

FR and FD Luminaires

Nonmetallic Fluorescent

4 foot, 2 lamp fixtures. High-impact fiberglass reinforced polyester fixtures suitable for use in wet and damp locations.



THORNE &
DERRICK
INTERNATIONAL

Thorne & Derrick
+44 (0) 191 410 4292
www.heatingandprocess.com

NEC/CEC — FR Series

Wet Locations

IP65 when used with optional polycarbonate lens

NEC/CEC — FD Series

Class I, Division 2, Groups A, B, C, D

Class I, Zone 2, IIC

Applications

- For use in locations where a high degree of corrosion resistance is required.
- FR Series:
 - For use in areas where high humidity or water vapor are present
 - Typical uses include meat- or food-processing plants, dairy or drug plants, breweries, kitchens, chemical plants, car washes, laundries and parking garages.
 - Can be used indoors or outdoors in protected locations (wet locations).
 - Operates safely in 38 °C (100 °F) ambient temperature areas.
- FD Series:
 - For use in hazardous locations defined by the NEC as Class I, Division 2; and Class I, Zone 2.
 - For wet-location use where protection against dirt, water and moisture is necessary.
 - Typical applications include oil refineries, petrochemical facilities, pulp and paper mills, food-processing plants, warehouses, underground tunnels and general manufacturing facilities.
- FD Series fixture is UL listed for Class I, Division 2.

Features

- Fixtures are available with ballasts to support T12 and T8 lamps for nearly all U.S. and foreign voltage and frequency combinations.
- Low operating costs provide more lumens per Watt than incandescent fixtures.
- Housing is smooth, seamless, one-piece injection molded.
- Lens comes in high-impact polycarbonate plastic or impact-resistant acrylic.
- Fixtures are washable, non-conductive and corrosion-resistant.
- Enclosure is rated at IP65 (using polycarbonate lens), dust-proof and protected against water spray.
- A compressible, one-piece, non-thixotropic polyol gasket is bonded to the housing around the entire perimeter. It forms a continuous tight seal with the lens to keep out dirt, vapor and moisture.
- Lens is securely clamped to fixture using six captive corrosion-proof molded celcon tension latches. Lens is impact-resistant acrylic to protect lamps against breakage, and protect work area from broken lamp glass.
- Electrical components are mounted on a metallic wireway. Reflector is supported by internal safety springs to simplify installation and servicing.
- Optional fusing protects circuitry against occasional line voltage spikes.
- FR Series fixtures are available with one or two watertight 1/2" hubs for electrical-feed mounting or single-entry mounting.

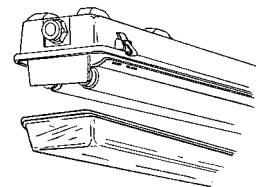
Standard Materials

- Housing: fiberglass reinforced polyester
- Lens: polycarbonate or acrylic. (Fixture has IP65 rating with polycarbonate lens.) Acrylic lens supplied as standard
- Latches: celcon
- Ceiling mounting bracket: stainless steel
- Adjustable wall mount: copperfree (4/10 of 1% max.) aluminum
- Fixed wall mount: stainless steel



Illustrated Features

Non-thixotropic polyol gasket is bonded to housing. With plastic latches closed, it forms a continuous, tight seal with lens. Keeps out moisture, vapor and dirt. Allows fast, easy fixture washing.



- Chain mount: zinc plated steel
- Gasket: non-thixotropic polyol
- Hubs: zinc plated steel with neoprene o-ring
- Lampholders: polycarbonate

Standard Finishes

- Housing: white color finish
- Celcon latches: white color finish
- Adjustable wall mount: epoxy powder coat

Options:

- Add Suffix **-F** for Fused
- Add Suffix **-T** for Terminal Blocks
- Add Suffix **-P** for Polycarbonate Lens for IP65 Rating
- Add Suffix **-E** for Emergency Battery Pack capability in moments of power interruption. Luminaire automatically switches to emergency mode, keeping two lamps illuminated for a minimum of 90 minutes. When AC power is restored, battery automatically recharges in 24 hours. Initial light output is 600-700 lumens.

NEC/CEC Compliances and Certifications

- FR Series:
 - UL Standard: UL 1598
 - UL Listed: E187946
 - CSA Standard: C22.2 No. 250
 - cUL Listed: E187946
- FD Series:
 - UL Standard: UL 1598, UL 844
 - UL Listed: E10794
 - CSA Standard: C22.2 No. 250, C22.2 No. 137
 - cUL Listed: E10794

FR and FD Luminaires

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4 foot, 2 lamp fixtures. High-impact fiberglass reinforced polyester fixtures suitable for use in wet and damp locations.

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NEC/CEC — FD Series

Class I, Division 2, Groups A, B, C, D

Class I, Zone 2, IIC

Order using catalog numbering guide below.

Catalog Numbering Guide For FR And FD Nonmetallic Fluorescent Lighting Fixtures

FR	N1	C	2	4	08	S	BU	2	F
Series: FR - Wet Location FD - Class I, Division 2 ①	Conduit/Cable Entry: N1 - 1/2" NPT Conduit Single Entry M1 - Cable Gland Single Entry ④ N2 - 1/2" NPT Conduit (2 hubs provided) M2 - Cable Gland Feed Thru ⑤	Mounting Configuration: C - Ceiling P - Pendant	Number of Lamps: 2 - 2 Lamps	Lamp Length: 4 - 4 Feet	Lamp Type: 08 - T8, 32 W, 265MA 12 - T12, 40 W, 430MA	Ballast Type: S - Solid State ②	Voltage: 347 - 347 V, 60 Hz ⑦ BU - 120-277 V, 50/60 Hz (-18 °C (0 °F) start) ⑤	Number of Ballasts: Blank - Single 2 - Double	Options: F - Fused ⑥ T - Terminal Blocks P - Polycarbonate lens ③ for IP65 EL - Emergency Battery Pack

① Fixture is not available with M1 or M2 cable entry options

② Cold weather standard for T8.

③ Use polycarbonate lens for IP65 rating.

④ Fixture will be supplied with a 1.5 m (5') length of #14/3 cord and 3 prong plug (120 V) pre-installed when ordered with cable gland. Fixture with cable gland can only be used with hook and chain mounting.

⑤ T8-RS only.

⑥ Canadian Electrical Code does NOT allow fusing in hazardous locations.

⑦ Certified to meet the Canadian Electrical Code (CEC) only.

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4 foot, 2 lamp fixtures. High-impact fiberglass reinforced polyester fixtures suitable for use in wet and damp locations.

NEC/CEC — FR Series

Wet Locations

IP65 when used with optional polycarbonate lens

NEC/CEC — FD Series

Class I, Division 2, Groups A, B, C, D

Class I, Zone 2, IIC

Appleton®

FLUORESCENT/AREA: NEC/CEC ENCLOSED AND GASKETED

Item	Description	Catalog Number
Hub		
	1/2" NPT watertight conduit hub	FHUB
Cable Gland		
	Cable gland	FGLAND
Lampholder		
	32 W (T8) and 40 W (T12) lampholder	FS0C40
Lens Clip		
	Standard plastic clips	FPCLIP
Lens		
	Acrylic lens cover	FLENS
	Polycarbonate lens cover ①	FPLENS
Ceiling Mounting Bracket (Supplied standard with product)		
	Stainless steel bracket with mounting hardware (set of 2)	FBRACKET
Fixed 45° Wall Mount		
	11 gauge (1/8") stainless steel (set of 2)	FWWFM

① When used with FD series, fixture has an IP65 rating.

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4 foot, 2 lamp fixtures. High-impact fiberglass reinforced polyester fixtures suitable for use in wet and damp locations.

NEC/CEC — FR Series

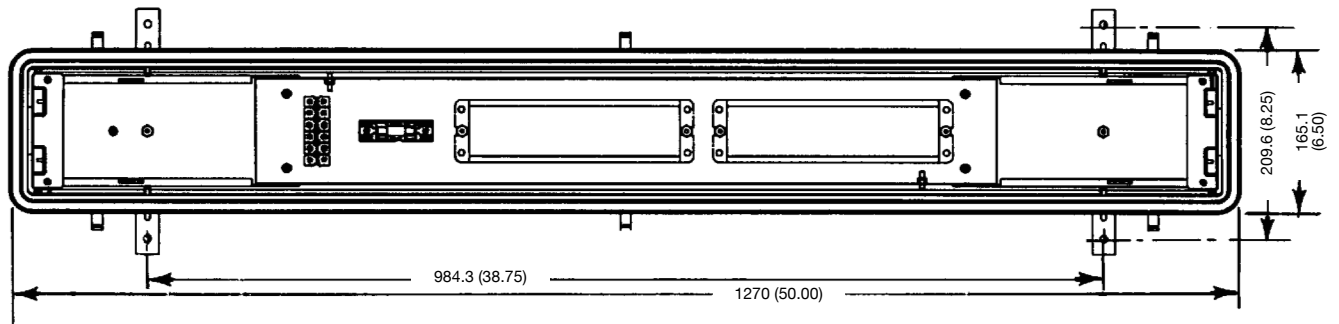
Wet Locations
IP65 when used with optional polycarbonate lens

NEC/CEC — FD Series

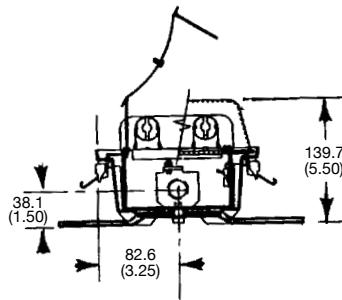
Class I, Division 2, Groups A, B, C, D
Class I, Zone 2, IIC

Dimensions in Millimeters (Inches)

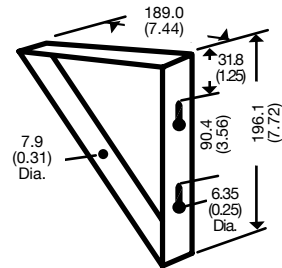
View of Fixture Cover



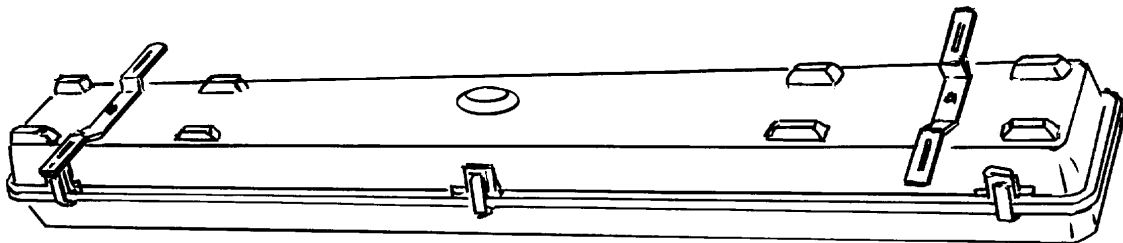
Side View



Fixed 45° Wall Mount — FVWFM



View of Fixture Mounting



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NEC/CEC — FR Series

Wet Locations

IP65 when used with optional polycarbonate lens

NEC/CEC — FD Series

Class I, Division 2, Groups A, B, C, D

Class I, Zone 2, IIC

Photometric Data

CANDELA DISTRIBUTION					
0.0	22.5	45.0	67.5	90.0	Flux
0	1155	1155	1155	1155	1155
5	1159	1153	1150	1148	1148
15	1118	1118	1124	1134	1137
25	1036	1049	1071	1109	1125
35	918	945	1010	1087	1114
45	766	812	927	1026	1056
55	569	652	788	900	927
65	342	450	598	719	753
75	148	259	432	567	604
85	25	133	318	444	473
90	4	98	270	376	412
95	5	84	258	372	414
105	2	42	182	292	341
115	0	13	69	139	182
125	0	3	22	36	50
135	0	0	9	15	19
145	0	0	2	7	9
155	0	0	0	0	2
165	0	0	0	0	0
175	0	0	0	0	0
180	0	0	0	0	0

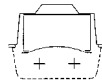
TOTAL LUMINAIRE EFFICIENCY = 84.6%

CIE Type — Semi-Direct

Plane: 0° 90°

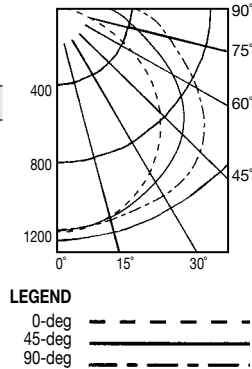
Spacing Criteria: 1.3 1.5

Shielding Angles: 1 0



ZONAL LUMEN SUMMARY

ZONE	LUMENS
0-30	926
0-40	1562
0-60	2962
0-90	4282
90-120	509
90-130	529
90-150	538
90-180	539
0-180	4820



REPORT NUMBER: ITL 47240

Lamps: Two 32 W, 4-foot F32T8/TL735 fluorescents, 2850 lumens per lamp with acrylic lens.

COEFFICIENTS OF UTILIZATION — ZONAL CAVITY METHOD

EFFECTIVE FLOOR CAVITY REFLECTANCE 0.20

% Ceiling RC		80				70				50				30				10				0			
% Walls RW		70	50	30	10	70	50	30	10	50	30	10	50	30	10	50	30	10	50	30	10	50	30	10	50
0		.98	.98	.98	.98	.95	.95	.95	.95	.89	.89	.89	.83	.83	.83	.78	.78	.78	.75	.75	.75	.75	.75	.75	.75
1		.88	.83	.78	.74	.84	.80	.76	.72	.75	.71	.68	.70	.67	.65	.65	.63	.61	.65	.63	.61	.58	.58	.58	.58
2		.79	.71	.65	.59	.76	.69	.63	.58	.64	.59	.55	.60	.56	.52	.56	.52	.50	.56	.52	.50	.47	.47	.47	.47
3		.71	.62	.54	.48	.68	.60	.53	.47	.56	.50	.45	.52	.47	.43	.49	.45	.41	.49	.45	.41	.39	.39	.39	.39
4		.65	.54	.46	.40	.62	.52	.45	.39	.49	.43	.38	.46	.41	.36	.43	.38	.35	.43	.38	.35	.32	.32	.32	.32
5		.60	.48	.40	.34	.57	.47	.39	.33	.44	.37	.32	.41	.35	.31	.38	.34	.30	.38	.34	.30	.28	.28	.28	.28
6		.55	.43	.35	.29	.53	.42	.34	.29	.39	.33	.28	.37	.31	.27	.35	.30	.26	.35	.30	.26	.24	.24	.24	.24
7		.51	.39	.31	.26	.49	.38	.30	.25	.36	.29	.24	.33	.28	.24	.32	.27	.23	.32	.27	.23	.21	.21	.21	.21
8		.47	.35	.28	.23	.45	.34	.27	.22	.32	.26	.22	.31	.25	.21	.29	.24	.20	.29	.24	.20	.19	.19	.19	.19
9		.44	.32	.25	.20	.42	.31	.25	.20	.30	.24	.19	.28	.23	.19	.27	.22	.18	.27	.22	.18	.17	.17	.17	.17
10		.41	.30	.23	.18	.40	.29	.22	.18	.27	.22	.17	.26	.21	.17	.25	.20	.16	.25	.20	.16	.15	.15	.15	.15

CANDELA DISTRIBUTION					
0.0	22.5	45.0	67.5	90.0	Flux
0	566	566	566	566	566
5	568	565	564	563	563
15	548	549	550	554	555
25	506	512	523	543	552
35	448	461	495	535	549
45	374	396	458	509	525
55	283	324	399	457	475
65	177	241	318	393	409
75	72	142	211	259	267
85	6	63	150	212	228
90	1	46	118	167	186
95	1	43	122	176	198
105	0	20	84	131	154
115	0	5	33	74	92
125	0	1	10	18	24
135	0	0	5	9	10
145	0	0	1	4	5
155	0	0	0	1	1
165	0	0	0	0	0
175	0	0	0	0	0
180	0	0	0	0	0

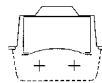
TOTAL LUMINAIRE EFFICIENCY = 83.6%

CIE Type — Semi-Direct

Plane: 0° 90°

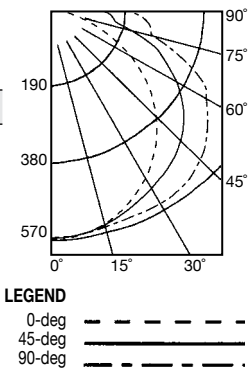
Spacing Criteria: 1.3 1.5

Shielding Angles: 1 0



ZONAL LUMEN SUMMARY

ZONE	LUMENS
0-30	453
0-40	765
0-60	1464
0-90	2126
90-120	241
90-130	251
90-150	256
90-180	256
0-180	2383



REPORT NUMBER: ITL 47241

Lamps: Two 32 W, 4-foot F32T8/TL735 fluorescents, 2850 lumens per lamp with polycarbonate lens.

COEFFICIENTS OF UTILIZATION — ZONAL CAVITY METHOD

EFFECTIVE FLOOR CAVITY REFLECTANCE 0.20

% Ceiling RC		80				70				50				30				10				0			
% Walls RW		70	50	30	10	70	50	30	10	50	30	10	50	30	10	50	30	10	50	30	10	50	30	10	50
0		.97	.97	.97	.97	.94	.94	.94	.94	.88	.88	.88	.82	.82	.82	.77	.77	.77	.75	.75	.75	.75	.75	.75	.75
1		.87	.82	.78	.74	.84	.79	.75	.72	.74	.71	.68	.69	.67	.64	.65	.63	.61	.65	.63	.61	.58	.58	.58	.58
2		.78	.70	.64	.58	.75	.68	.62	.57	.63	.59	.54	.59	.55	.52	.55	.52	.49	.56	.52	.49	.47	.47	.47	.47
3		.71	.61	.53	.48	.68	.59	.52	.47	.55	.49	.45	.52	.47	.43	.48	.44	.41	.49	.45	.41	.38	.38	.38	.38
4		.64	.54	.46	.40	.62	.52	.44	.39	.48	.42	.37	.45	.40	.36	.43	.38	.34	.43	.38	.34	.32	.32	.32	.32
5		.59	.47	.39	.34	.56	.46	.39	.33	.43	.37	.32	.40	.35	.31	.38	.33	.29	.38	.33	.29	.27	.27	.27	.27
6		.54	.42	.35	.29	.52	.41	.34	.28	.39	.32	.27	.36	.31	.27	.34	.29	.26	.34	.29	.26	.24	.24	.24	.24
7		.50	.38	.31	.25	.48	.37	.30	.25	.35	.29	.24	.33	.27	.23	.31	.26	.22	.31	.26	.22	.21	.21	.21	.21
8		.46	.35	.27	.22	.45	.34	.27	.22	.32	.26	.21	.30	.25	.21	.28	.24	.20	.28	.24	.20	.18	.18	.18	.18
9		.43	.32	.25	.20	.42	.31	.24	.20	.29	.23	.19	.28	.22	.18	.26	.21	.18	.26	.21	.18	.17	.17	.17	.17
10		.41	.29	.22	.18	.39	.28	.22	.18	.27	.21	.17	.26	.20	.17	.24	.20	.16	.24	.20	.16	.15	.15	.15	.15

FR and FD Luminaires

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4 foot, 2 lamp fixtures. High-impact fiberglass reinforced polyester fixtures suitable for use in wet and damp locations.

NEC/CEC — FR Series

Wet Locations

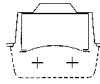
IP65 when used with optional polycarbonate lens

NEC/CEC — FD Series

Class I, Division 2, Groups A, B, C, D

Class I, Zone 2, IIC

Photometric Data

CANDELA DISTRIBUTION							TOTAL LUMINAIRE EFFICIENCY = 80.7%		
							CIE Type – Semi-Direct		
0.0	22.5	45.0	67.5	90.0	Flux				
0	1224	1224	1224	1224	1224	Plane:	0°	90°	
5	1228	1223	1221	1219	1218	Spacing Criteria:	1.3	1.5	
15	1185	1190	1204	1219	1222	Shielding Angles:	1	0	
25	1097	1122	1158	1200	1214				
35	974	1020	1090	1166	1192				
45	811	881	993	1094	1122				
55	600	701	837	943	967				
65	358	476	625	736	761				
75	154	271	443	566	600				
85	25	136	325	455	490				
90	5	101	285	401	442				
95	5	84	260	372	415				
105	2	45	187	294	343				
115	0	14	85	163	204				
125	0	3	23	53	81				
135	0	0	9	16	20				
145	0	0	0	5	7				
155	0	0	0	0	0				
165	0	0	0	0	0				
175	0	0	0	0	0				
180	0	0	0	0	0				
							ZONAL LUMEN SUMMARY		
							ZONE	LUMENS	
							0- 30	992	
							0- 40	1676	
							0- 60	3164	
							0- 90	4521	
							90-120	528	
							90-130	556	
							90-150	564	
							90-180	564	
							0-180	5085	

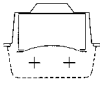
REPORT NUMBER: ITL 47242

Lamps: Two 40 W, 4-foot F40WW fluorescents, 3150 lumens per lamp with acrylic lens.

COEFFICIENTS OF UTILIZATION – ZONAL CAVITY METHOD

EFFECTIVE FLOOR CAVITY REFLECTANCE 0.20

% Ceiling RC		80				70				50				30				10				0
% Walls	RW	70	50	30	10	70	50	30	10	50	30	10	50	30	10	50	30	10	0			
0		.94	.94	.94	.94	.91	.91	.91	.91	.85	.85	.85	.79	.79	.79	.74	.74	.74	.72			
1		.84	.79	.75	.71	.81	.76	.73	.69	.71	.68	.65	.67	.64	.62	.62	.60	.58	.56			
2		.76	.68	.62	.57	.72	.66	.60	.55	.61	.57	.53	.57	.53	.50	.54	.50	.48	.45			
3		.68	.59	.52	.46	.66	.57	.51	.45	.53	.48	.43	.50	.45	.41	.47	.43	.40	.37			
4		.62	.52	.44	.39	.60	.50	.43	.38	.47	.41	.36	.44	.39	.35	.41	.37	.33	.31			
5		.57	.46	.39	.33	.55	.45	.38	.32	.42	.36	.31	.39	.34	.30	.37	.32	.29	.27			
6		.53	.41	.34	.28	.50	.40	.33	.28	.38	.32	.27	.35	.30	.26	.33	.29	.25	.23			
7		.49	.37	.30	.25	.47	.36	.29	.24	.34	.28	.24	.32	.27	.23	.30	.26	.22	.20			
8		.45	.34	.27	.22	.43	.33	.26	.22	.31	.25	.21	.29	.24	.20	.28	.23	.20	.18			
9		.42	.31	.24	.20	.40	.30	.24	.19	.29	.23	.19	.27	.22	.18	.26	.21	.18	.16			
10		.39	.28	.22	.18	.38	.28	.22	.17	.26	.21	.17	.25	.20	.16	.24	.19	.16	.14			

CANDELA DISTRIBUTION							TOTAL LUMINAIRE EFFICIENCY = 78.9%		
	0.0	22.5	45.0	67.5	90.0	Flux	CIE Type – Semi-Direct		
0	1188	1188	1188	1188	1188		Plane:	0°	90°
5	1188	1186	1186	1184	1183	113	Spacing Criteria:	1.3	1.5
15	1146	1155	1165	1177	1181	330	Shielding Angles:	1	0
25	1060	1085	1122	1165	1178	519			
35	940	984	1055	1135	1161	663			
45	782	850	970	1073	1102	738			
55	589	687	836	950	977	725			
65	367	500	652	765	791	618			
75	145	293	437	548	563	431			
85	12	132	306	428	464	302			
90	4	106	270	381	421				
95	5	86	244	348	389	240			
105	2	42	178	278	321	172			
115	0	8	82	163	201	88			
125	0	1	19	54	82	27			
135	0	0	8	16	18	6			
145	0	0	1	5	8	2			
155	0	0	0	0	0	0			
165	0	0	0	0	0	0			
175	0	0	0	0	0	0			
180	0	0	0	0	0	0			
							ZONAL LUMEN SUMMARY		
							ZONE	LUMENS	
							0- 30	961	
							0- 40	1624	
							0- 60	3087	
							0- 90	4438	
							90-120	500	
							90-130	527	
							90-150	535	
							90-180	535	
							0-180	4973	

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Lamps: Two 40 W, 4-foot F40WW fluorescents, 3150 lumens per lamp with polycarbonate lens.

COEFFICIENTS OF UTILIZATION – ZONAL CAVITY METHOD

EFFECTIVE FLOOR CAVITY REFLECTANCE 0.20

% Ceiling RC		80				70				50				30				10				0
% Walls	RW	70	50	30	10	70	50	30	10	50	30	10	50	30	10	50	30	10	0			
	0	.92	.92	.92	.92	.89	.89	.89	.89	.83	.83	.83	.78	.78	.78	.73	.73	.73	.70			
	1	.82	.78	.74	.70	.79	.75	.71	.68	.70	.67	.64	.65	.63	.61	.61	.59	.57	.55			
	2	.74	.67	.61	.55	.71	.64	.59	.54	.60	.55	.52	.56	.52	.49	.53	.49	.47	.44			
	3	.67	.58	.51	.45	.64	.56	.49	.44	.52	.47	.42	.49	.44	.41	.46	.42	.39	.37			
	4	.61	.51	.43	.38	.58	.49	.42	.37	.46	.40	.35	.43	.38	.34	.40	.36	.33	.31			
	5	.56	.45	.38	.32	.53	.44	.37	.31	.41	.35	.30	.38	.33	.29	.36	.32	.28	.26			
	6	.51	.40	.33	.28	.49	.39	.32	.27	.37	.31	.26	.35	.29	.25	.33	.28	.24	.23			
	7	.47	.36	.29	.24	.46	.35	.29	.24	.33	.27	.23	.31	.26	.22	.30	.25	.21	.20			
	8	.44	.33	.26	.21	.42	.32	.26	.21	.30	.25	.20	.29	.23	.20	.27	.23	.19	.17			
	9	.41	.30	.24	.19	.39	.29	.23	.19	.28	.22	.18	.26	.21	.18	.25	.20	.17	.16			
	10	.38	.28	.21	.17	.37	.27	.21	.17	.26	.20	.16	.24	.19	.16	.23	.19	.15	.14			