

Scaled data based on original data using  
LM-79-08 Approved Method: Electrical and Photometric Measurements of Solid-State  
Lighting Products

Test Report Prepared for  
Cooper Lighting Solutions  
(formerly Eaton)

Brand: FAIL-SAFE

Report Number: 168P132

Luminaire Tested: **FMS12CR-228-120-80/86**

Issue Date: 3/3/2020



**Test Information**

Test Method: LM-79-08  
Report Number: 168P132  
Test Lab:  
Issue Date: 3/3/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: FAIL-SAFE  
Catalog Number: FMS12CR-228-120-80/86  
Description: FAIL-SAFE 1 X 4 Fail-Safe FMS Series with a .125 Prismatic Acrylic  
and .250 Clear Polycarbonate Lens  
Light Source: Two - F28T5/835 - 2900 Lumens ea. - 28 Watts ea.  
Ballast/Driver: Energy Savings ES-2-T5-28-120-F Electronic - L.O.B.F. = 92.6

**Summary**

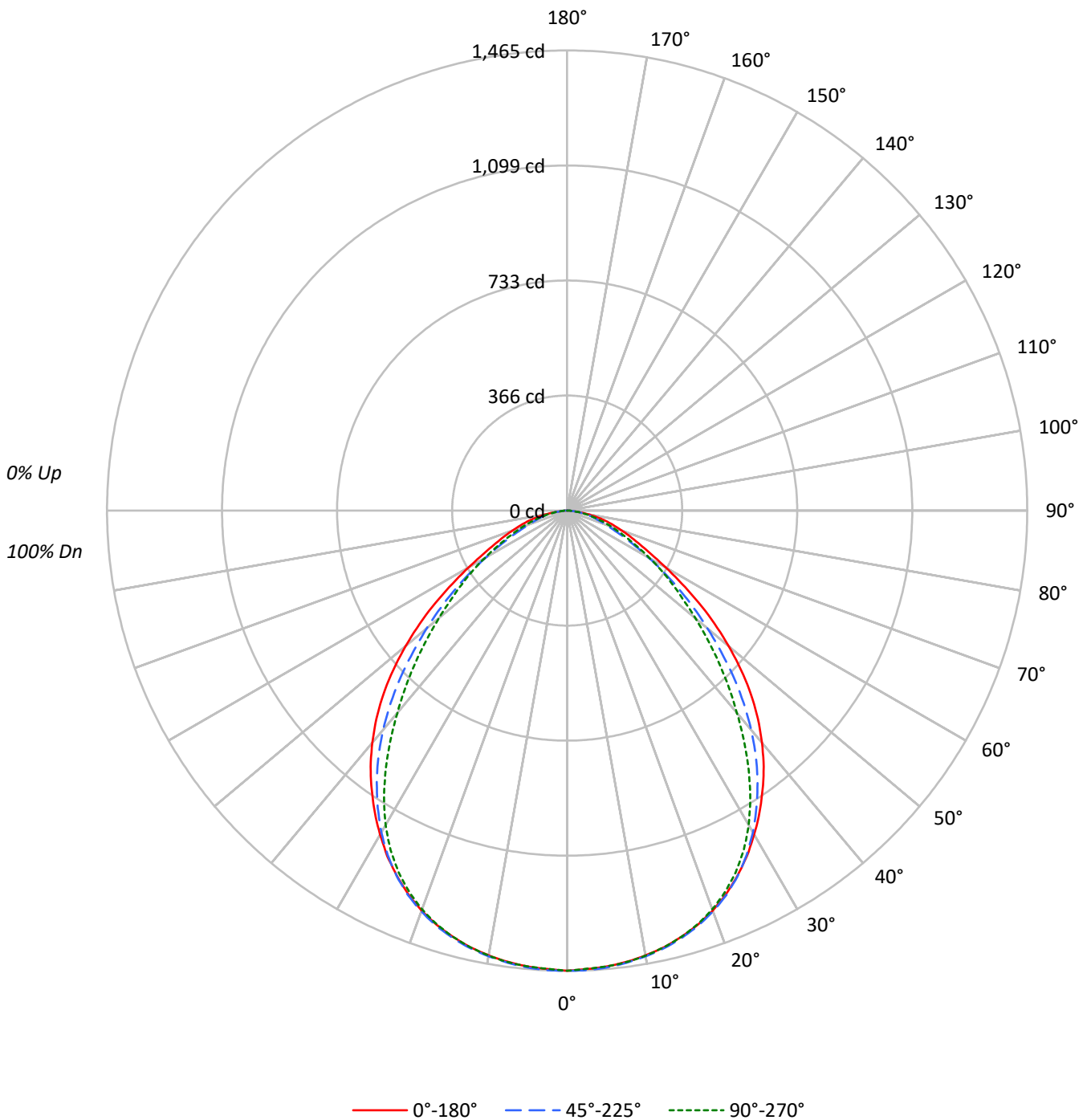
Lumens per Lamp: 2900 (2 lamps)  
Luminaire Lumens: 3109.3 lumens  
Efficiency: 53.6%  
Efficacy: 51.8 lumens/watt  
Spacing Criteria (0/90/45): 1.21 / 1.18 / 1.24  
Luminous Opening: Rectangular (W 0.58' x L: 3.74' x H: 0')  
CIE Type: Direct

Input Watts (W): 60  
Input Voltage (V): NR  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 25 FT

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### Luminous Intensity Polar Plot





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**COEFFICIENT OF UTILIZATION - ZONAL CAVITY METHOD:**

RF	20				20				20				20				20	
RC	80				70				50				30				10	0
RW	70	50	30	10	70	50	30	10	50	30	10	50	30	10	50	30	10	0
RCR																		
0	64	64	64	64	62	62	62	62	60	60	60	57	57	57	55	55	55	54
1	59	57	55	53	58	56	54	53	54	52	51	52	50	49	50	49	48	47
2	55	51	48	45	53	50	47	44	48	46	43	46	44	43	45	43	42	41
3	50	45	42	39	49	45	41	38	43	40	38	42	39	37	40	38	36	35
4	47	41	37	33	45	40	36	33	39	35	33	38	35	32	37	34	32	31
5	43	37	33	29	42	36	32	29	35	32	29	34	31	29	33	31	28	27
6	40	34	29	26	39	33	29	26	32	28	26	31	28	26	30	28	25	24
7	37	31	26	23	36	30	26	23	29	26	23	29	25	23	28	25	23	22
8	35	28	24	21	34	28	24	21	27	23	21	26	23	21	26	23	21	20
9	33	26	22	19	32	26	22	19	25	21	19	25	21	19	24	21	19	18
10	31	24	20	17	30	24	20	17	23	20	17	23	20	17	22	19	17	16

**AVERAGE LUMINANCE (cd/sqm):**

	0°	45°	90°
0°	7270	7270	7270
5°	7257	7272	7257
10°	7246	7261	7251
15°	7218	7238	7218
20°	7155	7171	7134
25°	7025	7030	6953
30°	6824	6778	6624
35°	6573	6403	6100
40°	6251	5908	5448
45°	5811	5256	4786
50°	5180	4501	4115
55°	4421	3737	3538
60°	3593	2967	3017
65°	3006	2325	2524
70°	2670	1886	2162
75°	2435	1706	1841
80°	1943	1515	1515
85°	1082	1025	1082



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**ZONAL LUMENS:**

**CANDELA DISTRIBUTION:**

Zone	Lumens	% Fixture	% Lamp		0°	22.5°	45°	67.5°	90°	Flux
0°-10°	138.7	4.5	2.4	0°	1465	1465	1465	1465	1465	
10°-20°	396.8	12.8	6.8	5°	1457	1457	1460	1461	1457	138
20°-30°	588.3	18.9	10.1	15°	1405	1406	1409	1410	1405	396
30°-40°	655.2	21.1	11.3	25°	1283	1286	1284	1278	1270	590
40°-50°	576.5	18.5	9.9	35°	1085	1078	1057	1025	1007	677
50°-60°	399.5	12.8	6.9	45°	828	796	749	696	682	635
60°-70°	222.1	7.1	3.8	55°	511	483	432	404	409	457
70°-80°	107.7	3.5	1.9	65°	256	239	198	204	215	259
80°-90°	24.6	0.8	0.4	75°	127	110	89	94	96	133
90°-100°	0.0	0.0	0.0	85°	19	19	18	19	19	26
100°-110°	0.0	0.0	0.0	90°	0	0	0	0	0	1
110°-120°	0.0	0.0	0.0	95°	0	0	0	0	0	0
120°-130°	0.0	0.0	0.0	105°	0	0	0	0	0	0
130°-140°	0.0	0.0	0.0	115°	0	0	0	0	0	0
140°-150°	0.0	0.0	0.0	125°	0	0	0	0	0	0
150°-160°	0.0	0.0	0.0	135°	0	0	0	0	0	0
160°-170°	0.0	0.0	0.0	145°	0	0	0	0	0	0
170°-180°	0.0	0.0	0.0	155°	0	0	0	0	0	0
0°-30°	1123.7	36.1	19.4	165°	0	0	0	0	0	0
0°-40°	1778.9	57.2	30.7	175°	0	0	0	0	0	0
0°-60°	2754.9	88.6	47.5	180°	0	0	0	0	0	0
0°-90°	3109.3	100.0	53.6							
90°-120°	0.0	0.0	0.0							
90°-150°	0.0	0.0	0.0							
90°-180°	0.0	0.0	0.0							
0°-180°	3109.3	100.0	53.6							



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**CANDELA DISTRIBUTION (FULL):**

	0°	22.5°	45°	67.5°	90°
0°	1465	1465	1465	1465	1465
2.5°	1461	1462	1465	1466	1460
5°	1457	1457	1460	1461	1457
7.5°	1449	1449	1452	1454	1450
10°	1438	1438	1441	1443	1439
12.5°	1424	1424	1427	1429	1424
15°	1405	1406	1409	1410	1405
17.5°	1383	1383	1386	1386	1381
20°	1355	1356	1358	1357	1351
22.5°	1322	1324	1325	1321	1314
25°	1283	1286	1284	1278	1270
27.5°	1240	1241	1237	1228	1218
30°	1191	1191	1183	1169	1156
32.5°	1140	1137	1122	1100	1085
35°	1085	1078	1057	1025	1007
37.5°	1028	1015	987	947	925
40°	965	946	912	864	841
42.5°	899	873	832	780	761
45°	828	796	749	696	682
47.5°	751	718	664	615	605
50°	671	639	583	538	533
52.5°	591	560	506	469	466
55°	511	483	432	404	409
57.5°	432	410	362	344	356
60°	362	344	299	291	304
62.5°	303	287	244	244	257
65°	256	239	198	204	215
67.5°	217	200	159	171	180
70°	184	168	130	143	149
72.5°	155	138	107	118	121
75°	127	110	89	94	96
77.5°	98	83	72	72	74
80°	68	59	53	51	53
82.5°	41	37	34	33	34
85°	19	19	18	19	19
87.5°	5	7	9	10	10
90°	0	0	0	0	0
92.5°	0	0	0	0	0
95°	0	0	0	0	0
97.5°	0	0	0	0	0
100°	0	0	0	0	0
102.5°	0	0	0	0	0
105°	0	0	0	0	0
107.5°	0	0	0	0	0
110°	0	0	0	0	0



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**CANDELA DISTRIBUTION (continued):**

	0°	22.5°	45°	67.5°	90°
112.5°	0	0	0	0	0
115°	0	0	0	0	0
117.5°	0	0	0	0	0
120°	0	0	0	0	0
122.5°	0	0	0	0	0
125°	0	0	0	0	0
127.5°	0	0	0	0	0
130°	0	0	0	0	0
132.5°	0	0	0	0	0
135°	0	0	0	0	0
137.5°	0	0	0	0	0
140°	0	0	0	0	0
142.5°	0	0	0	0	0
145°	0	0	0	0	0
147.5°	0	0	0	0	0
150°	0	0	0	0	0
152.5°	0	0	0	0	0
155°	0	0	0	0	0
157.5°	0	0	0	0	0
160°	0	0	0	0	0
162.5°	0	0	0	0	0
165°	0	0	0	0	0
167.5°	0	0	0	0	0
170°	0	0	0	0	0
172.5°	0	0	0	0	0
175°	0	0	0	0	0
177.5°	0	0	0	0	0
180°	0	0	0	0	0

(END OF REPORT)