40 watt 22.5" T12 Designer 4,100K Rapid Start Curvalume Fluorescent Sylvania Light Bulb (FB40/D41/6)

General Information

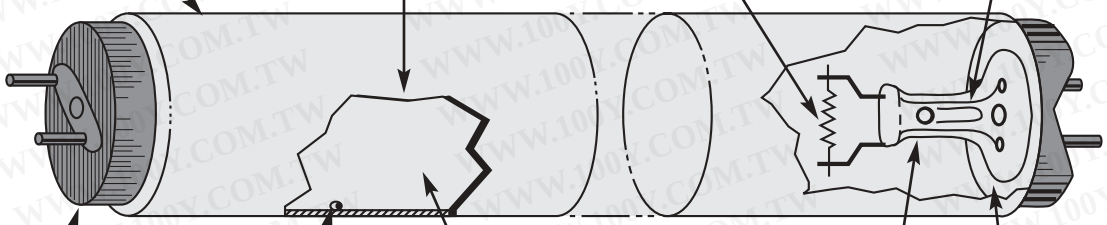
Our Part #:	24082
Manufacturer:	Sylvania
Manufacturer Code:	FB40/D41/6

Specifications

Light Output:	3,050 lumens
Energy Used:	40 watts
Average Lifetime:	18,000 hours
Bulb Type:	T12
Base Type:	Medium Bi-Pin
Color Temperature:	4,100K
CRI:	70
Length:	22.5 inches

OSRAM SYLVANIA: THE LEADER IN ENERGY SAVING FLUORESCENT LAMPS

The fluorescent lamp is an electric discharge device which utilizes a low pressure mercury vapor arc to generate ultra-violet (plus a little visible) energy. The ultra-violet energy is absorbed by a phosphor coat on the inside of the glass tube and converted by the phosphor to visible wavelengths; the wavelengths of the light generated are determined by the composition of the phosphor. In addition to the small amount of mercury vapor, the fluorescent tube contains an atmosphere of an inert gas, usually argon, krypton, neon, or a mixture of two or more of these gases. The pressure of the gases contained in the lamp is very low, usually from 2 to 3 torr. Atmospheric pressure is 760 torr.



BULB
Usually straight glass tube. May also be circular or U-shaped.

PHOSPHOR
Coating inside the bulb transforms ultraviolet radiation into visible light. Color of light produced depends on composition of phosphor.

CATHODE
"Hot cathodes" at each end of lamp are coated with emissive materials which emit electrons. Usually made of coiled-coil or single-coil tungsten wire.

EXHAUST TUBE
Air is exhausted through this tube during manufacture and inert gas introduced into the bulb.

BASE
Several different types used to connect the lamp to the electric circuit and to support the lamp in the lampholder.

MERCURY
A minute quantity of liquid mercury is placed in the bulb to furnish mercury vapor.

GAS
Usually argon or a mixture of inert gases at low pressure. Krypton is sometimes used.

STEM PRESS
The lead-in wires have an air tight seal here and are made of specific wire to assure about the same coefficient of expansion as the glass.

LEAD-IN WIRES
Connect to the base pins and carry the current to and from the cathodes and the mercury arc.

HOW TO READ PRODUCT INFORMATION - COMPACT FLUORESCENT

Nominal Wattage	Bulb	MOL (in)	MOL (mm)	Base	Product Number	Ordering Abbreviation	NEMA Generic Designation	Pkg Qty	Avg Rated Life (hrs)	CCT (K)	CRI	Approx Lumens Initial @25°C/77°F	Approx Lumens Mean @25°C/77°F	Symbols & Footnotes
20	T4	6.3	160	Med	29296	**CF20EL/830/MED**		6	6000	3000	82	1280	1101	2,21,28, 36,63,64
26	T4	6.8	173	G24D-3	20710	**CF26DD/830**	CFQ26W/G24D/30	50	10000	3000	82	1800	1548	2,21,28, 34,37
32	T4	5.5	140	GX24Q-3	20885	**CF32DT/E/IN/835**	CFTR32W/GX24Q/35	50	10000	3500	82	2400	2064	2,21,28, 33,35,59
40	T5	22.6	573	2G11	20586	**FT40DL/841/RS**	FT40W/2G11/RS/41	10	20000	4100	82	3150	2709	2,21,28

Nominal Wattage	Design wattage on reference ballast. Actual wattage dependent on ballast.
Bulb	Describes the shape of the bulb followed by the bulb's diameter at its widest point. The diameter value is expressed in eighths of an inch. Ex. T = Tubular, 4 = 4/8 inch = 1/2 inch. Please see page 103 for bulb illustrations.
Base	Base designations for compact fluorescent lamps are the NEMA designations. Please see page 104 for base illustrations.
MOL	Maximum overall length. The actual length of the lamp measured from the bottom of the base to the top outside edge of the glass. In many cases, the bottom of the base is the bottom of the center post of the base of the lamp.
Symbols & Footnotes	Most symbols and footnotes that apply to a specific product will appear in this space. The explanations of the symbols and footnotes are at the end of the fluorescent section.
Ordering Abbreviation	A text description of the lamp. Please see below for several examples and explanations of some of the codes.
NEMA Generic Designation	Designation assigned by NEMA (National Electrical Manufacturers Association).
CCT	Correlated Color Temperature. The degree of "whiteness" of the light. Expressed in kelvins (K). Please see page 99 for more information.
CRI	Color Rendering Index. A numbering system for rating the relative color rendering quality of a light source compared to a standard. Please see page 99 for more information.
Initial & Mean Lumens	Initial lumens are measured when the lamp has been operating for 100 hours. Mean lumens are typically measured at 40% of the rated life of the lamp. Compact Fluorescent lamp lumens are measured at 25°C (77°F).

How to Read Ordering Abbreviations

CF26DD/830		CF32DT/E/IN/835		FT40DL/841/RS		CF20EL/830/MED	
CF	Compact Fluorescent	CF	Compact Fluorescent	FT	Fluorescent Twin	CF	Compact Fluorescent
26	Nominal lamp wattage	32	Nominal lamp wattage	40	Nominal lamp wattage	20	Nominal lamp wattage
DD	DULUX Double	DT	DULUX Triple	DL	DULUX Long	EL	Electronic Lamp
8	82 CRI	E	Electronic or dimming operation	8	82 CRI	8	82 CRI
30	3000K CCT	IN	Amalgam	41	4100K CCT	30	3000K CCT
		8	82 CRI	RS	Rapid Start	MED	Medium screw base
		35	3500K CCT				

DULUX® LAMP FAMILIES

CF... DS = DULUX Single, 2-pin for magnetic operation, ECOLOGIC®
CF... DS/E = DULUX Single, 4-pin for electronic or dimming operation
CF... DD = DULUX Double, 2-pin for magnetic operation, ECOLOGIC
CF... DD/E = DULUX Double, 4-pin for electronic or dimming operation, ECOLOGIC
CF... DT = DULUX Triple, 2-pin for magnetic operation, ECOLOGIC
CF... DT/E = DULUX Triple, 4-pin for electronic or dimming operation, ECOLOGIC
CF... DT/E/IN = DULUX Triple, 4-pin for electronic or dimming operation, amalgam, ECOLOGIC
FT... DL = Fluorescent Twin, DULUX Long, 4-pin
CF... DF = DULUX Flat, 4-pin
CF... EL = DULUX self-ballasted, medium screw base

HOW TO READ PRODUCT INFORMATION - FLUORESCENT

Nominal Wattage	Bulb	Nominal Length(in)	MOL (in)	Base	Product Number	Ordering Abbreviation	Pkg Qty	Avg Rated Life (hrs)	CCT (K)	CRI	Approx Lumens Initial @25°C/77°F	Approx Lumens Mean (@35°C/95°F)	Symbols & Footnotes
32	T8	48	47.78	Med Bipin	21763	**FO32/835XP/ECO**	30	24000	3500	85	3000	2850	Ⓔ 2,21,31, 35,39,60,70
34	T12	48	47.78	Med Bipin	24594	**F34CW/SS** Formerly **F40CW/SS**	30	20000	4200	62	2650	2279	Ⓔ 2,10,13, 19,21,42
54	T5	48	45.5	Mini Bipin	20857	**FP54/830/HO**	40	20000	3000	82	4450 5000	4228 4750	2,21,26,35,59
60	T12	96	94	Single Pin	29815	**F96T12/CW/SS**	15	12000	4200	62	5300	4664	Ⓔ 2,15,21

Nominal Wattage	Design wattage on reference ballast. Actual wattage dependent on ballast.
Bulb	Describes the shape of the bulb followed by the bulb's diameter at its widest point. The diameter value is expressed in eighths of an inch. Ex. T = Tubular, 8 = 8/8 inch = 1 inch. Please see page 103 for bulb illustrations.
Base	Please see page 104 for base illustrations.
Nominal Length	The nominal length of linear fluorescent lamps is typically measured from back of lampholder to back of lampholder. PENTRON® linear lamp, CURVALUME® and Circline lamps are exceptions. The nominal length given for PENTRON linear lamps is the closest familiar nominal length. CURVALUME lamps are measured from the face of the bases to the outside of the glass bend. The measurement for Circline lamps is the outside diameter. Values are in inches.
MOL	Maximum overall length. The length of the lamp measured in inches.
Symbols & Footnotes	Most symbols and footnotes that apply to a specific product will appear in this space. The explanations of the symbols and footnotes are at the end of the fluorescent section.
Ordering Abbreviation	A text description of the lamp. Please see below for several examples and explanations of some of the codes.
CCT	Correlated Color Temperature. The degree of "whiteness" of the light. Expressed in kelvins (K). Please see page 99 for more information.
CRI	Color Rendering Index. A numbering system for rating the relative color rendering quality of a light source compared to a standard. Please see page 99 for more information.
Initial & Mean Lumens	Initial lumens are measured when the lamp has been operating for 100 hours. Mean lumens are typically measured at 40% of the rated life of the lamp. For longer life lamp such as the OCTRON® XP™ lamps, the mean lumens are measured at the same point in time as they are measured for the standard lamps they replace. Fluorescent lamp lumens are typically measured at 25°C (77°F). The lamp lumens are measured at both 25°C (77°F) and 35°C (95°F) for PENTRON linear lamps.

How to Read Ordering Abbreviations

FO32/835XP/ECO	
F	Fluorescent
O	OCTRON
32	Nominal lamp wattage
8	85 CRI
35	3500K CCT
XP	EXtended Performance
ECO®	ECOLOGIC® - TCLP passing lamp

F34CW/SS	
F	Fluorescent
34	Nominal lamp wattage
CW	Cool White phosphor
SS	SUPERSAVER® - reduced wattage lamp

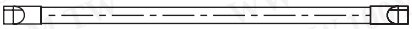
FP54/830/HO	
F	Fluorescent
P	PENTRON
54	Nominal lamp wattage
8	82 CRI
30	3000K CCT
HO	High Output

F96T12/CW/SS	
F	Fluorescent
96	96" nominal length
T	Tubular Shape Bulb
12	Bulb diameter; ⅛ inch = 1 ½ inches
CW	Cool White phosphor
SS	SUPERSAVER - reduced wattage lamp

FLUORESCENT LAMPS

The bulb shape and size of a fluorescent lamp are expressed by means of a code consisting of the letter "T" (which designates that the bulb is "tubular" in shape) followed by a number that expresses the diameter in eighths of an inch. Diameters range from T2 (¼ inch) to T17 (2 ⅛ inch). In nominal overall length, linear fluorescent lamps range from 6 to 96 inches. The nominal length is measured from back of lamp holder to back of lamp holder. For example, the actual overall length of the 40-watt rapid start T12 lamp with a nominal length of 48 inches is 47 ¾ inches. The nominal length given for PENTRON® linear lamps is the closest familiar nominal length. CURVALUME® U-shaped fluorescent lamps are available as OCTRON® T8 lamps with leg spacings of 1 ⅝ inches and 6 inches and as rapid start T12 lamps with leg spacings of 3 ⅝ inches and 6 inches. The leg spacing is measured from the center of one leg to the center of the other leg. The overall length of the CURVALUME lamps is measured from the face of the bases to the outside of the glass bend. Circline lamps, which are circular in shape, are available as T9 lamps with outside diameters of 6 ½, 8, 12 and 16 inches as well as PENTRON T5 lamps with outside diameters of 8.85 and 11.77 inches.The overall length of DULUX® compact fluorescent lamps is measured from the bottom of the base to the outside edge of the glass. In many cases, the bottom of the base is the bottom of the center post of the base of the lamp.

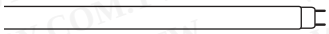
T2 MINIATURE



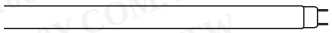
T2 Axial Base (2/8" Diameter)

PREHEAT, RAPID START

Preheat T5 Miniature Bipin (5/8" diameter
PENTRON T5 Miniature Bipin (5/8" diameter)

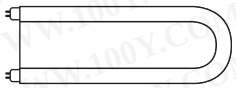


T8 Medium Bipin (1" diameter)

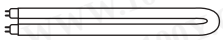


OCTRON T8 Medium Bipin (1" diameter)
Rapid Start or Instant Start operation

T12 Medium Bipin (1-1/2" diameter)



U-Shaped T12
(1-1/2" diameter)
6" leg spacing



OCTRON T8 U-Shaped
with 1 5/8" leg spacing
(1" diameter)

OCTRON T8 U-Shaped
with 6" leg spacing
(1" diameter)

ICETRON®

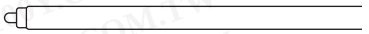
HIGH OUTPUT AND VERY HIGH OUTPUT

OCTRON T8 Recessed Double Contact (1" diameter)

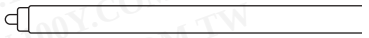
T12 Recessed Double Contact (1-1/2" diameter)

T14-1/2 Recessed Double Contact (1-13/16" diameter)

INSTANT START

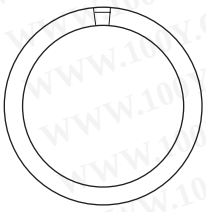


T6 Single Pin (3/4" diameter)

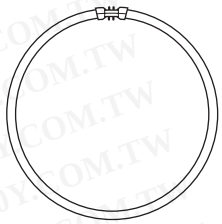


T8 Single Pin (1" diameter)
OCTRON T8 Single Pin (1" diameter)

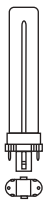
T12 Single Pin (1-1/2" diameter)



CIRCLINE 4-Pin T-9
(6-1/2", 8", 12", 16"
outside diameters)

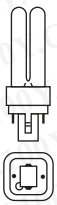


PENTRON CIRCLINE 4-
Pin T5 (8.85" & 11.77"
outside diameters)

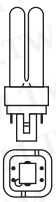


DULUX S

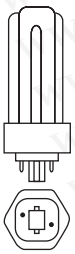
DULUX S/E



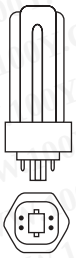
DULUX D



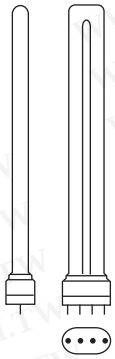
DULUX D/E



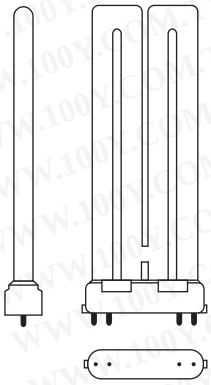
DULUX T



DULUX T/E
DULUX T/E/IN



DULUX L



DULUX F

DULUX
EL Triple

DULUX
EL TWIST

DULUX EL CLASSIC
(A-Shape)

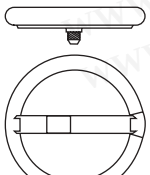
DULUX EL
BULLET

DULUX EL Low
Profile GLOBE

DULUX EL
GLOBE

DULUX EL
REFLECTOR

BR-30



DULUX EL Circline (6-1/2"
& 8" outside diameters)

BASES

For linear Preheat and Rapid Start Lamps, four electrical contacts are required, two at each end of the lamp. This is accomplished in the standard line of lamps by the use of a miniature bipin base for T5 lamps and a medium bipin for T8 and T12 lamps. The OCTRON® T8 medium bipin lamps may also be operated as instant start lamps with the proper wiring and ballasts. When operating OCTRON bipin lamps with instant start ballasts, the two contacts in the lamp holder are shorted together and connected to the single circuit in the ballast. In Circline lamps, the cathodes are connected to a four-pin base located between the junction of the two ends of the lamp. High Output (HO) and Very High Output (VHO) lamps have recessed double contact (RDC) type bases. Slimline Instant Start lamps require only two electrical contacts, one on each lamp end and have single pin bases.

Pin-based compact fluorescent lamps have either 2 pins or 4 pins. Each 2-pin lamp has an internal starter and is designed for preheat, magnetic operation. The 4-pin lamps are designed for electronic ballast operation and are dimmable. These lamps have no internal starter; starting the lamps is a function of the ballast.

Medium screw base, compact fluorescent lamps have integral ballasts.

SINGLE PIN


Single Pin for T6 Slimline


Single Pin for T8 Slimline & OCTRON


Single Pin for T12 Slimline

BIPIN


Miniature Bipin for T5 Preheat & PENTRON®

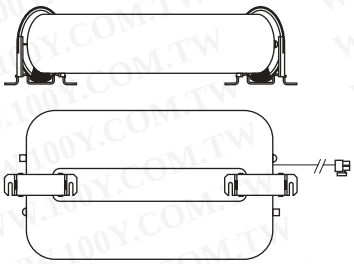

Miniature Bipin for T8 Preheat & OCTRON

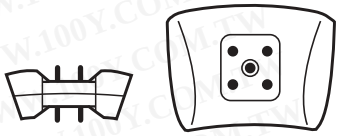

Medium Bipin for T12


Axial T2 Subminiature

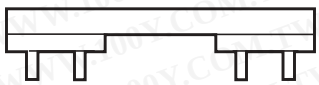

Recessed Double Contact for OCTRON T8 HO


Recessed Double Contact for T12 HO & VHO


ICETRON® Mounting Brackets


4-pin for PENTRON Circline

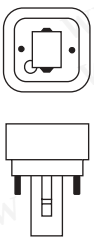
4-pin for T9 Circline

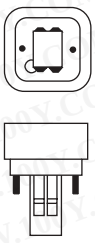

OCTRON T8 & T12 Rapid Start CURVALUME

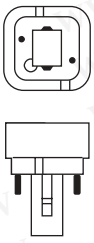
FOR CHOKE/STARTER OPERATION

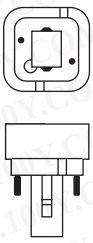

G 23


GX 23


G 23-2


GX 23-2


G 24 d2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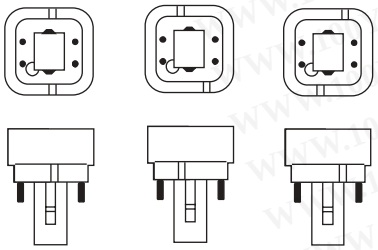
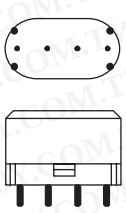
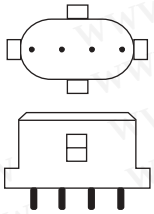
FOR ELECTRONIC OR DIMMING OPERATION


G 24 q-1 | G 24 q-2 | G 24 q-3


2 G 11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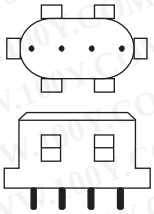
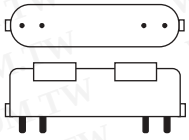
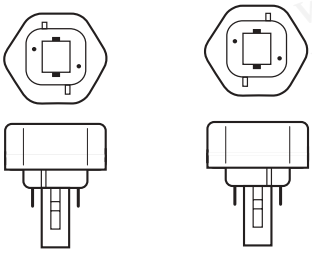

2 GX 7


2G 10 DULUX F


Medium Screw Base or DULUX® EL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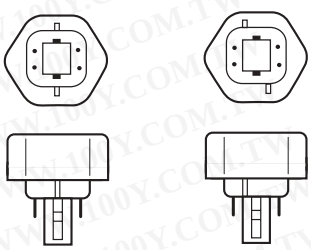
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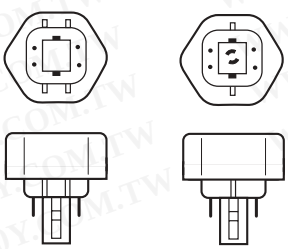
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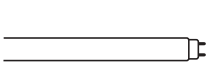
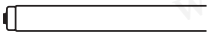

T12 Med Bipin


Circline 4-Pin T9


T12 RDC

RAPID START LAMPS

CURVALUME® Rapid Start SUPERSAVER® - U-Shaped, 6" Leg Spacing

Nominal Wattage	Bulb	Nominal Length (in)	MOL (in)	Base	Product Number	Ordering Abbreviation	Pkg Qty	Avg Rated Life (hrs)	CCT (K)	CRI	Approx Lumens Initial @25°C/77°F	Approx Lumens Mean @25°C/77°F	Symbols & Footnotes
34	T12	22.5	22.6	Med Bipin	24059	**FB34/CW/6/SS/UPC** *formerly FB40/CW/SS/6*	12	18000	4200	62	2600	2236	Ⓔ 1,2,43,45

CURVALUME® Rapid Start Standard Lamps - U-Shaped, 6" Leg Spacing

Nominal Wattage	Bulb	Nominal Length (in)	MOL (in)	Base	Product Number	Ordering Abbreviation	Pkg Qty	Avg Rated Life (hrs)	CCT (K)	CRI	Approx Lumens Initial @25°C/77°F	Approx Lumens Mean @25°C/77°F	Symbols & Footnotes
40	T12	22.5	22.6	Med Bipin	24080	**FB40/D30/6**	12	18000	3000	70	3050	2745	Ⓔ CRI 1,2,8,43
					24017	**FB40/D830/6**	12	18000	3000	80	3200	2880	Ⓔ CRI 1,2,8,43
					24081	**FB40/D35/6**	12	18000	3500	70	3050	2745	Ⓔ CRI 1,2,8,43
					24004	**FB40/CWX/6**	12	18000	4100	87	2100	1806	CRI 1,2,8,43
					24082	**FB40/D41/6**	12	18000	4100	70	3050	2745	Ⓔ CRI 1,2,8,43

Circline T9 Rapid Start Lamps

Nominal Wattage	Bulb	Outside Diameter (in)	Base	Product Number	Ordering Abbreviation	Pkg Qty	Avg Rated Life (hrs)	CCT (K)	CRI	Approx Lumens Initial @25°C/77°F	Approx Lumens Mean @25°C/77°F	Symbols & Footnotes
20	T9	6.25-6.75	4 Pin	20155	**FC6T9/WW/RS**	12	8000	3000	52	800	696	1,2,8,48
				20156	**FC6T9/CW/RS**	12	8000	4200	62	750	653	1,2,8,48
22	T9	8.00-8.50	4 Pin	20209	**FC8T9/DWW/RP**	6	12000	3000	70	1100	990	CRI 1,2,8,48
				20088	**FC8T9/WW/RS**	12	12000	3000	52	1050	914	1,2,8,48
				20148	**FC8T9/CW/RS**	12	12000	4200	62	1050	914	1,2,8,48
				20151	**FC8T9/CW/RS/6 PACK**	6	12000	4200	62	1050	914	1,2,8,48
				20080	**FC8T9/D/RS**	12	12000	6500	76	900	783	CRI 1,2,8,48
30	T9	8.00-8.50	4 Pin	20210	**FC8T9/830/EL**	6	10000	3000	80	1850	1591	CRI 1,2,3,16,17,49
32	T9	11.50-12.0	4 Pin	20233	**FC12T9/DWW/RP**	6	15000	3000	70	2100	1806	CRI 1,2,8,48
				20037	**FC12T9/WW/RS**	12	15000	3000	52	1950	1697	1,2,8,48
				20142	**FC12T9/CW/RS**	12	15000	4200	62	1925	1675	1,2,8,48
				20143	**FC12T9/CW/RS/6 PACK**	6	15000	4200	62	1925	1675	1,2,8,48
				20030	**FC12T9/D/RS**	12	15000	6500	76	1650	1436	CRI 1,2,8,48
40	T9	15.5-16	4 Pin	20057	**FC16T9/WW/RS**	12	18000	3000	52	2800	2436	1,2,8,48
				20132	**FC16T9/CW/RS**	12	18000	4200	62	2750	2393	1,2,8,48
				20072	**FC16T9/D/RS**	12	18000	6500	76	2350	2045	CRI 1,2,8,48

High Output (800mA) Rapid Start SUPERSAVER® Lamps

Nominal Wattage	Bulb	Nominal Length (in)	MOL (in)	Base	Product Number	Ordering Abbreviation	Pkg Qty	Avg Rated Life (hrs)	CCT (K)	CRI	Approx Lumens Initial @25°C/77°F	Approx Lumens Mean @25°C/77°F	Symbols & Footnotes
55	T12	48	46	Recessed DC	25137	**F48T12D35/HO/SS**	30	12000	3500	70	3750	3375	CRI 1,2,50,51
95	T12	96	93.91	Recessed DC	25008	**F96T12/D830/HO/SS**	15	12000	3000	80	8750	8050	Ⓔ CRI 1,2,50,51
					25011	**F96T12/WW/HO/SS**	15	12000	3000	52	7700	6237	Ⓔ 1,2,50,51

Symbols/Footnotes on page 139-143

SYMBOLS & FOOTNOTES FOR FLUORESCENT LAMPS

Symbol	Description
	New item introduced within the past year.
	Item will be discontinued when inventory is depleted.
	QUICK60+® warranty
	Rating given for 200mA operation.
	This fluorescent lamp generates radiant energy which is most beneficial for plant propagation and enhances vegetative and reproductive growth of many plants for home and commercial use.
	This lamp or ballast meets minimum Federal efficiency standards.
	This ECOLOGIC® lamp was designed to pass the Federal TCLP criteria for classification as non-hazardous waste in most states. Disposal regulations may vary; check local and state regulations.
CRI	This lamp is a High Color Rendering Lamp
	Product is Canadian Standards Association approved for the Canadian market
	Product is Underwriters Laboratories listed

Footnote	Description
1	Approximate initial lumens after 100 hours operation.
2	The life ratings of fluorescent lamps are based on 3 hr. burning cycles under specified conditions and with ballast meeting ANSI specifications. If burning cycle is increased, there will be a corresponding increase in the average hours life.
3	Rule of Thumb for Compact Fluorescent Lamps: Divide wattage of incandescent lamp by 4 to determine approximate wattage of compact fluorescent lamp that will provide similar light output.
4	Minimum starting temperature: CF5: -22 degrees F; CF7: -4 degrees F; CF9: 14 degrees F; CF13DS: 14 degrees F; CF13DD: -4 degrees F; CF18DD: 5 degrees F; CF18DT: -4 degrees F; CF26: 14 degrees F.
5	2 pin CF lamps should never be installed in 4 pin sockets regardless if lamp will fit.
6	SYLVANIA ECOLOGIC® fluorescent lamps are designed to pass the Federal Toxic Characteristic Leaching Procedure (TCLP) criteria for classification as non-hazardous waste in most states. TCLP test results are available upon request. Lamp disposal regulations may vary, check your local & state regulations. For more information, please visit www.lamprecycle.org
7	CAUTION: This lamp emits ultraviolet (UV) power during operation and is in Risk Group 1 per ANSI/IESNA RP-27.3-96. Exposure at less than 0.3 meters (12 inches) should be limited; for example exposure at 0.2m (8 inches) should not exceed 4 hours in an 8 hour interval (see ANSI/IESNA RP-27.1-96). Certain medications and chemicals can increase an individual's sensitivity. Consult your physician for specific information. Protective eyewear should be worn in occupational situations involving long term exposure in close proximity to the lamp. This lamp is not intended and should not be used for diagnostic, therapeutic or cosmetic purposes.
8	Minimum starting temperature is a function of the ballast; consult the ballast manufacturer.
9	There is a NEMA supported, industry issue where T2, T4, and T5 fluorescent and compact fluorescent lamps operated on high frequency ballasts may experience an abnormal end-of-life phenomenon. This end-of-life phenomenon can result in one or both of the following: 1. Bulb wall cracking near the lamp base. 2. The lamp can overheat in the base area and possibly melt the base and socket. NEMA recommends that high frequency compact fluorescent ballasts have an end-of-life shutdown circuit which will safely and reliably shut down the system in the rare event of an abnormal end-of-life failure mode described above. The final requirements of this system are yet to be defined by ANSI. For additional information refer to NEMA papers on their WEBSITE at www.NEMA.org.
10	This 4-pin DULUX® lamp has an internal end-of-life mechanism (EOL) that shuts down the lamp preventing abnormal end-of life failure modes. This lamp was designed for use with high frequency ballasts that do not have their own end-of-life (lamp) sensing circuits, but it is also compatible with high frequency ballasts that have their own end-of-life (lamp) sensing circuits.
11	Lumen output and life rated on high frequency operation.
12	Amalgam compact fluorescent lamps provide at least 90% light output from 40-140 degrees F. Non-amalgam compact fluorescent lamps provide at least 90% light output from 60-100 degrees F in the base up position, the temperature range is narrower for horizontal or base down.
13	These lamps may also be operated on rapid start circuits. On rapid start circuits the 24 watt lamp operates at 27 watts and the 36 watt lamp operated at 39 watts. Rated lamp life is unchanged.
14	Lumen output rated on high frequency operation. 60 HZ operation would result in lower lumen output.
15	DULUX® F lamps can typically be operated on DULUX L and PENTRON® HO ballasts of the same/similar wattage. Check with the ballast manufacturer to verify lamp/ballast compatibility.
16	Minimum starting temperature for DULUX EL lamps is 0° F, unless otherwise specified in product literature.

SYMBOLS & FOOTNOTES FOR FLUORESCENT LAMPS

Footnote	Description
17	DULUX® Els meet CSA, FCC and UL requirements.
18	Caution: DULUX EL units cannot be used on dimming circuits, emergency exit fixtures or lights, electronic timers, photocells or lighted switches. In outdoor applications, use only in enclosed fixtures to avoid exposure to weather. Use only on 120V, 60 Hz circuits. Never disassemble or modify lamp. Install or remove unit from fixture by grasping plastic base. Best performance achieved when operated at 77degrees F (25 degrees C).
19	Minimum starting temperature for EL Globes & Reflectors is -22 degrees F. Minimum starting temperature for EL Triples, Twists and Mini Twists is 0 degrees F.
20	The life rating of OCTRON® and OCTRON Curvalume lamps operated on magnetic rapid start ballasts is 20,000 hours. The life rating of OCTRON and OCTRON Curvalume lamps operated on instant start electronic ballasts is 15,000 hours.
21	OCTRON lamps should be operated only with magnetic rapid start ballasts designed to operate 265 mA, T8 lamps or high frequency (electronic) ballasts that are either instant start, or rapid start, or programmed rapid start specifically designed to operate T8 lamps. OCTRON lamps may be operated on instant start ballasts with ballast factors ranging from a minimum of 0.71 to a maximum of 1.20 at the nominal ballast input voltage. When OCTRON lamps are operated in the instant start mode, the two wires or two contacts of each socket should be connected to each other. They should then be connected to the appropriate ballast lead wire using National Electric Code techniques.
22	Life rating of OCTRON XP™ lamps operated on instant start electronic ballasts is 18,000 hours based on the industry standard life test cycle of 3 hours per start.
23	The lamp lumen maintenance factor used to determine the mean lumen value was 95%. This is the lamp lumen maintenance factor at 8,000 hours, 40% of 20,000 hours. It was used to allow comparison to standard OCTRON® lamps with an average rated life of 20,000 hours. The lamp lumen maintenance factor at 40% of the 24,000 hour average rated life of this lamp, 9600 hours, would be 94%.
24	Gold OCTRON lamp has plastic tube guard which filters wavelengths less than 525nm and provides shatter protection.
25	SAFELINE® lamps satisfy the criteria of having a non-shattering covering for prevention of glass and other lamp components in your product by containment within the safety coating material. The covering must be intact or the lamp must be replaced to be in compliance. An onsite inspector will require correction if the lamps are installed improperly or not maintained properly.
26	SAFELINE lamps are intended for indoor use only. Lamps must be used in ambient temperatures below 135 degreed F. The coating is designed to withstand constant operating temperatures up to 239 degrees F and has a melting point in excess of 500 degrees F. Lamps must be used with sockets that provide adequate lamp pin to socket contact. Lamps must not be used with defective ballasts sockets, or fixtures with improper wiring.
27	The lumen maintenance factor used to determine the mean lumens value was 90%, measured at 40% of the average rated life, 15,000 hours. The lumen maintenance factor at 4,000-4,800 hours (for comparison to F96T12 HO and F96T12 Slimline instant start lamps) is 91%.
28	The lamp lumen maintenance factor used to determine the mean lumen value was 95%. This is the lamp lumen maintenance factor at 8000 hours, 40% of 20,000 hours. It was used for comparison to standard OCTRON® lamps with an average rated life of 20,000 hours. The lamp lumen maintenance factor at 40% of 24,000 hours, 9600 hours, would be 94%; the lamp lumen maintenance factor at 40% of 30,000 hours, 12,000 hours, would be 93%
29	This lamp may also be operated by the OSRAM SYLVANIA QUICKTRONIC® PSN ballast (.88 BF), or the QUICTRONIC PSX ballast (.71 BF).
30	Recommended to be used on any F32 T8 Instant Start circuit. It is not recommended to be used:(1) with Rapid Start circuits unless the open circuit voltage is greater than 550V, (2) at lamp ambient temperatures below 60 degrees F or in drafty locations, (3) on low power factor ballast, (4) dimming ballast or (5) inverter operated emergency lighting systems unless any of the above equipment is specifically listed for use with the OCTRON® SUPERSAVER® 28 or 30 watt, 4 foot or 30W U-bent T8 lamp. Any of the above situations could result in lamp starting and stabilization problems.
31	The 30,000 hour average rated life of the FO32/800XPS/ECO OCTRON® lamp is based on operation at 3 hours per start on a dedicated QUICKTRONIC® PSX ballast. If operated on other ballasts for T8 OCTRON lamps, lamp life will be 20,000 hours for rapid start operation, 24,000 hours for programmed rapid start operation and 15,000 hours for instant start operation at 3 hours per start.
32	Germicidal lamps can be operated on corresponding wattage preheat ballasts.
33	Mean lumens at 8,000 hours (40% of 20,000 hours for comparison to standard OCTRON and F40 rapid start lamps). The lumen maintenance factor at 40% of average rated life (9,600 hours) is 94%.
34	Recommended to be used on any F96 T8 Instant Start circuit. It is not recommended to be used: (1) at lamp ambient temperatures below 60 degrees F or in drafty locations, (2) on low power factor ballast, or (3) inverter operated emergency lighting systems unless any of the above equipment is specifically listed for use with the OCTRON FO96 SUPERSAVER 55 watt T8 lamp. Any of the above situations could result in lamp starting and stabilization problems.

SYMBOLS & FOOTNOTES FOR FLUORESCENT LAMPS

Footnote	Description
35	The lumen maintenance factor used to determine the mean lumen value was 95%. This is the lamp lumen maintenance factor at 6000 hours, 40% of 15,000 hours. It was used to allow comparison to standard OCTRON® lamps with an average rated life of 15000 hours. The lamp lumen maintenance factor at 40% of the 18,000 hour average rated life of this lamp, 7200 hours, would be 94%.
36	The lumen maintenance factor used to determine the mean lumens value was 92%, measured at 40% of the average rated life, 15,000 hours. The lumen maintenance factor at 4,000-4,800 hours (for comparison to F96T12 HO and F96T12 Slimline instant start lamps) is 93%.
37	Approximate length of OCTRON CURVALUME lamps is measured from base face to outside of glass bend.
38	For optimum performance OCTRON CURVALUME 1 5/8 inch leg spacing lamps in the 3000K, 3500K and 4100K color temperatures are now available only in the 82CRI version (800 series). These lamps are made to the same color standards and may be used in combination with other SYLVANIA OCTRON lamps to meet the needs of lighting installations where T8 lamps are used.
39	The 30,000 hour average rated of the OCTRON® XPS CURVALUME® lamp is based on operation at 3 hours per start by a dedicated QUICKTRONIC® PSX ballast. If operated by other ballasts for T8 OCTRON lamps, life will be the same as that of the XP version of the lamp: typically 24,000 hours for rapid or programmed rapid start operation and 18,000 hours for instant start operation at 3 hours per start.
40	The lamp lumen maintenance factor used to determine the mean lumen value was 95%. This is the lamp lumen maintenance factor at 8,000 hours, 40% of 20,000 hours. It was used to allow comparison to standard OCTRON lamps with an average rated life of 20,000 hours. The lamp lumen maintenance factor at 40% of 24,000 hours, 9600 hours, would be 94%; the lamp lumen maintenance factor at 40% of 30,000 hours, 12000 hours, would be 93%.
42	Recommended only for use on 2-lamp, 30 watt rapid-start high power factor lead, indoor ballasts that meet ANSI standards. Not intended for use: (1) at lamp ambient temperatures below 60 degrees F or in drafty locations, (2) on low power factor ballasts, (3) reduced current/reduced light output ballasts, (4) dimming ballasts, or (5) on inverter operated emergency lighting systems unless any of the above equipment is specifically listed for use with 25 watt lamps.
43	Average rated life is measured at 3 hours per start on 2-lamp, rapid start magnetic ballasts per IES recommended practice. Lamp life on single-lamp rapid start ballasts may be reduced.
44	Average life rating at 12 hours operation per start is 28,800 hours.
45	Recommended for use on one or two lamp 40 watt rapid start, high power factor, lead, indoor ballasts that meet ANSI standards. Not intended for use: (1) at lamp ambient temperatures below 60 degrees F or in drafty locations, (2) on low power factor ballasts, (3) reduced current/reduced light output ballasts, (4) dimming ballasts, or (5) on inverter operated emergency lighting systems unless any of the above equipment is specifically listed for use with 34 watt lamps.
46	The "RS" designation has been eliminated to simplify the ordering abbreviation.
47	40W Rapid Start Lamps may be used in starter operated fixtures designed for 40W preheat lamps. Life rating for preheat service is approximately 15,000 hours average.
48	Rating for OSRAM SYLVANIA Circline lamps are based on operation in Rapid Start circuits. They will also operate on preheat circuits.
49	Caution: DULUX® EL Circline units cannot be used on dimming circuits, emergency exit fixtures or lights, electronic timers, photocells or lighted switches. In outdoor applications, use only in enclosed fixtures to avoid exposure to weather. Use only on 120V, 60 Hz circuits.
50	Recommended for use on one or two lamp high power factor, lead, 8-foot lamp, high output, indoor ballasts that meet ANSI standards. Not intended for use: (1) at lamp ambient temperatures below 60 degrees F or in drafty locations, (2) on low power factor ballasts, (3) reduced current/reduced light output ballasts, (4) dimming ballasts, or (5) on inverter operated emergency lighting systems unless any of the above equipment is specifically listed for use with 95 watt lamps.
51	Average life rating at 12 hours operation per start is 18,000 hours.
52	May be operated at 100 watts (1000MA) same as F84T12/HO.
53	Labeled for cold temperature (below 60 degrees F) operation only per EPACT.
54	Average life rating at 12 hours operation per start is 15,000 hours.
55	Low temperature performance rated at 35 degrees F ambient.
56	Low temperature performance rated at 35 degrees F ambient.
57	Cool White lamp with 30 degree aperture (Power Beam).
58	Recommended for use on 2-lamp high power factor, lead, 8-foot lamp, very high output, indoor ballasts that meet ANSI standards. Not intended for use: (1) at lamp ambient temperatures below 60 degrees F or in drafty locations, (2) on low power factor ballasts, (3) reduced current/reduced light output ballasts, (4) dimming ballasts, or (5) on inverter operated emergency lighting systems unless equipment is specifically listed for use with 195 watt lamps.
59	Recommended for use on one or two lamp high power factor, lead, instant-start, indoor ballasts that meet ANSI standards. Not intended for use: (1) at lamp ambient temperatures below 60 degrees F or in drafty locations, (2) on low power factor ballasts, (3) reduced current/reduced light output ballasts, (4) dimming ballasts, or (5) on inverter operated emergency lighting systems unless any of the above equipment is specifically listed for use with 32 watt or 60 watt lamps.

SYMBOLS & FOOTNOTES FOR FLUORESCENT LAMPS

Footnote	Description
60	For operation on instant start circuits. Use only in fixtures equipped with Instant Start Ballasts.
61	A fluorescent jacketed lamp consists of a T12 (1 1/2" diameter) lamp enclosed inside a T14.5 (1 13/16" diameter) glass jacket. A jacketed fluorescent lamp operates efficiently over a wide range of climatic conditions, including extremes of cold and strong wind in which an unjacketed (bare) lamp would be inefficient or inoperable. The jacket size provides the clearance necessary to minimize damaging lamp-jacket contact; narrow bands of rubber placed between the lamp and the jacket further prevent contact. A weather-tight seal is formed by neoprene rubber end caps.
62	Preheat lamp, starter required.
63	Due to their small diameter, T2 miniature fluorescent lamps operate at higher surface temperatures than other fluorescent lamps. To avoid possible burns, do not touch the lamp during operation and allow sufficient cooling time before removing the lamp from the fixture. The typical bulb wall temperature during operation is 120 degrees at the ends. The maximum allowable bulb wall temperature is 150 degrees C. To avoid electrical shock, turn electrical power off before removing or installing the lamp.
64	Use only with electronic ballasts which have been specifically designed to operate T2 miniature fluorescent lamps and to reliably and safely control all lamp operating modes including end-of-lamp-life sensing circuitry. If a non-conforming ballast is used, very high temperatures (350 degrees C typical) may be generated at the ends of the lamp especially during end-of-lamp-life operation, causing the lamp to crack and resulting in potential fire, electrical shock, or burn hazards.
65	Current ballast design incorporates a modular 2-Pin connector plugin from the lamp. An adapter, NAED code 26240, is available to connect 3-Pin lamp types to current (2-Pin) design ballasts.
66	Color and CRI at amalgam tip temperature of 149 degrees F (65 degrees C) for ICETRON 70 and ICETRON 100 and at 158 degrees F (70 degrees C) amalgam tip temperature for ICETRON 150.
67	ICETRON diameter is the outside diameter of the ferrite coil. ICETRON MOL is the length from the outside edge of the mounting bracket on one end to the outside edge of the mounting bracket on the opposite end.
68	WARNING: ICETRON® Inductively Coupled Electrodeless Fluorescent lamp. Read these warnings and instructions before installing and using this lamp. 1. This lamp operates at a higher temperature (130 C) than standard fluorescent lamps. To avoid the possibility of minor skin burns, do not touch lamp or metal mounting brackets during operation and allow sufficient cooling time prior to servicing, handling, or replacing lamp. 2. This lamp generates electric and magnetic fields during operation. The electric and magnetic fields generated by this lamp during operation in typical lighting applications do not pose exposure risks relative to the limits documented in ANSI C95.1. 3. To prevent electric shock, shut off the main power to the fixture and allow at least two minutes for ballast voltage to discharge before attempting to service or replace lamp. 4. To obtain optimum safety and system performance, use only with OSRAM SYLVANIA ballast. 5. To avoid potential electric shock hazard, do not use lamp if wires or insulation are cut or pulled out of connector. 6. To avoid potential electric shock hazard, do not use lamp if wires or insulation are cut or pulled out of connector.
69	WARNING: ICETRON® Inductively Coupled Electrodeless Fluorescent lamp. Read these warnings and instructions before installing and using this lamp. Instructions for Installation and Use. 1. To avoid premature lamp or ballast failure and ensure proper lamp, ballast, and system performance, make sure lamp, ballast, and fixture are properly installed. Electrical interconnects, electrical grounds, thermal management, and heat sinking specifications and requirements must be fully adhered to in all applications. (See OSRAM SYLVANIA ICETRON DESIGN GUIDE.) 2. Do not alter the electrical connector on lamp and/or ballast. To do so may adversely affect lamp operation, ballast life, and/or emission of EMI (electromagnetic interference). 3. This product may cause interference with radios, cordless telephones, and remote control devices. If interference occurs, relocate the radios, cordless telephones, and/or remote control devices away from this product.
70	The /2P version of the ICETRON lamp is supplied with a 24 inch lead wire terminated by a 2-Pin connector rather than the old 12 inch lead, 3-Pim connector design. The /2P versions are powered by QT1X100 ICE/UNV-T or QT1X150 ICE/UNV-T ballasts.
71	Starter required.
72	These lamps are not intended and should not be used for diagnostic, therapeutic, or cosmetic purposes.
73	CAUTION: This lamp emits ultraviolet (UV) power during operation and is in Risk Group 1 per ANSI/IESNA RP-27.3-96. Exposure at less than 0.35 meters (14 inches) should be limited; for example exposure at 0.25m (10 inches) should not exceed 4 hours in an 8 hour interval (see ANSI/IESNA RP-27.1-96). Certain medications and chemicals can increase an individual's sensitivity. Consult your physician for specific information. Protective eyewear should be worn in occupational situations involving long term exposure in close proximity to the lamp. This lamp is not intended and should not be used for diagnostic, therapeutic or cosmetic purposes.
74	CAUTION: This lamp emits ultraviolet (UV) power during operation and is in Risk Group 2 per ANSI/IESNA RP-27.3-96. Exposure at less than 0.45 meters (18 inches) should be limited; for example exposure at 0.3m (12 inches) should not exceed 4 hours in an 8 hour interval (see ANSI/IESNA RP-27.1-96). Certain medications and chemicals can increase an individual's sensitivity. Consult your physician for specific information. Protective eyewear should be worn in occupational situations involving long term exposure in close proximity to the lamp. This lamp is not intended and should not be used for diagnostic, therapeutic or cosmetic purposes.
75	CAUTION: This lamp emits ultraviolet (UV) power during operation and is in Risk Group 2 per ANSI/IESNA RP-27.3-96. Exposure at less than 0.55 meters (22 inches) should be limited; for example exposure at 0.4m (16 inches) should not exceed 4 hours in an 8 hour interval (see ANSI/IESNA RP-27.1-96). Certain medications and chemicals can increase an individual's sensitivity. Consult your physician for specific information. Protective eyewear should be worn in occupational situations involving long term exposure in close proximity to the lamp. This lamp is not intended and should not be used for diagnostic, therapeutic or cosmetic purposes.

SYMBOLS & FOOTNOTES FOR FLUORESCENT LAMPS

Footnote	Description
76	CAUTION: This lamp emits ultraviolet (UV) power during operation and is in Risk Group 2 per ANSI/IESNA RP-27.3-96. Exposure at less than 0.65 meters (26 inches) should be limited; for example exposure at 0.45m (18 inches) should not exceed 4 hours in an 8 hour interval (see ANSI/IESNA RP-27.1-96). Certain medications and chemicals can increase an individual's sensitivity. Consult your physician for specific information. Protective eyewear should be worn in occupational situations involving long term exposure in close proximity to the lamp. This lamp is not intended and should not be used for diagnostic, therapeutic or cosmetic purposes.
77	CAUTION: This lamp emits ultraviolet (UV) power during operation and is in Risk Group 2 per ANSI/IESNA RP-27.3-96. Exposure at less than 0.6 meters (24 inches) should be limited; for example exposure at 0.45m (18 inches) should not exceed 4 hours in an 8 hour interval (see ANSI/IESNA RP-27.1-96). Certain medications and chemicals can increase an individual's sensitivity. Consult your physician for specific information. Protective eyewear should be worn in occupational situations involving long term exposure in close proximity to the lamp. This lamp is not intended and should not be used for diagnostic, therapeutic or cosmetic purposes.
78	CAUTION: This lamp emits ultraviolet (UV) power during operation and is in Risk Group 2 per ANSI/IESNA RP-27.3-96. Exposure at less than 0.7 meters (28 inches) should be limited; for example exposure at 0.54m (20 inches) should not exceed 4 hours in an 8 hour interval (see ANSI/IESNA RP-27.1-96). Certain medications and chemicals can increase an individual's sensitivity. Consult your physician for specific information. Protective eyewear should be worn in occupational situations involving long term exposure in close proximity to the lamp. This lamp is not intended and should not be used for diagnostic, therapeutic or cosmetic purposes.
79	CAUTION: This lamp emits ultraviolet (UV) power during operation and is in Risk Group 2 per ANSI/IESNA RP-27.3-96. Exposure at less than 0.75 meters (30 inches) should be limited; for example exposure at 0.55m (22 inches) should not exceed 4 hours in an 8 hour interval (see ANSI/IESNA RP-27.1-96). Certain medications and chemicals can increase an individual's sensitivity. Consult your physician for specific information. Protective eyewear should be worn in occupational situations involving long term exposure in close proximity to the lamp. This lamp is not intended and should not be used for diagnostic, therapeutic or cosmetic purposes.
80	CAUTION: This lamp emits ultraviolet (UV) power during operation and is in Risk Group 2 per ANSI/IESNA RP-27.3-96. Exposure at less than 0.8 meters (31 inches) should be limited; for example exposure at 0.55m (22 inches) should not exceed 4 hours in an 8 hour interval (see ANSI/IESNA RP-27.1-96). Certain medications and chemicals can increase an individual's sensitivity. Consult your physician for specific information. Protective eyewear should be worn in occupational situations involving long term exposure in close proximity to the lamp. This lamp is not intended and should not be used for diagnostic, therapeutic or cosmetic purposes.
81	CAUTION: This lamp emits ultraviolet (UV) power during operation and is in Risk Group 2 per ANSI/IESNA RP-27.3-96. Exposure at less than 1.0 meters (39 inches) should be limited; for example exposure at 0.64m (24 inches) should not exceed 4 hours in an 8 hour interval (see ANSI/IESNA RP-27.1-96). Certain medications and chemicals can increase an individual's sensitivity. Consult your physician for specific information. Protective eyewear should be worn in occupational situations involving long term exposure in close proximity to the lamp. This lamp is not intended and should not be used for diagnostic, therapeutic or cosmetic purposes.
82	Blacklight lamp with 180 degree reflector.
83	CAUTION: This lamp emits ultraviolet (UV) power during operation and is in Risk Group 2 per ANSI/IESNA RP-27.3-96. Exposure at less than 2.0 meters (79 inches) should be limited; for example exposure at 1.4m (55 inches) should not exceed 4 hours in an 8 hour interval (see ANSI/IESNA RP-27.1-96). Certain medications and chemicals can increase an individual's sensitivity. Consult your physician for specific information. Protective eyewear should be worn in occupational situations involving long term exposure in close proximity to the lamp. This lamp is not intended and should not be used for diagnostic, therapeutic or cosmetic purposes.
84	CAUTION: This lamp emits ultraviolet (UV) power during operation and is in Risk Group 1 per ANSI/IESNA RP-27.3-96. Exposure at less than 0.25 meters (10 inches) should be limited; for example exposure at 0.14m (6 inches) should not exceed 4 hours in an 8 hour interval (see ANSI/IESNA RP-27.1-96). Certain medications and chemicals can increase an individual's sensitivity. Consult your physician for specific information. Protective eyewear should be worn in occupational situations involving long term exposure in close proximity to the lamp. This lamp is not intended and should not be used for diagnostic, therapeutic or cosmetic purposes.
85	CAUTION: This lamp emits ultraviolet (UV) power during operation and is in Risk Group 1 per ANSI/IESNA RP-27.3-96. Exposure at less than 0.3 meters (12 inches) should be limited; for example exposure at 0.14m (6 inches) should not exceed 4 hours in an 8 hour interval (see ANSI/IESNA RP-27.1-96). Certain medications and chemicals can increase an individual's sensitivity. Consult your physician for specific information. Protective eyewear should be worn in occupational situations involving long term exposure in close proximity to the lamp. This lamp is not intended and should not be used for diagnostic, therapeutic or cosmetic purposes.
86	CAUTION: This lamp emits ultraviolet (UV) power during operation and is in Risk Group 1 per ANSI/IESNA RP-27.3-96. Exposure at less than 0.3 meters (12 inches) should be limited; for example exposure at 0.15m (6 inches) should not exceed 4 hours in an 8 hour interval (see ANSI/IESNA RP-27.1-96). Certain medications and chemicals can increase an individual's sensitivity. Consult your physician for specific information. Protective eyewear should be worn in occupational situations involving long term exposure in close proximity to the lamp. This lamp is not intended and should not be used for diagnostic, therapeutic or cosmetic purposes.
87	WARNING: To prevent possible serious injury, eyes and skin should not be exposed to direct or reflected ultraviolet power emitted by this lamp. This lamp is in Risk Group 3 per ANSI/IESNA RP-27.3-96. Adequate protection should be provided by clothing, gloves, opaque materials, and ordinary window glass. Although this lamp will operate in standard fluorescent fixtures, it should not be used for general lighting applications.