STATE OF CALIFORNIA
Bid Specification

Lamps
Department of General Services

1.0 SCOPE

This specification describes the requirements for fluorescent lamps, high pressure sodium lamps, metal halide lamps, and ballasts for fluorescent lamps.

2.0 SPECIFICATIONS AND STANDARDS

Specifications and standards referenced in this document in effect on the opening of the Invitation for Bid forms a part of this specification where referenced. All applicable ANSI, IES, and NEMA standards in effect at the time of bid opening shall apply. All lamp performance specifications shall be measured in accordance with these standards.

3.0 REQUIREMENTS

Lamps

Linear & U-lamp Fluorescent	Mercury (mg/lamp)	Rated Life (hrs. @ 3 hr. start using instant start ballast, unless otherwise noted)	Color Rendering Index (CRI)
54 Watt HO Linear T5 - 3000K CCT	≤ 4	≥ 25000 [1]	≥ 80
54 Watt HO Linear T5 - 3500K CCT	≤ 4	≥ 25000 [1]	≥ 80
54 Watt HO Linear T5 - 4100K CCT	≤ 4	≥ 25000 [1]	≥ 80
54 Watt HO Linear T5 - 5000K CCT	≤ 4	≥ 25000 [1]	≥ 80
54 Watt HO Linear T5 - 6500K CCT	≤ 4	≥ 25000 [1]	≥ 80
17 Watt, 2-foot Linear T8 - 3000K CCT	≤ 4	≥ 24000	≥ 80
17 Watt, 2-foot Linear T8 - 3500K CCT	≤ 4	≥ 24000	≥ 80
17 Watt, 2-foot Linear T8 - 4100K CCT	≤ 4	≥ 24000	≥ 80
17 Watt, 2-foot Linear T8 - 5000K CCT	≤ 4	≥ 24000	≥ 80
17 Watt, 2-foot Linear T8 - 6500K CCT	≤ 4	≥ 24000	≥ 80
25 Watt, 3-foot Linear T8 - 3000K CCT	≤ 4	≥ 24000	≥ 80
25 Watt, 3-foot Linear T8 - 3500K CCT	≤ 4	≥ 24000	≥ 80
25 Watt, 3-foot Linear T8 - 4100K CCT	≤ 4	≥ 24000	≥ 80
25 Watt, 3-foot Linear T8 - 5000K CCT	≤ 4	≥ 24000	≥ 80
25 Watt, 3-foot Linear T8 - 6500K CCT	≤ 4	≥ 24000	≥ 80
25 Watt, 4-foot Linear T8 - 3000K CCT	≤ 4	≥ 24000	≥ 80
25 Watt, 4-foot Linear T8 - 3500K CCT	≤ 4	≥ 24000	≥ 80
25 Watt, 4-foot Linear T8 - 4100K CCT	≤ 4	≥ 24000	≥ 80
25 Watt, 4-foot Linear T8 - 5000K CCT	≤ 4	≥ 24000	≥ 80
28 Watt, 4-foot Linear T8 - 3000K CCT	≤ 4	≥ 24000	≥ 80
28 Watt, 4-foot Linear T8 - 3500K CCT	≤ 4	≥ 24000	≥ 80
28 Watt, 4-foot Linear T8 - 4100K CCT	≤ 4	≥ 24000	≥ 80
28 Watt, 4-foot Linear T8 - 5000K CCT	≤ 4	≥ 24000	≥ 80

30 Watt, 4-foot Linear T8 - 3000K CCT	≤ 4	≥ 24000	≥ 80
30 Watt, 4-foot Linear T8 - 3500K CCT	≤ 4	≥ 24000	≥ 80
30 Watt, 4-foot Linear T8 - 4100K CCT	≤ 4	≥ 24000	≥ 80
30 Watt, 4-foot Linear T8 - 5000K CCT	≤ 4	≥ 24000	≥ 80
32 Watt, 4-foot Linear T8 - 3000K CCT	≤ 4	≥ 24000	≥ 80
32 Watt, 4-foot Linear T8 - 3500K CCT	≤ 4	≥ 24000	≥ 80
32 Watt, 4-foot Linear T8 - 4100K CCT	≤ 4	≥ 24000	≥ 80
32 Watt, 4-foot Linear T8 - 5000K CCT	≤ 4	≥ 24000	≥ 80
32 Watt, 4-foot Linear T8 - 6500K CCT	≤ 4	≥ 24000	≥ 80
59 Watt, 8-foot Linear T8 - 3000K CCT	≤ 9	≥ 18000	≥ 80
59 Watt, 8-foot Linear T8 - 3500K CCT	≤ 9	≥ 18000	≥ 80
59 Watt, 8-foot Linear T8 - 4100K CCT	≤ 9	≥ 18000	≥ 80
59 Watt, 8-foot Linear T8 - 5000K CCT	≤ 9	≥ 18000	≥ 80
32 Watt U-bent T8/ 6" spacing - 3000K CCT	≤ 4	≥ 20000	≥ 80
32 Watt U-bent T8/ 6" spacing - 3500K CCT	≤ 4	≥ 20000	≥ 80
32 Watt U-bent T8/ 6" spacing - 4100K CCT	≤ 4	≥ 20000	≥ 80
31 Watt U-bent T8/ 1-5/8" spacing - 3000K CCT	≤ 8	≥ 20000	≥ 80
31 Watt U-bent T8/ 1-5/8" spacing - 3500K CCT	≤ 8	≥ 20000	≥ 80
31 Watt U-bent T8/ 1-5/8" spacing - 4100K CCT	≤ 8	≥ 20000	≥ 80
30-32 Watt, 4-foot Linear T12 - 4100K CCT [3]	≤ 10	≥ 9000	≥ 70
39 Watt, 4-foot Linear T12, 6500K CCT	≤ 10	≥ 9000	≥ 70
34 Watt, 4-foot Linear T12 - 3000K CCT	≤ 10	≥ 20000 [2]	≥ 80
34 Watt, 4-foot Linear T12 - 3500K CCT	≤ 10	≥ 20000 [2]	≥ 80
34 Watt, 4-foot Linear T12 - 4100K CCT	≤ 10	≥ 20000 [2]	≥ 80

1. 3 hr. start using programmed start ballast.
2. 3 hr. start using rapid start ballast.
3. The offered lamp wattage shall be within the range of 30 to 32 watts.

CFL	Mercury (mg/lamp)	Rated Life (hrs.)	Color Rendering Index (CRI)
Medium Base - Twist Shape Lamp			
Screw-in Compact, 120 VAC, ≤25 watts – Non dimming [3,4]	≤ 3.5	≥ 8000	≥ 80
Screw-in Compact, 120 VAC, >25 watts – Non dimming [3,4]	≤ 5	≥ 8000	≥ 80
2-pin - Twist Shape Lamp			
13 Watt, GU24 base [4]	≤ 5	≥ 8000	≥ 80
23 Watt, GU24 base [4]	≤ 5	≥ 8000	≥ 80
2-pin			
5 Watt, 2700K CCT, G23 Base	≤ 3	≥ 10000	≥ 80
5 Watt, 4100K CCT, G23 Base	≤ 3	≥ 10000	≥ 80

7 Watt, 2700K CCT, G23 Base	≤ 3	≥ 10000	≥ 80
7 Watt, 3500K CCT, G23 Base	≤ 3	≥ 10000	≥ 80
7 Watt, 4100K CCT, G23 Base	≤ 3	≥ 10000	≥ 80
7 Watt, 5000K CCT, G23 Base	≤ 3	≥ 10000	≥ 80
9 Watt, 2700K CCT, G23 Base	≤ 3	≥ 10000	≥ 80
9 Watt, 3500K CCT, G23 Base	≤ 3	≥ 10000	≥ 80
9 Watt, 4100K CCT, G23 Base	≤ 3	≥ 10000	≥ 80
9 Watt, 5000K CCT, G23 Base	≤ 3	≥ 10000	≥ 80
13 Watt, 2700K CCT, GX23 Base	≤ 3	≥ 10000	≥ 80
13 Watt, 3000K CCT, GX23 Base	≤ 3	≥ 10000	≥ 80
13 Watt, 3500K CCT, GX23 Base	≤ 3	≥ 10000	≥ 80
13 Watt, 4100K CCT, GX23 Base	≤ 3	≥ 10000	≥ 80
13 Watt, 5000K CCT, GX23 Base	≤ 3	≥ 10000	≥ 80
13 Watt, 2700K CCT, GX23-2 Base	≤ 3	≥ 10000	≥ 80
13 Watt, 3000K CCT, GX23-2 Base	≤ 3	≥ 10000	≥ 80
13 Watt, 3500K CCT, GX23-2 Base	≤ 3	≥ 10000	≥ 80
13 Watt, 4100K CCT, GX23-2 Base	≤ 3	≥ 10000	≥ 80
18 Watt, 2700K CCT, G24D-2 Base	≤ 3	≥ 10000	≥ 80
18 Watt, 3000K CCT, G24D-2 Base	≤ 3	≥ 10000	≥ 80
18 Watt, 3500K CCT, G24D-2 Base	≤ 3	≥ 10000	≥ 80
18 Watt, 4100K CCT, G24D-2 Base	≤ 3	≥ 10000	≥ 80
26 Watt, 2700K CCT, G24D-3 Base	≤ 3	≥ 10000	≥ 80
26 Watt, 3000K CCT, G24D-3 Base	≤ 3	≥ 10000	≥ 80
26 Watt, 3500K CCT, G24D-3 Base	≤ 3	≥ 10000	≥ 80
26 Watt, 4100K CCT, G24D-3 Base	≤ 3	≥ 10000	≥ 80
4-pin			
13 Watt, 2700K CCT, G24Q-1 Base	≤ 3	≥ 12000	≥ 80
13 Watt, 3000K CCT, G24Q-1 Base	≤ 3	≥ 12000	≥ 80
13 Watt, 3500K CCT, G24Q-1 Base	≤ 3	≥ 12000	≥ 80
13 Watt, 4100K CCT, G24Q-1 Base	≤ 3	≥ 12000	≥ 80
13 Watt, 2700K CCT, GX24Q-1 Base	≤ 5	≥ 12000	≥ 80
13 Watt, 4100K CCT, GX24Q-1 Base	≤ 5	≥ 12000	≥ 80
18 Watt, 2700K CCT, G24Q-2 Base	≤ 3	≥ 12000	≥ 80
18 Watt, 3000K CCT, G24Q-2 Base	≤ 3	≥ 12000	≥ 80
18 Watt, 3500K CCT, G24Q-2 Base	≤ 3	≥ 12000	≥ 80
18 Watt, 4100K CCT, G24Q-2 Base	≤ 3	≥ 12000	≥ 80
18 Watt, 2700K CCT, GX24Q-2 Base	≤ 5	≥ 12000	≥ 80
18 Watt, 3000K CCT, GX24Q-2 Base	≤ 5	≥ 12000	≥ 80
18 Watt, 3500K CCT, GX24Q-2 Base	≤ 5	≥ 12000	≥ 80
18 Watt, 4100K CCT, GX24Q-2 Base	≤ 5	≥ 12000	≥ 80
26 Watt, 2700K CCT, G24Q-3 Base	≤ 3	≥ 12000	≥ 80
26 Watt, 3000K CCT, G24Q-3 Base	≤ 3	≥ 12000	≥ 80
26 Watt, 3500K CCT, G24Q-3 Base	≤ 3	≥ 12000	≥ 80
26 Watt, 4100K CCT, G24Q-3 Base	≤ 3	≥ 12000	≥ 80
26 Watt, 2700K CCT, GX24Q-3 Base	≤ 5	≥ 12000	≥ 80
26 Watt, 3000K CCT, GX24Q-3 Base	≤ 5	≥ 12000	≥ 80
26 Watt, 3500K CCT, GX24Q-3 Base	≤ 5	≥ 12000	≥ 80
26 Watt, 4100K CCT, GX24Q-3 Base	≤ 5	≥ 12000	≥ 80
32 Watt, 2700K CCT, GX24Q-3 Base	≤ 5	≥ 12000	≥ 80
32 Watt, 3000K CCT, GX24Q-3 Base	≤ 5	≥ 12000	≥ 80
32 Watt, 3500K CCT, GX24Q-3 Base	≤ 5	≥ 12000	≥ 80
32 Watt, 4100K CCT, GX24Q-3 Base	≤ 5	≥ 12000	≥ 80

42 Watt, 2700K CCT, GX24Q-4 Base	≤ 5	≥ 12000	≥ 80
42 Watt, 3000K CCT, GX24Q-4 Base	≤ 5	≥ 12000	≥ 80
42 Watt, 3500K CCT, GX24Q-4 Base	≤ 5	≥ 12000	≥ 80
42 Watt, 4100K CCT, GX24Q-4 Base	≤ 5	≥ 12000	≥ 80
57 Watt, 3000K CCT, GX24Q-5 Base	≤ 5	≥ 12000	≥ 80
57 Watt, 3500K CCT, GX24Q-5 Base	≤ 5	≥ 12000	≥ 80
57 Watt, 4100K CCT, GX24Q-5 Base	≤ 5	≥ 12000	≥ 80
4-pin Long Lamp			
18 Watt, 3000K CCT, 2G11 Base, 9" Lamp	≤ 5	≥ 12000	≥ 80
18 Watt, 3500K CCT, 2G11 Base, 9" Lamp	≤ 5	≥ 12000	≥ 80
18 Watt, 4100K CCT, 2G11 Base, 9" Lamp	≤ 5	≥ 12000	≥ 80
24 Watt, 3000K CCT, 2G11 Base	≤ 5	≥ 12000	≥ 80
24 Watt, 3500K CCT, 2G11 Base	≤ 5	≥ 12000	≥ 80
24 Watt, 4100K CCT, 2G11 Base	≤ 5	≥ 12000	≥ 80
36 Watt, 3000K CCT, 2G11 Base	≤ 5	≥ 12000	≥ 80
36 Watt, 3500K CCT, 2G11 Base	≤ 5	≥ 12000	≥ 80
36 Watt, 4100K CCT, 2G11 Base	≤ 5	≥ 12000	≥ 80
40 Watt, 3000K CCT, 2G11 Base	≤ 5	≥ 12000	≥ 80
40 Watt, 3500K CCT, 2G11 Base	≤ 5	≥ 12000	≥ 80
40 Watt, 4100K CCT, 2G11 Base	≤ 5	≥ 12000	≥ 80
50 Watt, 3000K CCT, 2G11 Base	≤ 5	≥ 12000	≥ 80
50 Watt, 3500K CCT, 2G11 Base	≤ 5	≥ 12000	≥ 80
50 Watt, 4100K CCT, 2G11 Base	≤ 5	≥ 12000	≥ 80
55 Watt, 4100K CCT, 2G11 Base	≤ 5	≥ 12000	≥ 80
80 Watt, 3000K CCT, 2G11 Base	≤ 5	≥ 12000	≥ 80
80 Watt, 3500K CCT, 2G11 Base	≤ 5	≥ 12000	≥ 80
80 Watt, 4100K CCT, 2G11 Base	≤ 5	≥ 12000	≥ 80

3. Criteria for determining comparable CFL for incandescent lamp replacement:
   - Mean lumens of the CFL lamp shall be 100% - 125% of the replaced incandescent lamp's mean lumens.
   - The CFL lamp shall be available in one of the following color temperatures: 2700K, 3000K, 3500K, or 4100K (±10% for all color temperatures).
   - CFL lamp shall have a standard medium screw-in base.

4. CFL lamp shall be Energy Star (Version 4) compliant.

High Pressure Sodium (HPS) – Cycling [5]	Mercury (mg/lamp)	Rated Life (hrs.)	Color Rendering Index (CRI)
50 watt, medium base, clear lamp	≤ 18	≥ 24000	≥ 21
50 watt, medium base, coated lamp	≤ 18	≥ 24000	≥ 21
50 watt, mogul base, clear lamp	≤ 18	≥ 24000	≥ 21
50 watt, mogul base, coated lamp	≤ 18	≥ 24000	≥ 21
70 watt, medium base, clear lamp	≤ 17	≥ 24000	≥ 21
70 watt, medium base, coated lamp	≤ 17	≥ 24000	≥ 21
70 watt, mogul base, clear lamp	≤ 17	≥ 24000	≥ 21
100 watt, medium base, clear lamp	≤ 23	≥ 24000	≥ 21
100 watt, medium base, coated lamp	≤ 23	≥ 24000	≥ 21
100 watt, mogul base, clear lamp	≤ 23	≥ 24000	≥ 21
100 watt, mogul base, coated lamp	≤ 23	≥ 24000	≥ 21

150 watt, medium base, clear lamp	≤ 17	≥ 24000	≥ 21
150 watt, medium base, coated lamp	≤ 17	≥ 24000	≥ 21
150 watt, mogul base, clear 2-15/16" dia. lamp	≤ 17	≥ 24000	≥ 21
150 watt, mogul base, clear 3-1/2" dia. lamp	≤ 23	≥ 24000	≥ 21
200 watt, mogul base, clear 2-1/4" dia. lamp	≤ 31	≥ 24000	≥ 21
250 watt, mogul base, clear 2-1/4" dia. lamp	≤ 32	≥ 24000	≥ 21
400 watt, mogul base, clear 2-1/4" dia. lamp	≤ 31	≥ 24000	≥ 21
1000 watt, mogul base, clear 3-1/8" dia. lamp	≤ 44	≥ 24000	≥ 21

5. High Pressure Sodium lamps shall also meet the following California Dept. of Transportation requirements:
   - Conform to the requirements in ANSI Standard: C 78, "Lamp Specifications, Physical and Electrical Characteristics of High-Intensity-Discharge Lamps," when tested in conformance with the requirements in ANSI Standard: C 78.388, "Methods of Measurement of High Pressure Sodium Lamp Characteristics."
   - Produce the following lumen output for the listed lamp wattages:

Lamp Wattage	Initial Lumen Output
150	16,000
200	22,000
250	27,000
400	50,000

High Pressure Sodium (HPS) – Dual Arc, Instant Restrike [6]	Mercury (mg/lamp)	Rated Life (hrs.)	Color Rendering Index (CRI)
70 watt	≤ 34	≥24000	≥ 21
100 watt	≤ 45	≥ 24000	≥ 21
150 watt	≤ 34	≥ 24000	≥ 21
250 watt	≤ 41	≥ 24000	≥ 21
400 watt	≤ 62	≥ 24000	≥ 21
1000 watt	≤ 88	≥ 24000	≥ 21

6. High Pressure Sodium lamps shall also meet the following California Dept. of Transportation requirements:
   - Conform to the requirements in ANSI Standard: C 78, "Lamp Specifications, Physical and Electrical Characteristics of High-Intensity-Discharge Lamps," when tested in conformance with the requirements in ANSI Standard: C 78.388, "Methods of Measurement of High Pressure Sodium Lamp Characteristics."
   - Produce the following lumen output for the listed lamp wattages:

Lamp Wattage	Initial Lumen Output
150	16,000
250	27,000
400	50,000

High Pressure Sodium (HPS) – Non cycling [7]	Mercury (mg/lamp)	Rated Life (hrs.)	Color Rendering Index (CRI)
50 watt, mogul base	≤ 18	≥ 30000	≥ 21
70 watt, mogul base, 2-15/16" dia. lamp	≤ 2	≥ 30000	≥ 21
100 watt, mogul base, 2-15/16" dia. lamp	≤ 4	≥ 30000	≥ 21
150 watt, mogul base	≤ 3	≥ 30000	≥ 21
200 watt, mogul base	≤ 7	≥ 30000	≥ 21
250 watt, mogul base	≤ 8	≥ 30000	≥ 21
400 watt, mogul base	≤ 6	≥ 30000	≥ 21
1000 watt, mogul base	≤ 15	≥ 30000	≥ 21

7. High Pressure Sodium lamps shall also meet the following California Dept. of Transportation requirements:
   - Conform to the requirements in ANSI Standard: C 78, "Lamp Specifications, Physical and Electrical Characteristics of High-Intensity-Discharge Lamps," when tested in conformance with the requirements in ANSI Standard: C 78.388, "Methods of Measurement of High Pressure Sodium Lamp Characteristics."
   - Produce the following lumen output for the listed lamp wattages:

Lamp Wattage	Initial Lumen Output
150	16,000
200	22,000
250	27,000
400	50,000

Metal Halide - Standard	Mercury (mg/lamp)	Rated Life (hrs.)	Color Rendering Index (CRI)
175 watt, medium base, clear lamp	≤ 28	≥ 7500	≥ 65
175 watt, medium base, coated lamp	≤ 28	≥ 7500	≥ 65
175 watt, mogul base, clear lamp	≤ 28	≥ 7500	≥ 65
175 watt, mogul base, coated lamp	≤ 28	≥ 7500	≥ 65
175 watt, mogul base, coated lamp, base up ±15°	≤ 28	≥ 7500	≥ 65
250 watt, mogul base, clear 3-1/2" dia. lamp	≤ 36	≥ 7500	≥ 65
250 watt, mogul base, coated 3-1/2" dia. lamp	≤ 36	≥ 7500	≥ 65
250 watt, mogul base, coated 3-1/2" dia. lamp, base up ±15°	≤ 36	≥ 7500	≥ 65
400 watt, mogul base, clear 3-1/2" dia. lamp	≤ 66	≥ 15000	≥ 62
400 watt, mogul base, coated 3-1/2" dia. lamp	≤ 66	≥ 15000	≥ 62
400 watt, mogul base, clear 4-5/8" dia. lamp	≤ 66	≥ 15000	≥ 62
400 watt, mogul base, coated 4-5/8" dia. lamp	≤ 66	≥ 15000	≥ 62
1000 watt, mogul base, clear 4-5/8" dia. lamp	≤ 151	≥ 9000	≥ 65

1000 watt, mogul base, clear 7" dia. lamp	≤ 151	≥ 9000	≥ 65
1000 watt, mogul base, coated 7" dia. lamp	≤ 151	≥ 9000	≥ 65
1500 watt, mogul base, clear lamp	≤ 204	≥ 3000	≥ 60

Metal Halide - Ceramic PAR	Mercury (mg/lamp)	Rated Life (hrs.)	Color Rendering Index (CRI)
≤25 watts, medium base, PAR 30 lamp, spot 10°	≤ 4	≥ 9000	≥ 80
≤25 watts, medium base, PAR 30 lamp, flood 30°	≤ 4	≥ 9000	≥ 80
39 watt, medium base, PAR 20 lamp, spot 10°, 3000K CCT	≤ 6	≥ 9000	≥ 80
39 watt, medium base, PAR 20 lamp, flood 30°, 3000K CCT	≤ 6	≥ 9000	≥ 80
39 watt, medium base, PAR 30 lamp, spot 10°, 3000K CCT	≤ 6	≥ 9000	≥ 80
39 watt, medium base, PAR 30 lamp, flood 30°, 3000K CCT	≤ 6	≥ 9000	≥ 80
70 watt, medium base, PAR 38 lamp, spot 15°, 3000K CCT	≤ 9	≥ 12000	≥ 80
70 watt, medium base, PAR 38 lamp, flood 25°, 3000K CCT	≤ 9	≥ 12000	≥ 80
100 watt, medium base, PAR 38 lamp, spot 15°, 3000K CCT	≤ 10	≥ 12000	≥ 80
100 watt, medium base, PAR 38 lamp, flood 25°, 3000K CCT	≤ 10	≥ 12000	≥ 80

Metal Halide - Ceramic	Mercury (mg/lamp)	Rated Life (hrs.)	Color Rendering Index (CRI)
50 watt, medium base, clear lamp, 3000K CCT	≤ 9	≥ 10000	≥ 80
70 watt, medium base, clear lamp, 3000K CCT	≤ 9	≥12000	≥ 80
70 watt, medium base, coated lamp, 3000K CCT	≤ 9	≥12000	≥ 80
70 watt, medium base, clear lamp, 4000K CCT	≤ 9	≥12000	≥ 80
70 watt, medium base, coated lamp, 4000K CCT	≤ 9	≥12000	≥ 80
100 watt, medium base, clear lamp, 3000K CCT	≤ 8	≥ 16000	≥ 80
100 watt, medium base, coated lamp, 3000K CCT	≤ 8	≥ 16000	≥ 80
100 watt, medium base, clear lamp, 4000K CCT	≤ 8	≥ 16000	≥ 80
100 watt, medium base, coated lamp, 4000K CCT	≤ 8	≥ 16000	≥ 80
150 watt, medium base, clear lamp, 3000K CCT	≤ 16	≥ 12000	≥ 80
150 watt, medium base, coated lamp, 3000K CCT	≤ 16	≥ 12000	≥ 80

Metal Halide - Pulse Start	Mercury (mg/lamp)	Rated Life (hrs.)	Color Rendering Index (CRI)
175 watt, mogul base, clear 3-1/2" dia. lamp, base up ±15°	≤ 31	≥ 15000	≥ 62
175 watt, mogul base, coated 3-1/2" dia. lamp, base up ±15°	≤ 31	≥ 15000	≥ 62
250 watt, mogul base, clear lamp	≤ 33	≥ 12000	≥ 65
250 watt, mogul base, clear lamp, base up ±15°	≤ 31	≥ 12000	≥ 65
400 watt, mogul base, clear 4-5/8" dia. lamp	≤ 67	≥ 15000	≥ 62
400 watt, mogul base, clear 4-5/8" dia. lamp, base up ±15°	≤ 67	≥ 15000	≥ 62
400 watt, mogul base, coated 4-5/8" dia. lamp, base up ±15°	≤ 67	≥ 15000	≥ 62
750 watt, mogul base, clear lamp, horizontal position	≤ 116	≥ 12000	≥ 65

Ballasts

Ballasts shall be for all T8 fluorescent lamps and 4-pin compact fluorescent lamps (CFL). T8 fluorescent lamp ballasts shall be for 1, 2, 3 and 4 lamp applications. Ballasts shall be electronic, UL listed, contain no polychlorinated biphenyl (PCB), and designed in accordance

with all applicable NEMA, ANSI, and CSI specifications. Supplied ballasts shall operate on 120 VAC. Ballasts operating on 277 VAC shall also be supplied. Both fixed output and dimmable ballasts shall be supplied.