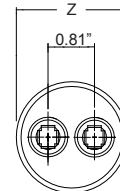
Base Size	Description	L inches	W inches
A	1 1/4" Oval	1.31	2.16
B	1 1/2" Oval	1.56	2.69
C	1 3/4" Oval	1.91	2.91
D	2" Oval	1.97	3.66



Tolerance on all case dimensions is ± 0.06 "

ROUND OIL-FILLED CASE SIZES

Base Size	Description	Y inches	Z inches
P	1 3/4" Round	1.75	1.87
S	2" Round	2.00	2.12
T	2 1/2" Round	2.50	2.62



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Oval HID Lighting Oil Filled Metal Case Capacitors

Rated for 60,000 hour duty @ 90 °C

Cap (uF)	Aerovox P/N	Base Size	Can Height Inches (mm)
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240 VAC, 90°C Case Temperature

35	Z92S2435MN	B	3.75 (95.3)
40	Z92S2440MN	B	3.75 (95.3)
45	Z92S2445MN	B	3.75 (95.3)
52	Z92S2452MN	B	3.75 (95.3)
55	Z92S2455MN	B	3.75 (95.3)

300 VAC, 90°C Case Temperature

5	Z91S3005MN	A	2.19 (55.6)
6	Z91S3006MN	A	2.19 (55.6)
12	Z91S3012MN	A	2.88 (73.2)
14	Z92S3014MN	B	2.75 (69.9)
28	Z93S3028MN	C	3.13 (79.5)
40	Z93S3040MN	C	3.25 (82.6)
55	Z93S3055MN	C	3.88 (98.6)
64	Z93S3064MN	C	4.25 (108)

330 VAC, 90°C Case Temperature

7	Z91S3307MN	A	2.19 (55.6)
8	Z91S3308MN	A	2.19 (55.6)
10	Z91S3310MN	A	2.69 (68.3)
12	Z91S3312MN	A	2.88 (73.2)
14	Z91S3314MN	A	2.88 (73.2)
16	Z91S3316MN	A	3.75 (95.3)
17.5	Z92S3317NN	B	3.13 (79.5)
24	Z93S3324MN	C	2.75 (69.9)
26	Z93S3326MN	C	3.13 (79.5)
29	Z93S3329MN	C	3.13 (79.5)
30	Z93S3330MN	C	3.13 (79.5)
34	Z93S3334MN	C	3.13 (79.5)
35	Z93S3335MN	C	3.13 (79.5)
48	Z93S3348MN	C	3.88 (98.6)

Cap (uF)	Aerovox P/N	Base Size	Can Height Inches (mm)
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400 VAC, 90°C Case Temperature

10	Z93S4010MN	C	2.75 (69.9)
15	Z93S4015MN	C	2.75 (69.9)
21	Z93S4021MN	C	3.13 (79.5)
22.5	Z93S4022NN	C	3.13 (79.5)
24	Z93S4024MN	C	3.13 (79.5)

480 VAC, 90°C Case Temperature

3	Z91S4803MN	A	2.25 (57.2)
4	Z91S4804MN	A	2.69 (68.3)
5	Z91S4805MN	A	2.88 (73.2)
6	Z92S4806MN	B	2.75 (69.9)
10	Z92S4810MN	B	2.75 (69.9)
12	Z93S4812MN	C	3.13 (79.5)
15	Z92S4815MN	B	3.75 (95.3)
20	Z93S4820MN	C	3.75 (95.3)
21	Z93S4821MN	C	3.75 (95.3)
22	Z93S4822MN	C	3.88 (98.6)
24	Z93S4824MN	C	3.88 (98.6)
26	Z93S4826MN	C	3.88 (98.6)
28	Z93S4828MN	C	3.88 (98.6)

525 VAC, 90°C Case Temperature

16	Z93S5216NN	C	3.13 (79.5)
24	Z93S5224NN	C	4.25 (108.0)
26	Z93S5226NN	C	4.25 (108.0)
26	Z94S5226NN	D	2.88 (73.2)
32	Z93S5232NN	C	4.75 (120.7)
32	Z94S5232NN	D	3.75 (95.3)

100°C Case Temperature

Cap (uF)	Aerovox P/N	Base Size	Can Height Inches (mm)	VAC
24	Z94S4024BN	D	3.25 (82.6)	400
24	Z94S4824BN	D	3.75 (95.3)	480
21	Z94S5221JN	D	3.75 (95.3)	525
26	Z94S5226JN	D	3.75 (95.3)	525

For additional ratings, contact the factory

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ROUND HID LIGHTING OIL FILLED METAL CASE CAPACITORS

Rated for 60,000 hour duty @ 90 °C

Cap (uF)	Aerovox P/N	Base Size	Can Height Inches (mm)
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300 VAC, 90°C Case Temperature

8	Z73S3008MN	P	2.17 (55.1)
14	Z73S3014MN	P	2.38 (60.5)
22.5	Z73S3022NN	P	2.88 (73.2)

330 VAC, 90°C Case Temperature

5	Z73S3305MN	P	2.25 (57.2)
7	Z73S3307MN	P	2.88 (73.2)
12	Z73S3312MN	P	2.38 (60.5)
14	Z73S3314MN	P	2.88 (73.2)
28	Z73S3328MN	P	3.15 (80.0)

400 VAC, 90°C Case Temperature

10	Z73S4010MN	P	2.38 (60.5)
15	Z73S4015MN	P	2.88 (73.2)
22.5	Z73S4022NN	P	3.75 (95.3)
24	Z73S4024MN	P	3.75 (95.3)
24	Z74S4024MN	S	2.88 (73.2)

Cap (uF)	Aerovox P/N	Base Size	Can Height Inches (mm)
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480 VAC, 90°C Case Temperature

10	Z73S4810MN	P	2.88 (73.2)
24	Z74S4824MN	S	3.25 (82.6)
24	Z76S4824MN	T	3.15 (80.0)

525 VAC, 90°C Case Temperature

26	Z74S5226NN	S	4.75 (120.7)
32	Z74S5232NN	S	4.92 (125.0)
32	Z76S5232NN	T	3.55 (90.2)

100°C Case Temperature

				VAC
10	Z73S4010BN	P	2.38 (60.5)	400
15	Z73S4015BN	P	3.25 (82.6)	400
24	Z74S4024BN	S	3.75 (95.3)	400
24	Z74S4824BN	S	4.25 (108.0)	480

BI-LEVEL (DUAL) - HID LIGHTING OIL FILLED METAL CASE CAPACITORS

Rated for 60,000 hour duty @ 90 °C

Cap (uF)	Aerovox P/N	Base Size	Can Height Inches (mm)
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330 VAC, 90°C Case Temperature

20 + 15	2363-MF	C	3.88 (98.6)
22 + 13	2798-MF	C	2.75 (69.9)
33 + 15	1901-MF	C	3.88 (98.6)
35 + 20	2292-MF	C	3.88 (98.6)
38 + 9	3167-MF	C	3.88 (98.6)
45 + 19	3152-MF	D	3.75 (95.3)

330 VAC, 90°C Case Temperature

10 + 5	3602-MF	C	2.75 (69.9)
11 + 4	3389-MF	C	2.75 (69.9)
11.5 + 7	3601-MF	C	2.75 (69.9)
18 + 7.5	3378-MF	C	2.75 (69.9)
18 + 8	3362-MF	C	3.13 (79.5)

Cap (uF)	Aerovox P/N	Base Size	Can Height Inches (mm)
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400 VAC, 90°C Case Temperature

14 + 8	2690-MF	C	2.75 (69.9)
15 + 9	1964-MF	C	3.13 (79.5)
15.3 + 6.9	3175-MF	C	3.13 (79.5)
16 + 8	2784-MF	C	3.13 (79.5)
16.5 + 7	3171-MF	C	3.13 (79.5)
36 + 12	3279-MF	D	3.75 (95.3)
7 + 3	1966-MF	C	2.75 (69.9)
7.5 + 2	3173-MF	C	2.75 (69.9)
9 + 5	3357-MF	C	2.75 (69.9)

525 VAC, 90 °C Case Temperature

18 + 8	2962-MF	D	3.75 (95.3)
23 + 9	2907-MF	D	3.75 (95.3)

For additional ratings, contact the factory

WARRANTY

Aerovox Corp. (hereafter called Company), warrants to the Purchaser that capacitors manufactured by the Company are free from defects in materials, workmanship, and title for one-year from date of shipment; and this warranty is conditional based on proper installation, use and maintenance.

NO OTHER WARRANTIES ARE MADE, EITHER EXPRESSED OR IMPLIED (INCLUDING, WITHOUT LIMITATION WARRANTIES AS TO MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE).

PURCHASER RETAINS RESPONSIBILITY FOR THE APPLICATION AND FUNCTIONAL ADEQUACY OF THE CAPACITOR.

LIMITS OF LIABILITY. Under no circumstances will the Company be liable for consequential, incidental, or exemplary damages; and the Company liability for any claim shall not exceed Purchaser's cost from the Company of specific capacitor(s) that generates such claim.