

Retail Lighting Elements  
 Helpful Hints  
 Lighting Fixture Specifications

Basic Retail Lighting  
 Intermediate Retail Lighting  
 Higher-end Retail Lighting



SMALL RETAIL LIGHTING

# knowhow

## INTRODUCTION

### ENERGY EFFECTIVE LIGHTING

The selection of the right lighting can be a major contribution to retail sales. Lighting can establish a store's image, lead customers inside, focus their attention, make the products attractive and visible, and in general encourage purchasing. "Energy Effective" lighting provides all these benefits for the lowest life-cycle cost, while

saving energy, operating costs and maintenance. This guide shows you how it is done, with sample layouts and specifications that are energy effective, and energy code compliant. Retail lighting must have good color, contrast and balance between lighted surfaces. Other qualities are listed in the chart below. There is no single formula for all retail lighting. A professional lighting designer or retail designer may be able to create successful designs while breaking all the rules suggested here. However, this guide is intended to provide sound advice and simple techniques for consistently



Exposed sources give a bright, clean look.

successful and "energy effective" retail lighting.

### LIGHTING LAYOUTS

These layouts are intended for independent retail establishments between 500 and 1000 square feet in

size, and for three different types of stores: **Basic** retail lighting systems are appropriate for high activity, self-service retailing such as mass merchandising and discount stores. Shelves are generally tall and dense. Bright surfaces, exposed sources and industrial luminaires are an important part of the approach, communicating the image of "maximum value" to customers.

**Higher-end** retailing requires lower ambient levels and more accent lighting to create contrast and drama. These stores have a more relaxed level of customer activity with more personalized sales assistance. The majority of stores fall in between these categories, requiring more ambient lighting than exclusive shops, with fewer accent lights. We call this category an **intermediate** retail store.

### MOST IMPORTANT DESIGN FACTORS FOR RETAIL LIGHTING

	Feature Display	General Retail	Cashier	Circulation
Color Rendering Index / Color Temperature	●	●	⦿	⦿
Contrast / Accent / Highlight	●	●	⦿	⦿
Daylighting Integration / Control	●	●	●	○
Direct Glare / Reflected Glare	●	⦿	●	○
Image or Style	●	⦿	⦿	⦿
Modeling of Objects / Shadows	●	⦿	⦿	○
Visual Priority / Organization	⦿	⦿	⦿	⦿
Quantity of Light on Vertical Displays (fc)	⦿	⦿	●	⦿
Quantity of Light on Horizontal Surfaces (fc)	⦿	⦿	⦿	⦿
Aiming Flexibility of Accent Lighting	●	○		

● Very Important    ⦿ Important    ○ Somewhat Important

\* Adapted from the Lighting Design Guide. IESNA Lighting Handbook, 9th Edition

# retail lighting elements



## AMBIENT LIGHTING

General, uniform lighting using light fixtures that distribute the light widely, directly or indirectly. Ambient lighting enables the customer to see and examine the merchandise, and the sales staff to complete the sale and perform their other duties.

## ACCENT LIGHTING

Spotlighting used to provide higher levels of light in a focused pattern to accentuate selected objects in relation to their surroundings. Accent lighting establishes the importance of certain objects through the use of contrast, and highlights the form, structure, texture or color of the merchandise.

## PERIMETER LIGHTING AND VALANCE LIGHTING

Lighting the vertical surfaces. Asymmetrical light fixtures can direct light on tall vertical shelving and displays, typically located at the perimeter of the merchandise area. Valance lighting allows the source to be quite close to the merchandise, providing a shield or “valance” to conceal the light sources from the view of the customer. Valances are often built into the wall, shelving unit or gondola. Although primarily intended to provide light down on the merchandise, they also can be designed to light up on signage or provide indirect ambient lighting for the space.

## SHELF LIGHTING AND CASE LIGHTING

Small or miniature light sources located very close to the objects being displayed, shielded from the customer’s view. This lighting must be carefully selected for the particular application to avoid accidental contact with hot lamps and to prevent damaging the merchandise with too much ultra-violet radiation or heat.

## It's a Trade-Off

Higher-end shops do not need to use more energy to be effective. The lighting layouts on pages 4, 5 and 6 all have connected loads of 2.1 watts per square foot or less. All achieve good quality lighting appropriate for their businesses. Higher light levels are provided in **Basic** retailing. **Higher-end** shops provide more focus and highlights by decreasing the ambient light levels. Compared to common practice, 2.1 watts per square foot not only meets the latest energy codes, but also saves 30% of a store's energy cost for lighting.

# helpful hints

## TRUE OR FALSE?

**Q. Incandescent light has a truer color?**

**A. FALSE.** There is no “true” color of light, but mid-day natural light is often considered a standard because it has all the wavelengths of color in more or less equal amounts. Incandescent sources are rich in warm tones but weak in cool tones. This is flattering to skin tones but poor in revealing colors for many products, especially those containing blues and greens. New “tri-phosphor” technology has resulted in fluorescent sources with superior color rendering in a wide variety of color appearances and lamp types.

**Q. Low-voltage lamps use less energy than standard voltage lamps?**

**A. FALSE.** A 50 watt 12-volt lamp uses the same amount of power as a 50 watt, 120 volt lamp or 50 watt 277 volt lamp. However, low-voltage lamps have smaller filaments, which enables tighter focus of the beam. Thus, low voltage may be the most energy-effective choice for accent lighting.

**Q. More light is better?**

**A. FALSE.** Lighting for retail is all about contrast and focus. Too much accent lighting means no contrast and no focus. The greatest lighting value is achieved by balancing ambient and accent lighting.

# quicktips

## Getting the Most “Bang for your Bucks”

1. Put the light source close to the merchandise.
2. For ambient lighting, use efficient, diffuse sources, such as fluorescent.
3. For accent lighting, use narrow beam spotlights such as Halogen PARs or Low-Voltage MR-16s.
4. Use the fewest types of lamp to get the desired effect, reducing relamping mistakes and maintenance headaches.
5. Illuminate the aisles with spill light from the accented merchandising areas or displays.
6. Lower levels of ambient lighting require fewer watts of accent lighting.
7. Use the lightest colors on the interior surfaces of shelving.
8. Use organized patterns of light fixtures. Chaotic patterns may confuse, agitate or fatigue the customers.
9. Use high color rendering lamps for both ambient and task lighting.



## RETAIL don'ts COMMON MISAPPLICATIONS

1. Using incandescent lights for everything
2. Track lighting rather than fixed locations
3. Using floodlights rather than spotlights
4. Random fixture layouts or visual chaos
5. Too many shiny surfaces
6. Black ceilings
7. Dark finishes
8. Accenting everything emphasizing nothing in particular
9. Spotty lighting. Not enough ambient light to clearly examine merchandise

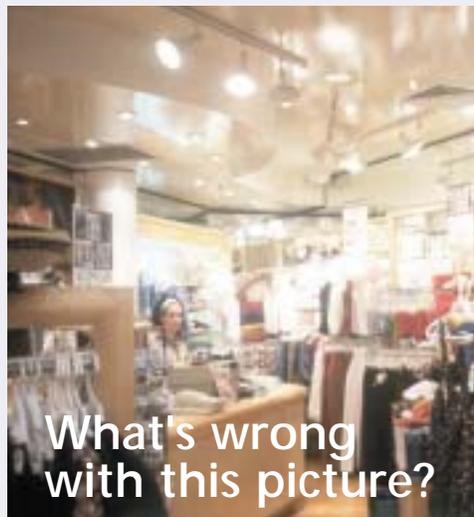
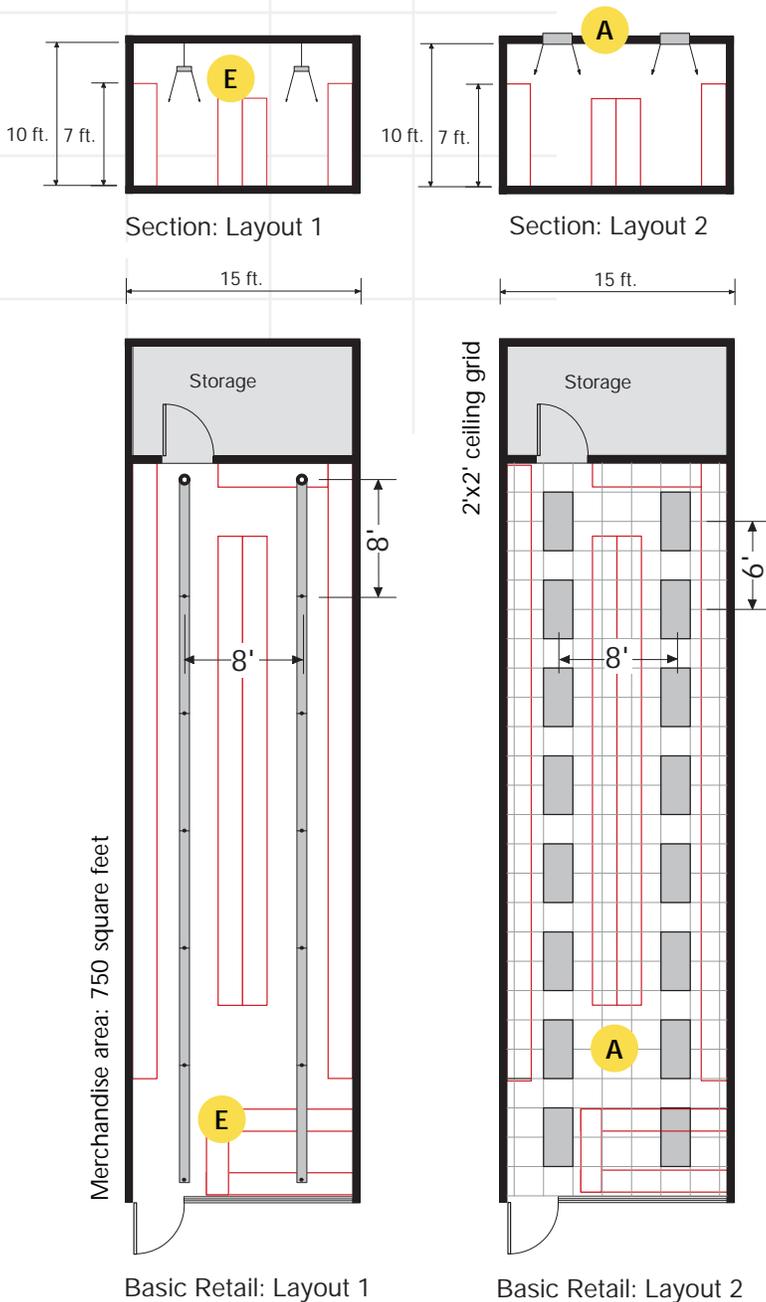


Photo by H. McKay

# basic retail lighting

## Bright ambient lighting



Types of stores: High activity retailing such as mass merchandising, discount stores, hardware, video, fast food, grocery, service establishments and sale of bulk or large objects such as appliances or furniture. A destination store that doesn't require lighting to draw customers inside, and that offers inexpensive products and/or significant value for money. Self-service.

Purpose of lighting: To light all objects uniformly, provide good visibility for reading labels and to create a bright, clean, stimulating environment.

### Lighting Strategies:

- Exposed sources are effective to project a "discount" or "speedy service" image. Fluorescent sources provide the best value, giving good color rendering, high efficiency lighting with the longest life.
- Use light colored finishes on all wall surfaces to increase overall brightness and reflected light.
- For a greater sense of brightness and consistency with daylight use "841" color lamps. This stands for a Color Rendering Index of 80+ and a Correlated Color Temperature of 4100K.
- Consider neon or colored lights for window displays or to identify departments.

### Lighting Levels:

50-80 footcandles ambient lighting.

## BASIC RETAIL FIXTURE SCHEDULE

**A:** 3-lamp Parabolic 2'x4'

**E:** 2-lamp Fluorescent pendant

See page 7 for complete fixture specifications.

## SUMMARY TABLE FOR "BASIC" RETAIL

	Layout 1	Layout 2
Ambient <sup>1</sup> Footcandles (fc)	80-90	50-60
Connected Load (W/sf)	1.8	1.9
Energy Savings <sup>2</sup> (%)	45-55%	40-50%
First Cost <sup>3</sup> (material & labor)	No adder	No adder
Applicable Area <sup>4</sup> (sf)	650-850	650-850

1-Actual FC may be 30% lower due to shelving units over 6' tall. 2-Savings compared to current lighting practices in the New England region. 3-Layout 1 and 2 cost the same and represent the lowest cost option. This is the basis of comparison for "Intermediate" and "Higher-End" costs. 4-Layout applies to any store within this size range, while meeting light level recommendations and without exceeding energy codes. Add rows of fixtures for larger stores.



# intermediate retail lighting

Ambient lighting with limited accent lighting



By locating efficient, inexpensive lights close to the product, valance lighting (Type C) is a very "energy effective" strategy.

Types of stores: Clothing, stationary, beauty shop, gourmet shops, accessories, housewares, furniture and small objects. Most common store type, with average level of retail activity.

Purpose of lighting: Sufficiently uniform illumination necessary to see and examine product and read labels. Limited accent lighting is desirable to set products apart, to create highlights or enhance texture and to attract attention to window displays.

Lighting Strategies:

- Partially conceal ambient light sources with louvers or baffles to create more emphasis on product.
- Locate accent lights close to displays.
- Use exposed or decorative accent lights to create attention or establish image.

Lighting levels: 30-50 fc ambient, 75-100 fc accent.

## INTERMEDIATE RETAIL FIXTURE SCHEDULE

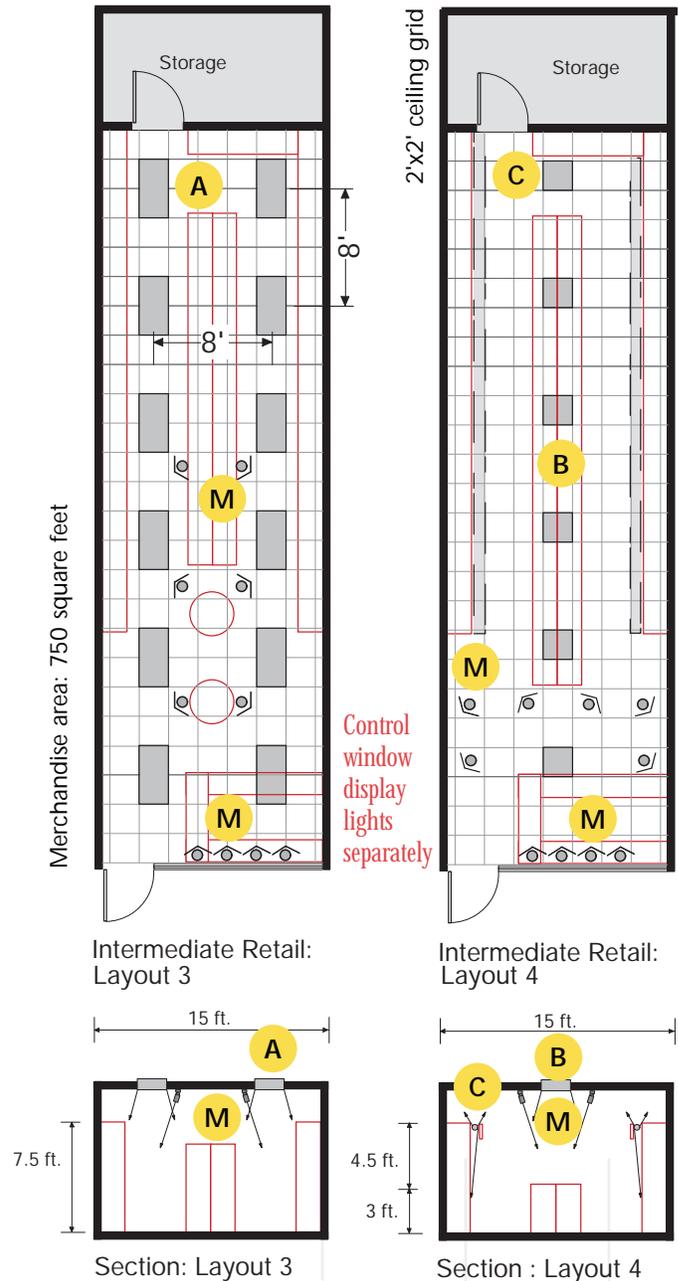
A: 3-lamp Parabolic 2'x4'

B: 2-lamp Parabolic 2'x2'

C: 1-lamp Fluorescent Valance

M: 50 Watt Accent Lights (M1, 2 or 3)

See page 7 for complete fixture specifications.



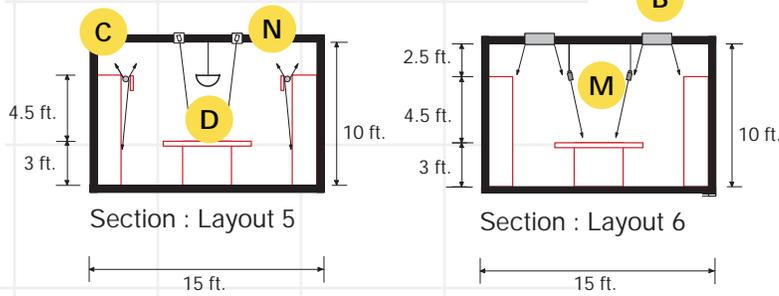
## SUMMARY TABLE FOR "INTERMEDIATE" RETAIL

	Layout 3	Layout 4
Ambient <sup>1</sup> Footcandles (fc)	35-45	35-45
Connected Load (W/sf)	2.1	1.8
Energy Savings <sup>2</sup> (%)	35-45%	45-55%
First Cost Increase <sup>3</sup> (material & labor)	+30-40%	+25-35%
Applicable Area <sup>4</sup> (sf)	650-850	650-850

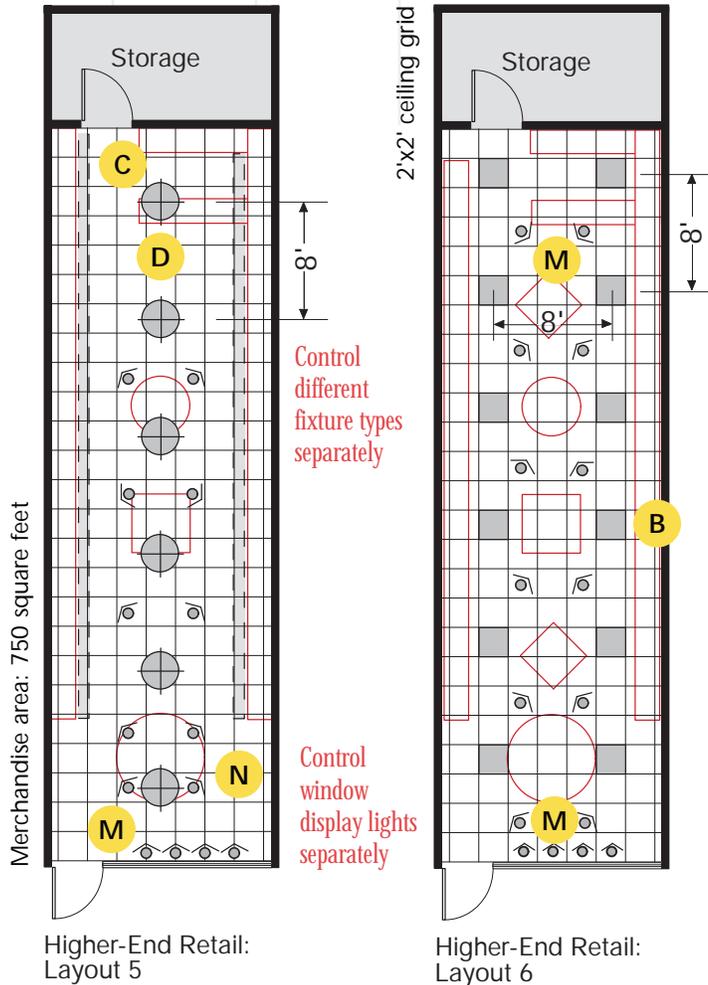
1-Actual FC may be 30% lower due to shelving units over 6' tall. 2-Savings compared to current lighting practices in the New England region. 3-Cost compared to Basic Retail Layouts 1 and 2 on page 4. 4-Layout applies to any store within this size range, while meeting lighting level recommendations and without exceeding energy codes. Add rows of fixtures for larger stores.

# higher-end retail

Reduced ambient light, more accent lighting



higher-end



Types of stores: More expensive or exclusive merchandise, such as jewelry, gifts, antiques, fine clothing and accessories, fine housewares and beauty salons. Lower activity than other retail types. Most personalized attention and assistance from sales personnel.

Purpose of lighting: To establish image and enhance product color, sparkle or texture. Encourage lingering, examination and impulse buying.

### Lighting Strategies:

- Use lower illumination levels for ambient lighting to enhance contrast of accent lighting, but do not eliminate ambient system.
- Use fluorescent lighting for ambient lighting. White-painted parabolic louvers may be preferable in small spaces or low ceilings. For highest end applications, consider smaller diameter (T-5 or T-2) fluorescent lamps for concealed applications such as coves, valances and shelf lighting.
- Use the best color rendering lamps (CRI above 80) and a warmer color temperature of 3000 to 3200 Kelvin. For example, select fluorescent lamps designated 830.
- Use accent lighting to establish a hierarchy of importance. Since the eye is attracted to the brightest object in the field of view and then to the next brightest object, provide the highest wattage or the tightest focus lamps on the most important items or areas of the store.
- Use exposed or decorative sources to attract attention to specific displays or areas of the shop.

Lighting Levels: 15-40 fc ambient, 75-100 fc accent. Accent lighting is coupled with areas of lowest ambient lighting levels.

### SUMMARY TABLE FOR "HIGHER-END" RETAIL

	Layout 5	Layout 6
Ambient <sup>1</sup> Footcandles (fc)	35-45	20-30
Connected Load (W/sf)	2.1	2.1
Energy Savings <sup>2</sup> (%)	35-45%	35-45%
First Cost Increase <sup>3</sup> (material & labor)	+140-150%	+80-90%
Applicable Area <sup>4</sup> (sf)	650-850	650-850

1-Actual FC may be 20% lower due to shelving units over 5' tall. 2-Savings compared to current lighting practices in the New England region. 3-Cost compared to Basic Retail Layouts 1 and 2. 4-Layout applies to any store of within this size range, while meeting lighting level recommendations and without exceeding energy codes. Add rows of fixtures for larger spaces.

### HIGHER-END RETAIL FIXTURE SCHEDULE

- B - 2-lamp Parabolic 2'x2'
- C - 1-lamp Fluorescent Valance
- D - Decorative Pendant
- M - 50 to 90 Watt Accent Lights (M1, 2, or 3)
- N - 50 Watt MR16 Recessed Accent Light

# lighting fixture schedule

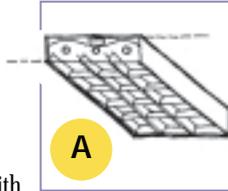
These specifications include lighting fixtures that will ensure a balance of performance, flexibility, energy-savings and maintenance at a cost-effective price. Many standard products will meet these specifications.

## AMBIENT LUMINAIRES

### A. 2' x 4' PARABOLIC TROFFER, THREE-LAMP

LAMPS: (3) 32W T8, 835 color

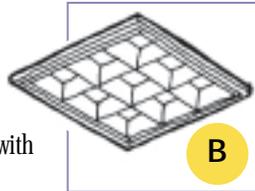
DESCRIPTION: Recessed fluorescent with white baked enamel interior reflector, parabolic louvers that are white-painted or semi-specular anodized aluminum, minimum 2-3/4" deep, with 18 cells. Three-lamp electronic instant-start ballast, 91 nominal input watts. 71% minimum fixture efficiency.



### B. 2' x 2' PARABOLIC TROFFER, TWO-LAMP

LAMPS: (2) 31W T8 U-tube, 6" leg spacing. 835 color for intermediate retail, 830 color for higher-end shops

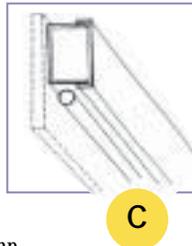
DESCRIPTION: Recessed Fluorescent troffer with white baked enamel interior reflector and parabolic louvers that are painted white or semi-specular anodized aluminum, minimum 2-3/4" deep, with 9 cells. Two-lamp electronic instant start ballast, 61 nominal input watts. 65% minimum fixture efficiency.



### C. VALANCE: SIDE-SOCKET FLUORESCENT CHANNEL

LAMPS: (1) 32W T8, 835 color in intermediate retail, 830 color in higher end shops

DESCRIPTION: Standard fluorescent industrial strip with single lamp mounted on side. Nominal 8'-0" housing with two lamps in-line. Two-lamp electronic instant start ballasts, 61 nominal input watts. Tandem wire and use four-lamp ballasts where possible.



### D. SMALL DECORATIVE PENDANT BOWL

LAMPS: (4) 13W TT, 830 color

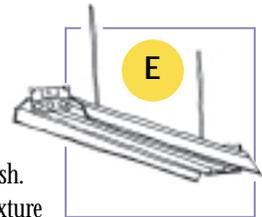
DESCRIPTION: 20" to 24" diameter bowl with frosted or patterned or colored glass or acrylic. Provides image and brightness to space, and may light ceiling.



### E. 2-LAMP FLUORESCENT INDUSTRIAL WITH REFLECTOR. PENDANT OR SURFACE MOUNTED

LAMPS: (2) 32W T8, 841 color for basic retail, 835 color for intermediate retail

DESCRIPTION: Pendant or surface mounted fluorescent luminaire in modules of 8'-0" (4 lamps per 8'-0"). White baked enamel finish. Minimum 90% downlight. 95% minimum fixture efficiency. Four-lamp electronic instant-start ballast, 110 nominal input watts. Surface mount to low ceilings (8'-6" or less) or pendant mount at 18" above highest product shelf.

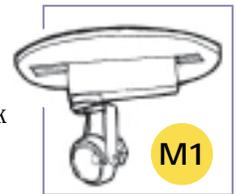


## ACCENT LUMINAIRES

### M1. MR-16 SPOT LIGHT

LAMP: 50W MR-16 Narrow Spot

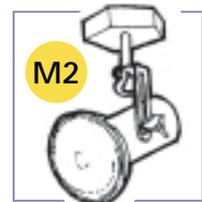
DESCRIPTION: Requires low voltage electronic transformer. Mount to J-box, canopy, mono-track or pendant, as required by application. Use narrowest beam spread for the most impact.



### M2. HALOGEN PAR 20 LAMP SPOT LIGHT

LAMP: 50W PAR 20 Spot

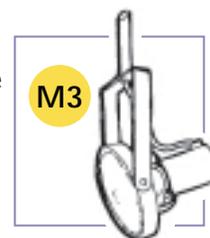
DESCRIPTION: Alternative to M1. No transformer required. Mount to J-box, canopy, mono-track or pendant, as required by application. Use narrowest beam spread for the most impact.



### M3. HALOGEN PAR 30 or PAR 38 SPOT LIGHT

LAMP OPTIONS: 50W PAR 30 Spot or Q90 PAR 38 Spot

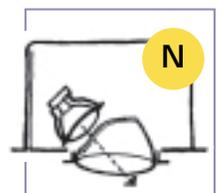
DESCRIPTION: Alternative to M1 or M2. Larger size lamp and softer beam spread. Choose PAR 30 or PAR 38 fixture to fit lamp size. Mount to J-box, canopy, mono-track or pendant, as required by application. Use narrowest beam spread for the most impact. Reduce quantity of 90 Watt lamps.



### N. RECESSED MR-16 ADJUSTABLE ANGLE ACCENT LIGHT

LAMP: 50W MR-16 Narrow Spot

DESCRIPTION: Recessed housing with nominal 5" diameter aperture. 35 degree tilt or more. Specular or semi-specular clear cone. Integral low voltage transformer.

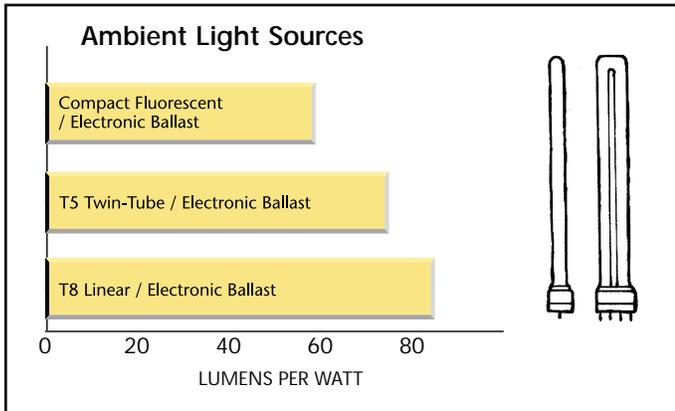


## UNDERSTANDING THE NEW FLUORESCENT LAMP COLORS

The standard three-digit system for classifying fluorescent lamps includes information about the Color Rendering Index (CRI) and the Correlated Color Temperature. Thus "835" stands for a CRI of 80+ and a color temperature of 3500 Kelvin.

The Color Rendering Index indicates how well a given lamp renders the colors of the objects it illuminates. For Basic retailing, a CRI of 70+ is generally adequate. For Intermediate and Higher-End shops, 80+ is preferable. Correlated color temperature refers to the appearance of any light source. Low wattage incandescent is very "warm" at about 2700 Kelvin, Halogen is somewhat warm at 3000 Kelvin, and daylight is quite "cool" at 5000 to 10,000 Kelvin. The new fluorescent lamps are available in a wide range of color temperatures, but those most appropriate for retailing are 3000 K for Higher-End shops, 3500 K for Intermediate shops, and 4100 K for Basic retailing.

## Lamp/Ballast Efficacies

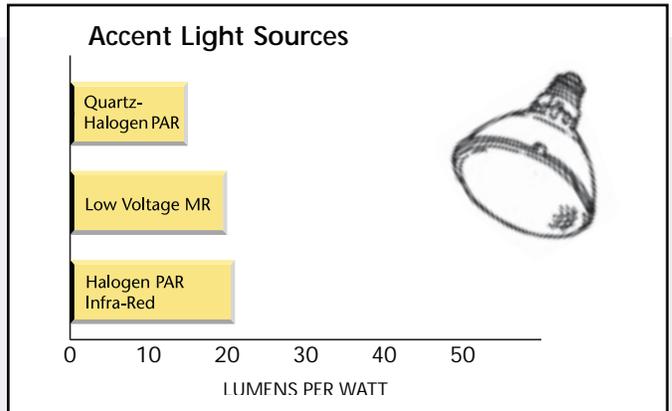


## Controls are important!



"Proper lighting controls assure that individual fixtures are on only when they are most effective. The display window lights should be controlled separately from the rest of the store lights. In addition, other

fixture types should be on separate circuits, controlled by an astronomical time clock. This way, only the most efficient fixtures will be used outside of business hours, for staff activities such as cleaning and restocking. This not only saves energy, but greatly reduces maintenance for burned-out accent lights."



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# LIGHTING SOLUTIONS