

## Precise™ ConstantColor™ MR16

**Precise™ ConstantColor™ MR16**  
**50mm ø Dichroic Mirror Halogen Lamps**  
**20W, 35W, 50W, 71W**

### Description

Precise™ MR16 lamps are low voltage tungsten halogen reflector-mounted lamps popular for downlighting and accent lighting applications because of their small size, precise beam control, high efficacy, excellent white light and cool beam characteristics. Precise™ MR16 lamp comprises a small halogen low voltage filament capsule permanently cemented into a one-piece, dichroic coated all glass reflector. The computer designed multi-faceted reflector produces a “precise” beam pattern with excellent uniformity and sharp beam cut-off.

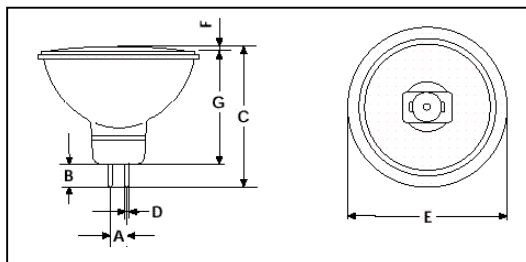
The reflector is ellipsoidal in shape. The filament is precisely aligned along the optical axis of the reflector during the manufacturing process to achieve the required beam pattern. Beam patterns range from very narrow spots to wide floods.

The Cover glass (closed) versions incorporate an integral clear lens to ensure that both bulb and reflector are protected from dust and dirt during installation and operation. The cover glass effectively eliminates UV-C radiation and greatly reduces UV-B radiation. The use of Cover glass together with specially developed UV control quartz material for the capsule results in almost no UV-B or UV-C radiation. They use the same reflectors as the open versions – and hence have the same dimensions, allowing users to interchange lamps at will.

### ConstantColor™ Coating

The application of GE Thin Film Technology is designed to maintain consistent colour throughout life. The durable tantalum and silica oxides can withstand temperatures of 500°C without degradation over a rated life of up to 5000 hours on 20, and 35W lamps, 6000 hours on 50W lamps and 4000 hours on 71W lamps. Because this coating will not degrade over life, a high level of lumen maintenance is achieved throughout lamp life. Normal dichroic coatings can lose as much as 50% of lumen maintenance over life as non-durable coatings degrade. This ensures that light colouration is the same from lamp to lamp. Because the coating is applied to the inside and the outside of the reflector, a reduced quantity of light is wasted out the back of the lamp. The light that does escape through the reflector is a consistent hue which will not vary from lamp to lamp through life ensuring replacements do not appear different from existing lamps.

The ConstantColor™ interference film still allows 66% of the infra-red heat to pass through the back of the reflector to ensure a cool beam is achieved while reflecting forward almost 100% of the visible light.



### Dimensions (mm)

	A	B	C	D	E	F	G
Closed bulb							
MIN.	-	6.1	-	1.45	49.4	-	35.8
AVE.	5.33	-	-	-	-	-	-
MAX.	-	7.62	50.5	1.60	50.7	4.5	38.4

### Technical Data

12 Volts

Burning Position: any

Bulb: clear, closed, Cap:GU5.3

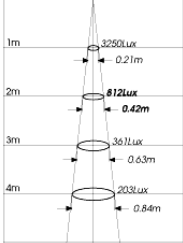
Order Code	Watts	Peak Intensity (CD)	Beam Spread (°)	Colour Temp. (K)	Rated Avg. Life (h)
ESX/CG	20	3250	12	2900	5000
BAB/CG	20	475	40	2900	5000
FRB/CG	35	7500	12	3000	5000
FRA/CG	35	3200	20	3000	5000
FMW/CG	35	1000	40	3000	5000
EXT/CG	50	8400	14	3050	6000
EXZ/CG	50	2900	25	3050	6000
EXN/CG	50	1500	40	3050	6000
FNV/CG	50	850	55	3050	6000
EYF/CG	71	10400	15	3050	4000
EYJ/CG	71	4550	25	3050	4000
EYC/CG	71	2000	42	3050	4000

# Performance Cones

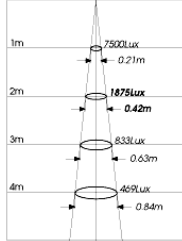
All GE reflector lamps have a performance cone. This is to help achieve the most effective spread and level of illumination by showing the lamp power, beam spread and mounting distance of each lamp.

A performance cone is a visual indicator of the angle at which the intensity of a beam produced by a reflector is at 50% of its peak. The cone shows the angle, the level of peak illuminance (lux) and the beam diameter for planes at right angles at various distances (m) from the lamps. The bold type at 2m serves as a benchmark for a glance comparison of respective beam diameter and lux for different lamps.

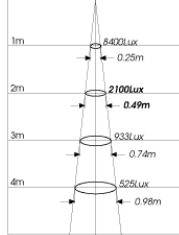
**ESX/CG 20W 12°**



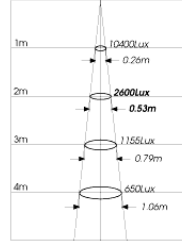
**FRB/CG 35W 12°**



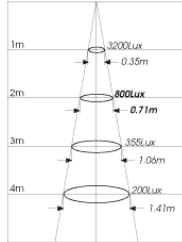
**EXT/CG 50W 14°**



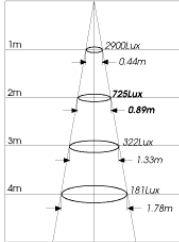
**EYF/CG 71W 15°**



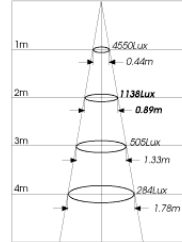
**FRA/CG 35W 20°**



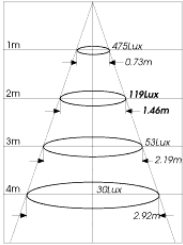
**EXZ/CG 50W 25°**



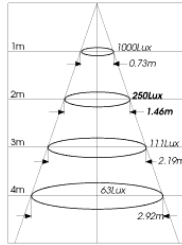
**EYJ/CG 71W 25°**



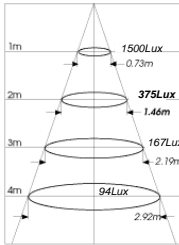
**BAB/CG 20W 40°**



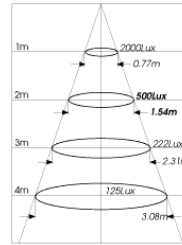
**FMW/CG 35W 40°**



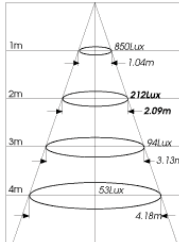
**EXN/CG 50W 40°**



**EYC/CG 71W 42°**



**FNV/CG 50W 55°**

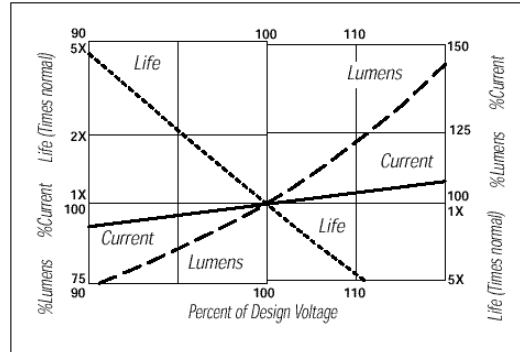
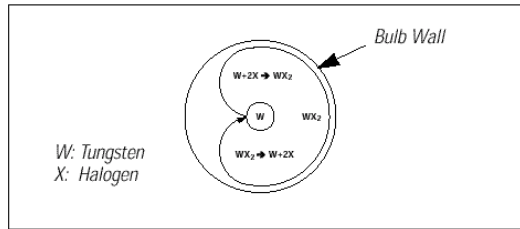


## Operation and Maintenance

- Low voltage tungsten halogen lamps are sensitive to voltage variations. Even a small change in voltage can have a considerable impact on lamp life (see "Light, Life & Voltage"). Designers should match fitting transformer ratings to actual mains line voltages to ensure that the lamps operate at as close to 12V as possible.
- Rapid cycling can also shorten lamp life, and designers should take advice from their GE Lighting representative before using these lamps in flashing or blinking applications.
- The lamps may be dimmed by reducing voltage. However, this may cause the bulbs to blacken. If this occurs the lamp should be run at full voltage (12V) for fifteen minutes, thereby clearing the problem. Note that the nature of low voltage lighting systems requires the use of fluorescent-type dimmers.
- Switch off mains supply before installing/removing lamp.
- Fuse is essential in circuit.
- Observe temperature tolerances: pinch seal, max. 350°C, bulb wall min. 250°C.
- Lamps should be free from contamination, including finger marks, before lamp is operated. Lamps can be cleaned with a soft cloth moistened with alcohol.
- Good condition of the lampholder contacts is essential.
- Bulb wall temperatures are high and therefore lamps should not be operated in flammable atmospheres unless enclosed in suitably rated luminaires.
- Ensure lamp is cool before removing.
- Do not use if outer reflector is cracked/broken.

## Tungsten Halogen Principle

The tungsten filament is enclosed in a gas filled quartz bulb, together with a controlled quantity of halogen. At the operating temperature some tungsten vapourizes and migrates to the cooler areas of the bulb where before it can be deposited, it combines with the halogen to form a tungsten halide. This circulates until it comes near the filament where the halide dissociates and deposits the tungsten back on the filament. This cycle continues throughout the operating life of the lamp. As the bulb wall remains clean the bulb size can be reduced considerably by the use of quartz which can withstand the high wall temperatures. The small bulb and strong materials withstand much higher working pressures and the increased gas density. This reduces filament evaporation, thus offering increased performance either as more light or longer life.



## Light, Life & Voltage

For any particular lamp, the light output and life depend upon the voltage at which a lamp is operated. For instance, as approximations, the light output varies as the 3.6th power of the voltage and the life varies inversely as the 12th power of the voltage. The Chart and Tables below illustrate the effects of overvoltage or undervoltage applied to lamp on its current, life and light output. The values given (except for long life lamps) are reasonably valid between 95% and 110% rated volts. Beyond this range the indicated characteristics may not be realised because of the increasing influence of factors which cannot be incorporated into the chart. The chart applies only to D.C. or sine-wave A.C. current. The data may differ particularly for lamp operation on half-wave rectified voltage, semiconductor dimming devices of constant operation.

VOLTS %	AMPS %	LUMENS %	LIFE %
99	99.5	96.5	111
98	99.0	93.2	122
97	98.4	89.9	136
96	97.9	86.7	150
95	97.4	83.5	167
90	94.8	69.1	287

Overrated Bulb Voltages (>100%)			
VOLTS %	AMPS %	LUMENS %	LIFE %
101	100.5	103.6	90
102	101.0	107.2	82
103	101.5	110.9	74
104	102.0	114.8	68
105	102.5	118.7	61
110	105.0	139.7	39

## Tungsten Halogen Lamps & UV Radiation


Potentially harmful high energy UV-C and UV-B radiation emitted by the filament are absorbed by the wall of the capsule which is produced with specially developed "UV Control" quartz. The use of UV control quartz together with an optically neutral front cover glass allows the lamp to fully comply with the latest stringent requirements of IEC 60357.

## IEC Standards

GE tungsten halogen lamps comply with the following international standards where applicable:

- IEC 60432-3 Tungsten Halogen Lamps Safety Standard,
- IEC 60357 Tungsten Halogen Lamps,
- IEC 60061 Lamp Caps & Holders.

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October 2003