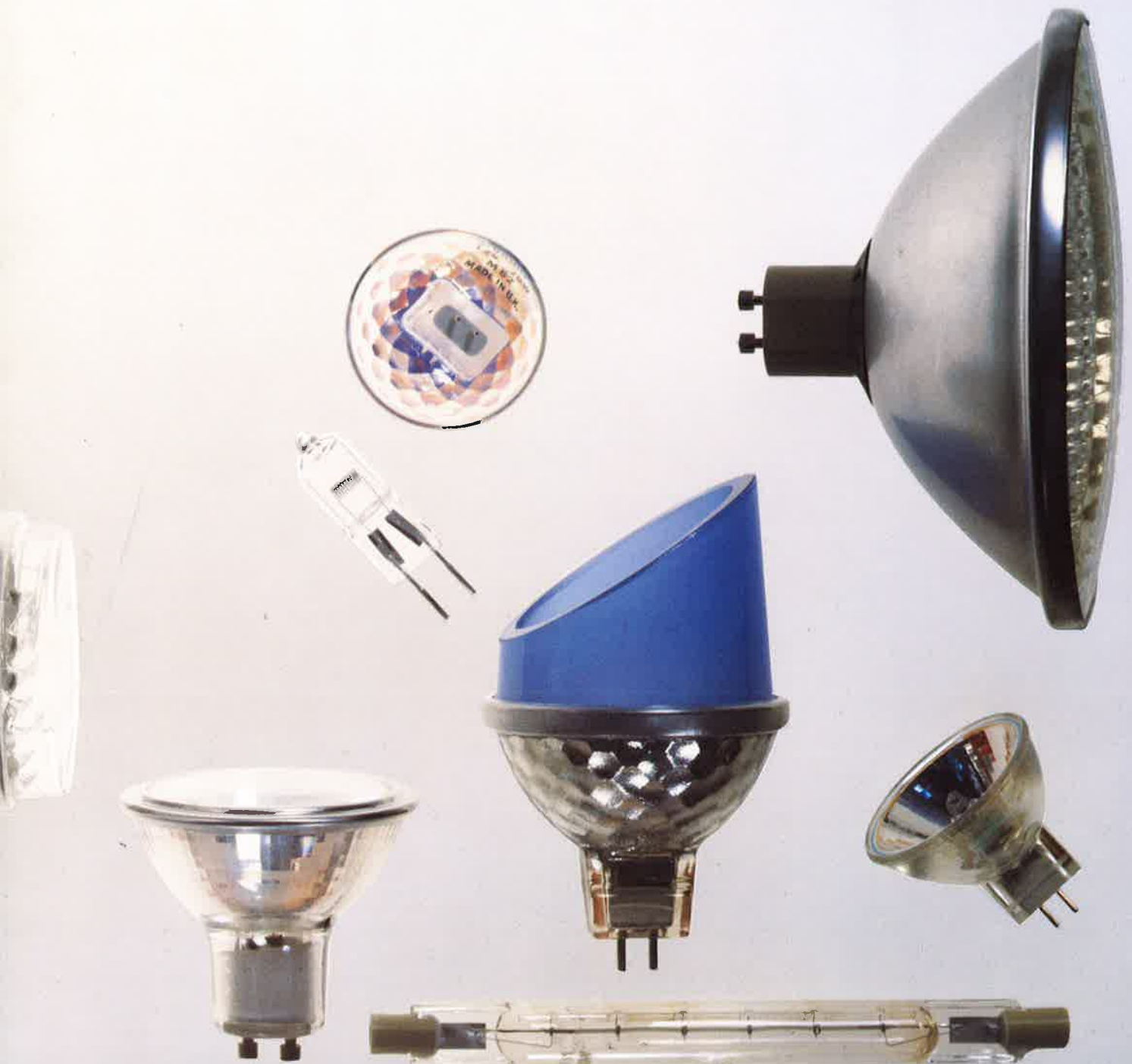




GE Thorn

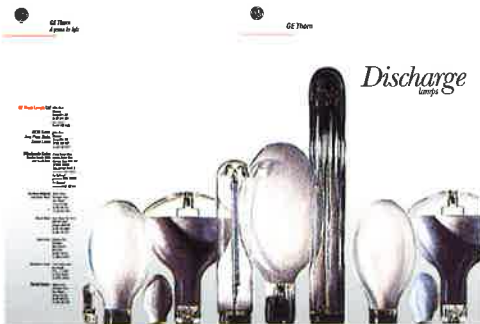
Halogen *display lamps*



GE Thorn

Thorn, already the largest manufacturer of lamps in the United Kingdom, is now joined with GE Lighting, creating the world's foremost light source supplier.

The range of lamps thus offered, together with the proven commitment of GE Thorn to quality and service, provide the widest support to the lighting industry and satisfaction to its users.



Information on other GE Thorn lamps is available on request.

Low voltage lamps

- 2/3 Dichroic mirror lamps; features
- 4/5 Dichroic mirror lamps; performance selector
- 6/7 Open dichroic mirror & metal reflector lamps
- 8/9 Sealed dichroic mirror lamps
- 10/13 HALOGEM sealed decorative lamps
- 14/15 TAL50 sealed dichroic mirror lamps
- 16/17 TAL100 sealed metal reflector lamps
- 18/19 Capsules lamps: 6, 12 & 24V

Mains voltage lamps

- 20/21 PAR64, capsules & single ended tubular lamps
- 22/23 Double ended linear lamps
- 24 Lampholders for low voltage lamps
- 25 Product number index

To save time for designers and manufacturers, lamps are shown at full size wherever space so allows.

Halogen lamps

Halogen lamps like other incandescent lamps, produce light and heat when an electric current is passed through the tungsten filament. In a conventional lamp, as the tungsten incandesces it evaporates; this process eventually burns out the filament and blackens the glass bulb.

Unlike the conventional lamp, a Halogen lamp uses a bromine or iodine halogen gas to combine with the evaporating tungsten and effectively re-cycles the tungsten by depositing it back on the filament.

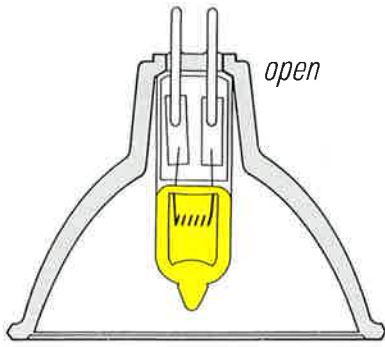
Tungsten Halogen lamps work at high temperatures and gas densities in very compact bulbs. GE Thorn uses only quartz in its halogen display lamps (some lamps are made of hard glass, but this has been found to be less durable in the higher wattages used in display lamps).

The end result of GE Thorn halogen lamp technology may be summed up thus:

- *more light per watt*
- *crisp, white light*
- *much longer life*
- *virtual 100% output throughout life*
- *small light source permits precise control of beam shape and direction.*

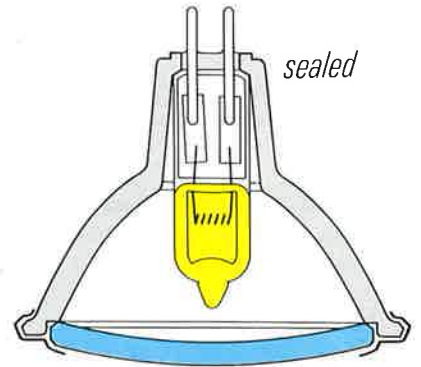


Low voltage lamps: Dichroic mirror lamps: features

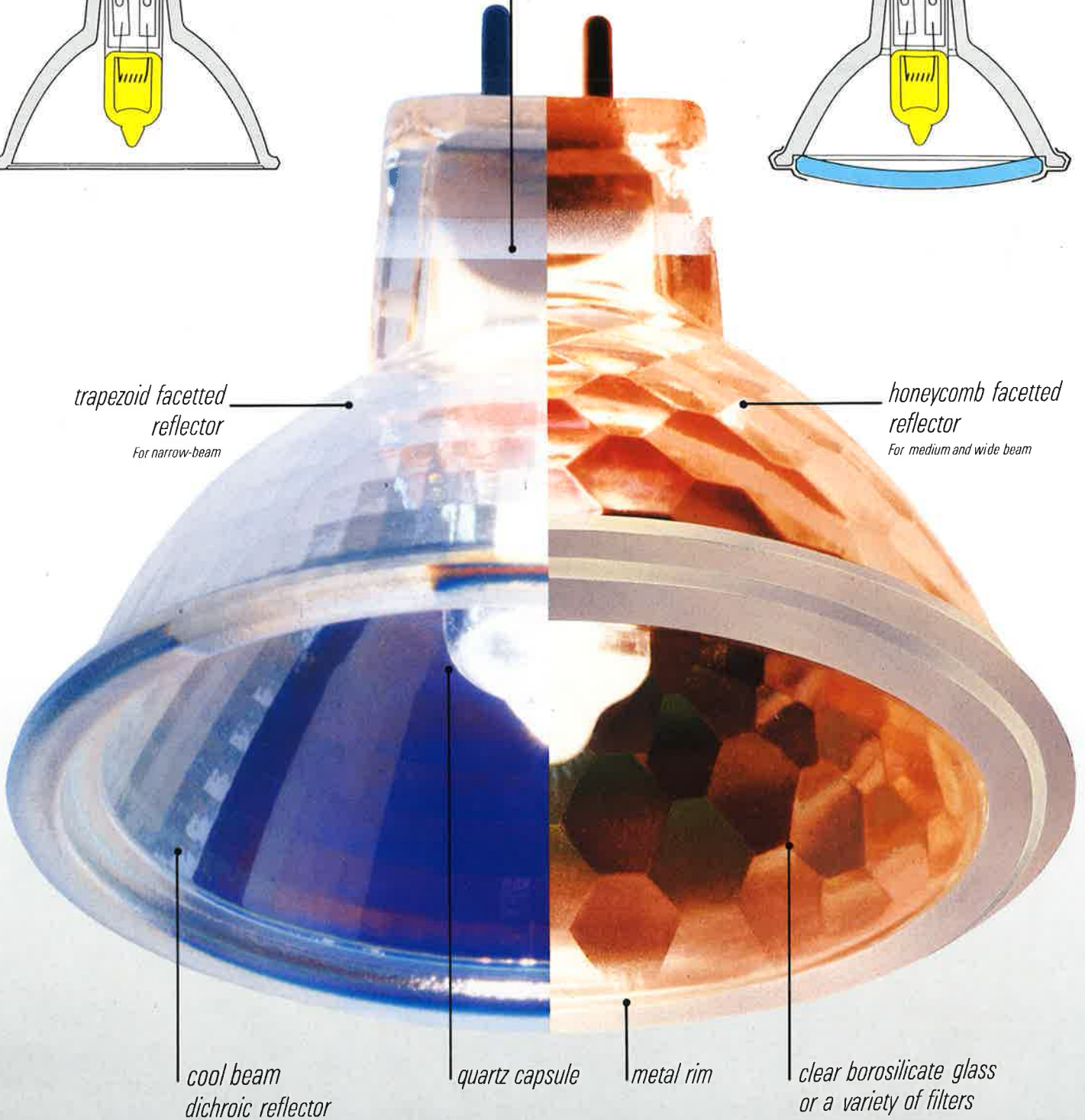


open

slotted GU5.3 or GU4 base



sealed



*trapezoid faceted reflector
For narrow-beam*

*honeycomb faceted reflector
For medium and wide beam*

cool beam dichroic reflector

quartz capsule

metal rim

*clear borosilicate glass
or a variety of filters*

Open & sealed lamps: common features



Sparkle, with or without the front glass, produced by faceted reflectors gives a livelier accent lighting with a visually attractive lamp.



Optical integrity. A precisely focussed lamp is achieved by photoelectric positioning of the capsule into its reflector.



Cool beam. 23 layers of dichroic coatings reflect light forward and transmit heat rearward.



Slotted base engages with the GE Thorn lampholder springs providing secure retention



Optimum beam control is achieved by reflectors specifically designed for medium/wide distribution (honeycomb facets) or narrow distribution (trapezoid facets).



Cool pinch. Innovative design of all THORN dichroic mirror lamps has created a range with probably the lowest pinch temperature of any comparable lamp in the world. A cool pinch temperature enables Sealed Lamps to be used in luminaires designed for open lamps.



Quartz construction ensures the reliability of the lamp. Comparable lamps made from hard glass have proved more vulnerable to early failure.



To Help Users achieve the most effective display lighting, GE Thorn packs show the lamp's 'beam performance cone' (see page 4)

Sealed lamps: features



Metal rim. The anodised metal rim ensures retention of the front glass without affecting the light output.



Front glass in clear borosilicate does not dull the lamp performance.



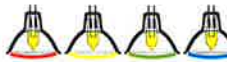
Sealed against dirt. The front glass seals against dirt and maintains light output in dirty and harsh environments.



Extra protection. The front glass protects the capsule from mishandling and contact with combustible materials; GE Thorn sealed mirror lamps are suitable for exterior applications in luminaires designed to relevant IP class.



New standard. The front glass adds 3mm to the overall length of a sealed lamp. To recognise this, a new international specification is required to ensure all manufacturers' lamps are dimensionally compatible.



New colours. Red, yellow, green and blue, applied to the front glass of the sealed lamp, give saturated colours superior to reflector-coated lamps.



Neodymium. Reduces yellow light producing whites of greater purity and enriched colours.



Ultra Violet Filter. Ideal for delicate or valuable items requiring extra special protection, suited for fine art display, museums and art galleries. This filter blocks over 99% of all radiation below 400nm and has a colour rendering index of Ra99.

Dichroic mirror lamps: performance selector

Open

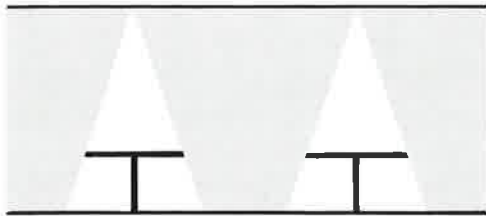
Performance Cones

These indicate the angle at which the intensity of the beam is at 50% of peak. Peak illuminance (lux) and beam diameter are given for planes at right angles and at various distances (m) from the source.

For spotlighting a single object, the Cones can be used to select both the amount of light and the area illuminated by the main portion of the lamp's beam.

example 1

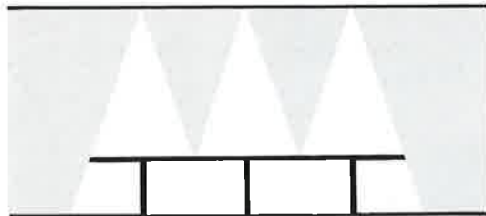
Each M58 with a beam angle of 38 degrees produces a beam of 1.38m diameter at 2m with a peak intensity of 388 lux over a table of 1.2m diameter.



Where a continuous, uniform illuminance is required, the Cones are 'budded' together.

example 2

Three M58 illuminate a conference table approximately 3.6x 1.2m



50mm Ø

m	20W M68		35W M71		50W M49		75W M60	
	11°	lux	8°	lux	10°	lux	12°	lux
1	.19	5000	.14	9000	.17	12000	.21	16000
2	.39	1250	.28	2250	.35	3000	.42	4000
3	.58	556	.42	1000	.52	1333	.63	1778
4	.77	313	.56	560	.70	750	.84	1000
5	.96	200	.70	360	.87	480	1.05	640
m	M94		M70		M50		M82	
	24°	lux	18°	lux	21°	lux	18°	lux
1	.43	1000	.32	3600	.37	3700	.32	7500
2	.85	250	.63	900	.74	925	.63	1875
3	1.28	111	.95	400	1.11	411	.95	833
4	1.70	63	1.27	225	1.48	231	1.27	469
5	2.13	40	1.58	144	1.85	148	1.58	300
m	M69		M81		M58		M61	
	36°	lux	38°	lux	38°	lux	38°	lux
1	.65	500	.69	970	.69	1550	.69	2250
2	1.30	125	1.38	243	1.38	388	1.38	562
3	1.95	56	2.07	108	2.07	172	2.07	250
4	2.60	31	2.75	61	2.75	97	2.75	140
5	3.25	20	3.44	39	3.44	62	3.44	90
m	M80		M98					
	60°	lux	60°	lux				
1	1.15	700	1.15	900				
2	2.31	175	2.31	225				
3	3.46	78	3.46	100				
4	4.62	44	4.62	56				
5	5.77	28	5.77	36				

35mm Ø

m	12W M64		20W M52 M55*		35W M65	
	7°	lux	10°	lux	8°	lux
1	.12	6400	.17	5500	.14	9000
2	.24	1600	.35	1375	.28	2250
3	.37	711	.52	611	.42	1000
4	.49	400	.70	344	.56	563
5	.61	256	.87	220	.70	360
m	M51 M54*		M66			
	17°	lux	20°	lux		
1	.30	1760	.35	3000		
2	.60	440	.71	750		
3	.90	196	1.06	333		
4	1.20	110	1.41	188		
5	1.49	70	1.76	120		
m	M62 M63*					
	30°	lux				
1	.54	600				
2	1.07	150				
3	1.61	67				
4	2.14	38				
5	2.68	24				

*SBC base



As a first step in the correct application of lamps, Performance Cones are supplied, whenever they are applicable, both in this publication and packaging.

M prefix denotes lamp with GU5.3 or GU4 base (see pages 6, 7, 8, 9)
TAL prefix denotes lamp with Twist And Lock base (see pages 14, 15)

Sealed

20W				35W				50W				65W				Neodymium 50W				Ultra Violet 50W				Colour 50W						
M268 TAL414				M271 TAL417				M249 TAL420				M260 TAL424				M104 TAL428				M186 TAL430				M249R TAL420R						
m	11°	lux		m	8°	lux		m	10°	lux		m	12°	lux		m	10°	lux		m	10°	lux		m	10°	lux				
1	.19	4500		.14	8100		.17	10800		.21	12960		.17	6000		.17	10800		.17	10800		.17	10800		.17	10800				
2	.39	1125		.28	2025		.35	2700		.42	3240		.35	1500		.35	2700		.35	2700		.35	2700		.35	2700				
3	.58	500		.42	900		.52	1270		.63	1440		.52	667		.52	1270		.52	1270		.52	1270		.52	1270				
4	.77	282		.56	504		.70	675		.84	810		.70	375		.70	675		.70	675		.70	675		.70	675				
5	.96	180		.70	324		.87	432		1.05	518		.87	240		.87	432		.87	432		.87	432		.87	432				
M294 TAL415				M270 TAL418				M250 TAL421				M282 TAL425				M105 TAL429				M187 TAL431				M249G TAL420G						
m	24°	lux		m	18°	lux		m	21°	lux		m	18°	lux		m	21°	lux		m	21°	lux		m	10°	lux				
1	.43	900		.32	3240		.37	3330		.32	6075		.37	2200		.37	3330		.37	3330		.37	3330		.37	3330		.37	3330	
2	.85	225		.63	810		.74	833		.63	1518		.74	550		.74	833		.74	833		.74	833		.74	833		.74	833	
3	1.28	100		.95	360		1.11	370		.95	675		1.11	244		1.11	370		1.11	370		1.11	370		1.11	370		1.11	370	
4	1.70	57		1.27	203		1.48	208		1.27	380		1.48	138		1.48	208		1.48	208		1.48	208		1.48	208		1.48	208	
5	2.13	36		1.58	130		1.85	133		1.58	243		1.85	88		1.85	133		1.85	133		1.85	133		1.85	133		1.85	133	
M269 TAL416				M281 TAL419				M258 TAL422				M261 TAL426				M188 TAL432				M249Y TAL420Y										
m	36°	lux		m	38°	lux		m	38°	lux		m	38°	lux		m	38°	lux		m	10°	lux								
1	.65	450		.69	873		.69	1395		.69	1822		.69	1395		.69	1395		.69	1395		.69	1395		.69	1395				
2	1.30	113		1.38	219		1.38	349		1.38	455		1.38	349		1.38	349		1.38	349		1.38	349		1.38	349				
3	1.95	50		2.07	97		2.07	155		2.07	202		2.07	155		2.07	155		2.07	155		2.07	155		2.07	155				
4	2.60	28		2.75	55		2.75	87		2.75	113		2.75	87		2.75	87		2.75	87		2.75	87		2.75	87				
5	3.25	18		3.44	35		3.44	56		3.44	72		3.44	56		3.44	56		3.44	56		3.44	56		3.44	56				
M280 TAL423				M298 TAL427				M249B TAL420B																						
m	60°	lux		m	60°	lux		m	10°	lux																				
1	1.15	630		1.15	729		1.15	729		1.15	729																			
2	2.31	158		2.31	182		2.31	182		2.31	182																			
3	3.46	70		3.46	81		3.46	81		3.46	81																			
4	4.62	40		4.62	45		4.62	45		4.62	45																			
5	5.77	25		5.77	29		5.77	29		5.77	29																			
Neodymium 12W				Neodymium 20W				Neodymium 35W				Neodymium 50W				Ultra Violet 20W														
M264				M252				M265				M148				M252R														
m	7°	lux		m	10°	lux		m	8°	lux		m	10°	lux		m	10°	lux												
1	.12	5760		.17	4950		.14	8100		.17	2750		.17	2750		.17	2750		.17	2750										
2	.24	1440		.35	1238		.28	2025		.35	688		.35	688		.35	688		.35	688										
3	.37	640		.52	550		.42	900		.52	306		.52	306		.52	306		.52	306										
4	.49	360		.70	310		.56	507		.70	172		.70	172		.70	172		.70	172										
5	.61	230		.87	198		.70	324		.87	110		.87	110		.87	110		.87	110										
M251				M266				M252G																						
m	17°	lux		m	20°	lux		m	10°	lux																				
1	.30	1584		.35	2700		.35	2700		.35	2700																			
2	.60	396		.71	675		.71	675		.71	675																			
3	.90	176		1.06	300		1.06	300		1.06	300																			
4	1.20	99		1.41	169		1.41	169		1.41	169																			
5	1.49	63		1.76	108		1.76	108		1.76	108																			
M262				M252Y				M252B																						
m	30°	lux		m	10°	lux		m	10°	lux																				
1	.54	540		.17	17		.17	17		.17	17																			
2	1.07	135		.35	35		.35	35		.35	35																			
3	1.61	60		.52	52		.52	52		.52	52																			
4	2.14	34		.70	70		.70	70		.70	70																			
5	2.68	22		.87	87		.87	87		.87	87																			

Open dichroic mirror lamps & metal reflector lamps

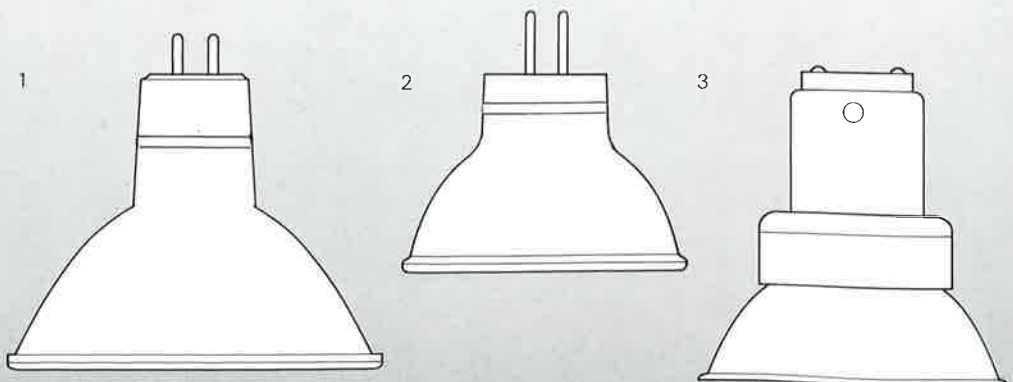


GX5.3 = GU5.3
GZ4 = GU4

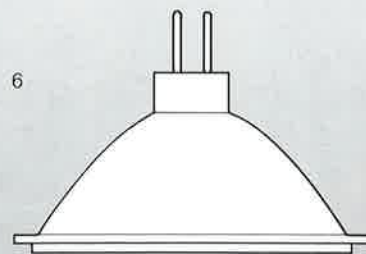
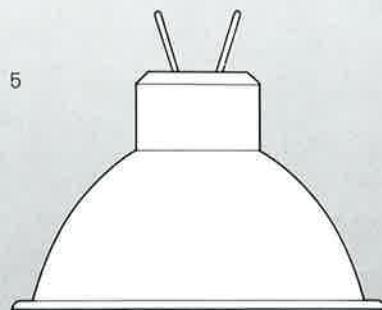
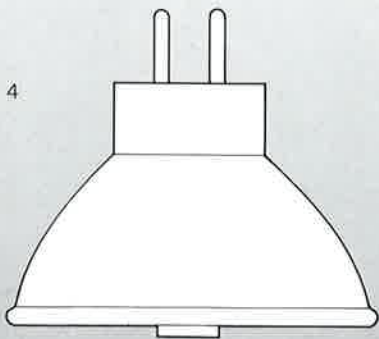
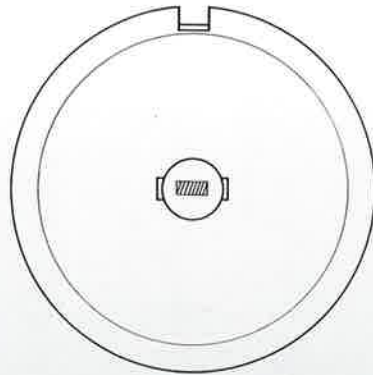
Mirror lamps, originally made for projectors, were designed to be mechanically supported at their front rim. The lamp's pins were intended only for electrical connection to a simple lampholder.

In display lighting applications, the lamps are held instead by the pins and this has proved to be not only bad engineering practice but also to contravene electrical safety standards as recognised in IEC Standards (unless specifically designed for such purpose). To remedy these shortcomings GE THORN first introduced a lamp with a slot* in its base and a lampholder whose springs latched into the slot thus securing the lamp mechanically. These features have been adopted by IEC standards and the improved lamp and lampholder have the designation GU5.3 and GU4.

* Patented



	lamp	ANSI code	voltage	wattage	lamp cap	average life hrs	peak beam cd	beam angle to half peak degrees	diameter mm max	length mm max	colour K	operating position	filament type	bulb finish	illustration	box qty
50mm	M68	ESX	12	20	GU5.3	3500	5000	11	50.7	44.5	2900	univ	trans	clear	1	10
	M94	BBF	..	..	..	..	1000	24	..	..	..	..	..	frosted	..	..
	M69	BAB	..	..	..	..	500	36	..	..	..	..	..	frosted	..	..
	M71	FRB	12	35	GU5.3	3500	9000	8	50.7	44.5	2900	univ	trans	clear	1	10
	M70	FRA	..	..	..	..	3600	18	..	..	..	..	..	clear	..	..
	M81	FMW	..	..	..	..	970	38	..	..	..	..	..	frosted	..	..
	M49	EXT	12	50	GU5.3	3500	12000	10	50.7	44.5	3000	univ	trans	clear	1	10
	M50	EXZ	..	..	..	..	3700	21	..	..	..	..	trans	clear	..	..
	M58	EXN	..	..	..	..	1550	38	..	..	..	..	trans	frosted	..	..
	M80	FNV	..	..	..	..	700	60	..	..	..	..	axial	frosted	..	..
	M60	EYF	12	75	GU5.3	3500	16000	12	50.7	44.5	3000	univ	axial	clear	1	10
	M82	FNW	..	..	..	..	7500	18	..	..	..	..	axial	clear	..	..
	M61	EYC	..	..	..	..	2250	38	..	..	..	..	axial	frosted	..	..
	M98	—	..	..	..	..	900	60	..	..	..	..	trans	frosted	..	..
	35mm	M64	FTA	12	12	GU4	2000	6400	7	35.3	38.5	2900	univ	trans	clear	2	10
M52		FTB	12	20	GU4	3500	5500	10	35.3	38.5	2900	univ	trans	clear	2	10
M55		FSS	..	..	SBC B15D	..	5500	10	..	42.0	..	..	..	..	3	..
M51		FTC	..	..	GU4	..	1760	17	..	35.5	..	..	..	..	2	..
M54		FST	..	..	SBC B15D	..	1760	17	..	42.0	..	..	..	..	3	..
M62		FTD	..	..	GU4	..	600	30	..	35.5	..	..	..	..	2	..
M63		FSV	..	..	SBC B15D	..	600	30	..	42.0	..	..	..	..	3	..
M65		FTE	12	35	GU4	3500	9000	8	35.3	38.5	2900	univ	trans	clear	2	10
M66		FTF	..	..	..	..	3000	20	..	35.5	..	..	..	..	..	..
Metal reflectors 50mm	M37	—	12	55	GY6.35	750	NA	NA	50.7	42.0	3000	univ	trans	clear	4	10
	M39	—	6	20	2 TAB	2000	NA	NA	49.8	39	2950	univ	trans	clear	5	10
	M48	—	12	..	G4	..	7500	6.5	48	36	..	..	..	6	..	



Special reflector

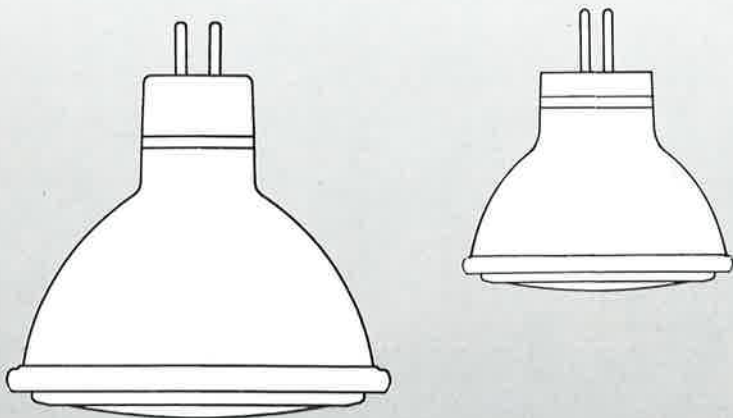
M48		
m	6.5°	lux
1	.11	7500
2	.23	1875
3	.34	833
4	.45	470
5	.57	300

Sealed dichroic mirror lamps



Lamp bases

Like the Open lamps shown in the preceding pages, these too have the new GU bases for greater electrical and mechanical performance and safety. They can of course be installed on existing luminaires fitted with GX lampholders.

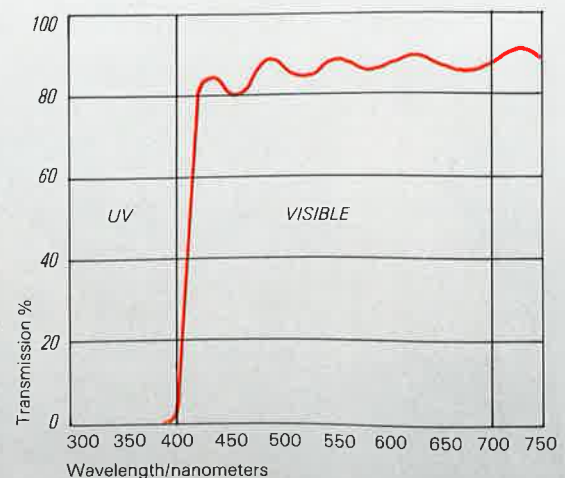


Ultra Violet Filter

The Bausch and Lomb Optivex™ UV Filter uses thin film layers that are carefully designed to selectively transmit visible light whilst eliminating virtually all UV radiation below 400nm.

Ideally suitable for works of art and other sensitive display items where the reduction of ultra violet radiation to reduce photochemical degradation is especially important.

Bausch & Lomb Optivex™ Ultraviolet Dichroic Filter Transmittance Curve



	lamp	ANSI code	voltage	wattage	lamp cap	average life hrs	peak beam cd	beam angle to half peak degrees	diameter mm max	length mm max	colour K	operating position	filament type	bulb finish	box qty
50mm	M268		12	20	GU5.3	3500	4500	11	50.7	47.5	2900	univ	trans	clear	10
	M294		..	..	..	..	900	24	..	..	..	..	..	frosted	..
	M269		..	..	..	..	450	36	..	..	..	..	..	frosted	..
	M271		12	35	GU5.3	3500	8100	8	50.7	47.5	2900	univ	trans	clear	10
	M270		..	..	..	..	3240	18	..	..	..	..	..	clear	..
	M281		..	..	..	..	873	38	..	..	..	..	..	frosted	..
	M249	FXK	12	50	GU5.3	3500	10800	10	50.7	47.5	3000	univ	trans	clear	10
	M250	FXJ	..	..	..	..	3330	21	..	..	..	..	trans	clear	..
	M258	FXH	..	..	..	..	1395	38	..	..	..	..	trans	frosted	..
	M280		..	..	..	..	630	60	..	..	..	..	axial	frosted	..
	M260		12	65	GU5.3	3500	12960	12	50.7	47.5	3000	univ	axial	clear	10
	M282		..	..	..	..	6075	18	..	..	..	..	axial	clear	..
	M261		..	..	..	..	1822	38	..	..	..	..	axial	clear	..
	M298		..	..	..	..	729	60	..	..	..	..	trans	frosted	..
35mm	M264		12	12	GU4	2000	5760	7	35.3	42.5	2900	univ	trans	clear	10
	M252		..	20	..	3500	4950	10	..	42.5	..	..	..	..
	M251		..	20	..	..	1584	17	..	39.5	..	..	..	..
	M262		..	20	..	..	540	30	..	39.5	..	..	..	..
	M265		..	35	..	..	8100	8	..	42.5	..	..	..	..
	M266		..	35	..	..	2700	20	..	33.5	..	..	..	..
Neodymium 50mm	M104		12	50	GU5.3	3500	6000	10	50.7	47.5	3600	univ			10
	M105		..	..	..	..	2200	21	..	..	..	..			..
Neodymium 35mm	M148		12	20	GU4	3500		10	35.3	42.5		univ			10
Ultra Violet 50mm	M186		12	50	GU5.3	3500	10800	10	50.7	48		univ	trans	clear	10
	M187		..	..	..	..	3330	21	..	48		..	..	clear	..
	M188		..	..	..	..	1395	38	..	48		..	..	frosted	..
Colours 50mm	Red M249R		12	50	GU5.3	3500		10	50.7	47.5		univ			10
	Green M249G		..	..	..	..		..	..	..		..			..
	Yellow M249Y		..	..	..	..		..	..	..		..			..
	Blue M249B		..	..	..	..		..	..	..		..			..
Colours 35mm	Red M252R		12	20	GU4	3500		10	35.3	42.5		univ			10
	Green M252G		..	..	..	..		..	..	..		..			..
	Yellow M252Y		..	..	..	..		..	..	..		..			..
	Blue M252B		..	..	..	..		..	..	..		..			..

new standard
Sealed lamps are 3mm longer than open types, this demands a new international specification – to ensure all manufacturers' products are dimensionally compatible.

*GU5.3 lamp bases are compatible with GX5.3 lampholders.
GU4 lamp bases are compatible with G24 lampholders.

These sealed mirror lamps are suitable for exterior applications in luminaires designed to relevant IP class.

Neodymium

The front glass on these lamps is specially treated to reduce the yellow content of the light output, greatly enhancing the colour rendition of illuminated material.



Neodymium



Halogen

Colours

Red, yellow, green and blue, applied to the front glass of the sealed lamp, give saturated colours superior to reflector-coated lamps.



HALOGEN™ Sealed decorative lamps

HALOGENs bring an innovative approach to interior decorative lighting. Designed for use in 50mm downlighters,* the brilliance and efficiency of low voltage Tungsten Halogen light is combined with a range of decorative glass in one complete lamp ready for use.

The Wedge and Cylinder HALOGENs produce downlighting comparable to that of sealed mirror lamps and may be used as much for accent lighting as for their decorative qualities. The interchangeability of HALOGENs and their range of appearances and functions provide unique flexibility to installations employing downlighters.

In common with GE Thorn low voltage Tungsten Halogen Mirror Lamps, HALOGENs,

- have a quartz glass capsule for reliability
- are sealed against dust and mishandling
- have a metal ring to provide secure attachment of the decorative glass.

*Downlighters where the rim of the standard dichroic mirror lamp is essentially flush with the ceiling plane. Downlighters must be fitted with GU5,3 lampholders or utilize a means of retaining the lamp by the front rim.





HALOGEN Sealed decorative lamps

HALOGENS Design: Luciano Zucchi/Lightscape



Directional 50W

The rotating glass prism re-directs the halogen beam to provide well-spread vertical illuminance or accent lighting without the need for expensive mechanisms in the luminaire.

Multipoint 20W

The myriad points of the clear glass capture the bright white halogen light and scatter it to produce a sparkling source.

Wedge 35W-50W

The etched glasses have a polished edge while the clear version has a ground edge. The direct beam from the reflector is not affected by the colour of the decorative glass and Wedge may therefore be used in place of an ordinary mirror lamp.

Colours: Clear, etched, rose, sky blue.

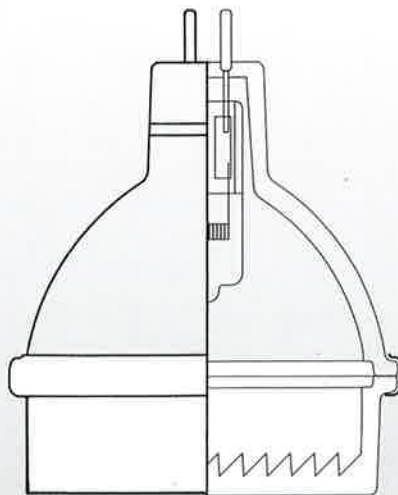
Cylinder 35W-50W

With the same finishes and features of Wedge, the Cylinder too produces generous downlighting perfectly suited for both general or decorative accent lighting.

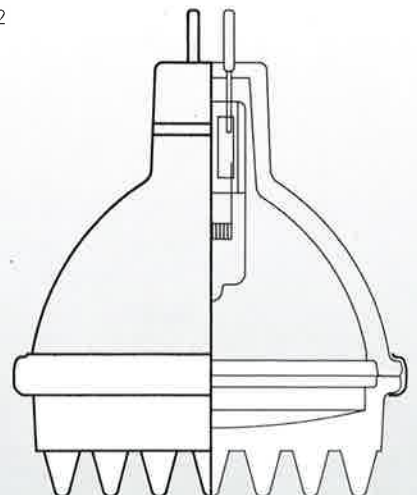
Dome 35W

With its etched glass the Dome provides generously diffused general lighting. Colour: Etched.

1



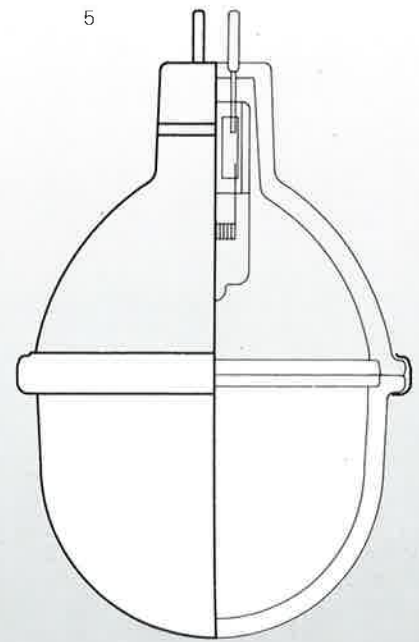
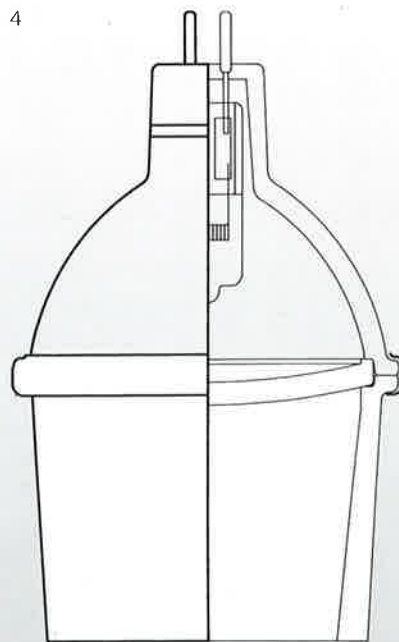
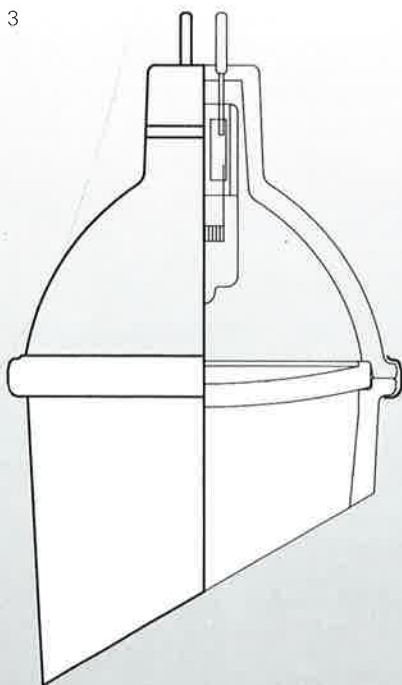
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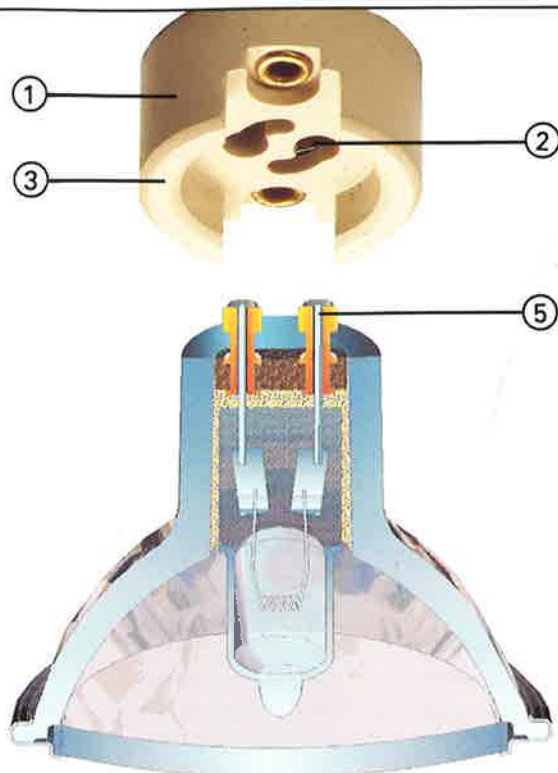
	lamp	voltage	wattage	lamp cap	average life hrs	peak beam cd	beam angle to half peak degrees	diameter mm max	length mm max	colour K	operating position	filament type	bulb finish	illustration	box qty
Directional 50mm	H50WW	12	50	GU5.3	3500	2400	20	50.7	51.5	3000	univ	trans	clear	1	5
Multipoint 50mm	H20M	12	20	GU5.3	3500	275	32	50.7	710	3000	univ	trans	clear	2	5
Wedge 50mm	H35WC H35WE H35WB H35WR	12	35	GU5.3	3500	2000	20	50.7	80.5	3000	univ	trans	clear etched blue rose	3	5
	H50WC H50WE H50WB H50WR	12	50	GU5.3	3500	2750	20	50.7	80.5	3000	univ	trans	clear etched blue rose	3	5
Cylinder 50mm	H35CC H35CE H35CB H35CR	12	35	GU5.3	3500	2000	20	50.7	75.5	3000	univ	trans	clear etched blue rose	4	5
	H50CC H50CE H50CB H50CR	12	50	GU5.3	3500	2750	20	50.7	75.5	3000	univ	trans	clear etched blue rose	5	5
Dome 50mm	H35DE	12	35	GU5.3	3500	600	36	50.7	75.5	3000	univ	trans	etched	5	5

From late 1991 HALOGEMS will be available with the TAL base. Also available will be a Universal Clip to convert suitable GX5.3 Lampholders to GU5.3.

m	20W Multipoint 32°		35W Dome 36°		35W Cylinder & Wedge 20°		50W Cylinder & Wedge 20°		50W Directional 20°			
	peak	average	peak	average	peak	average	peak	average	beam angle 25°	peak	average	
1	6	275	6	600	4	2000	4	2750	2000	4	2100	1550
2	1.1	70	1.3	150	7	500	7	690	510	9	530	390
3	1.7	30	1.9	70	1.1	220	1.1	310	230	1.3	240	170
4	2.3	20	2.6	40	1.4	120	1.4	130	130	1.7	130	100



TAL50 Sealed mirror reflector lamps



- 1 shaped to guide lamp pillars into keyholes
- 2 permanickel contacts
- 3 high temperature steatite ceramic
- 4 PTFE leads, UL approved. Lengths 150 × 250mm (not illustrated)
- 5 large, robust pillars for greater contact area



Twist And Lock base

TAL designates the new Twist And Lock* base created by GE Thorn engineers to make the lamp installation rapid and the luminaire safe. TAL is the first user-friendly base for low-voltage lamps and its benefits will endear it to all commercial and domestic users.

- lower pinch temperature
- easier, faster lamping
- increased electrical reliability
- sturdier construction
- straightforward replacement

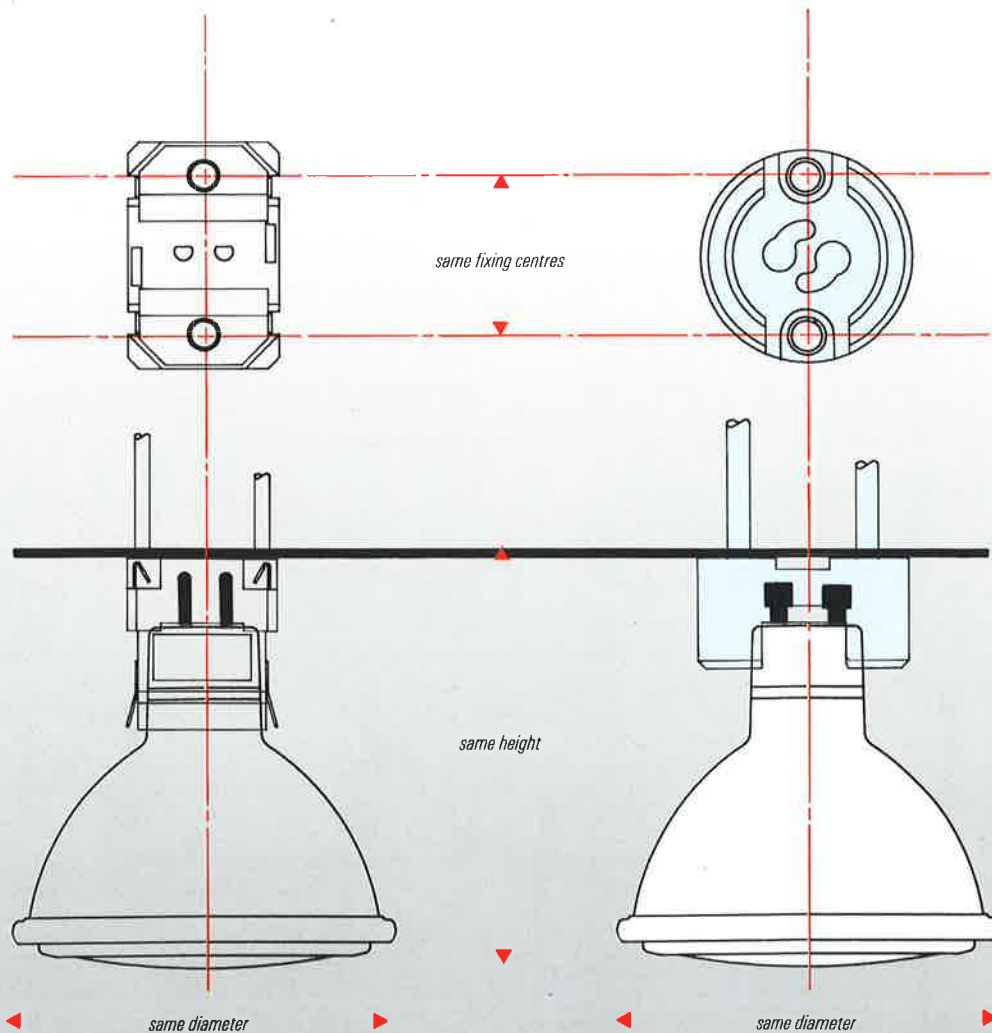
Twist And Lock describes exactly the movement required to mount the lamp onto the lampholder.

With TAL there is no need for force and trial-and-error is eliminated. The circular lampbase is guided into position and the pillars naturally find the keyhole entries. There is no risk of partial electrical contact since contact can only be made once mechanical lock is achieved. The generously sized TAL pillars offer greater contact area and thus improved electrical reliability. The sturdy construction of the TAL base also offers greater mechanical retention.

For full description of features and performances of the TAL lamps, please refer to pages 2, 3, 4, 5, 10.

	lamp	voltage	wattage	lamp cap	average life hrs	peak beam cd	beam angle to half peak degrees	diameter mm max	length mm max	colour K	operating position	filament type	bulb finish	box qty
Sealed 50mm	TAL414	12	20	GU7	3500	4500	11	50.7	50.5	2900	univ	trans	clear	10
	TAL415	..	..	..	..	900	24	..	..	..	..	..	frosted	..
	TAL416	..	..	..	..	450	36	..	..	..	..	..	frosted	..
	TAL417	12	35	GU7	3500	8100	8	50.7	50.5	2900	univ	trans	clear	10
	TAL418	..	..	..	..	3240	18	..	..	..	..	..	clear	..
	TAL419	..	..	..	..	873	38	..	..	..	..	..	frosted	..
	TAL420	12	50	GU7	3500	10800	10	50.7	50.5	3000	univ	trans	clear	10
	TAL421	..	..	..	..	3330	21	..	..	..	..	..	clear	..
	TAL422	..	..	..	..	1395	38	..	..	..	..	..	frosted	..
	TAL423	..	..	..	..	630	60	..	..	..	..	..	frosted	..
	TAL424	12	65*	GU7	3500	11500	12	50.7	50.5	3000	univ	axial	clear	10
	TAL425	..	..	..	..	5000	18	..	..	..	..	axial	clear	..
	TAL426	..	..	..	..	1600	38	..	..	..	..	axial	clear	..
	TAL427	..	..	..	..	800	60	..	..	..	..	trans	frosted	..
	* Sealed 65W TAL dichroic mirror lamps availability to be advised.													
Neodymium 50mm	TAL428	12	50	GU7	3500	6000	10	50.7	50.7		univ	trans	clear	10
	TAL429	..	..	..	..	2200	21	..	50.7		..	..	clear	..
Ultra Violet 50mm	TAL430	12	50	GU7	3500	10800	10	50.7	48		univ	trans	clear	10
	TAL431	..	..	..	..	3330	21	..	48		..	..	clear	..
	TAL432	..	..	..	..	1395	38	..	48		..	..	frosted	..
Colours 50mm	Red TAL420R	12	50	GU7	3500		10	50.7	50.5		univ	trans	clear	10
	Green TAL420G	..	..	..	..		..	..	..		..	..	..	..
	Yellow TAL420Y	..	..	..	..		..	..	..		..	..	..	..
	Blue TAL420B	..	..	..	..		..	..	..		..	..	..	..

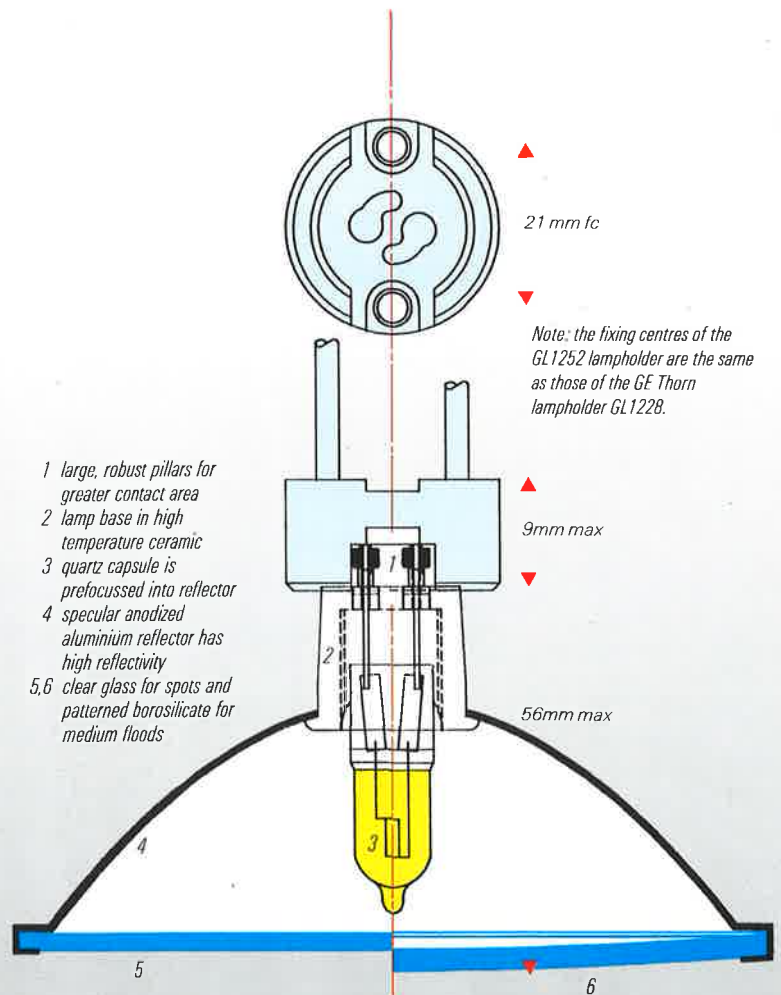
TAL lampholder is dimensionally compatible with THORN lampholder GL1228 and luminaires designed for the latter may be converted to TAL without any significant alteration.



TAL100 Sealed metal reflector lamps



The TAL100 delivers powerful accent light where there are already high levels of illuminance, for instance as provided by high intensity discharge sources. With an average life of 3500 hours, the luminous intensity of the TAL100 is up to 17% higher than the nearest comparable type and size of lamp. Because TAL100 is sealed the light output is maintained even in dirty environments and luminaires need no safety glass. The range of TAL100 includes beam angles from 3° to 20° and, with wattages of 35, 50 and 75w, it gives ample opportunity to service different display lighting requirements.



	lamp	voltage	wattage	lamp cap	average life hrs	peak beam cd	beam angle to half peak degrees	diameter mm max	length mm max	colour K	operating position	filament type	front glass	box qty
100mm	TAL138	12	35	GU7	3500	53000	3	100	57	3000	univ	trans	clear	10
	TAL139	..	50	..	..	55000	4	..	..	..	..	trans	clear	..
	TAL140	..	50	..	..	3330	21	..	..	..	..	trans	patterned	..
	TAL141	..	75	..	..	6750	18	..	..	..	..	axial	patterned	..

35W

TAL138

m	3°	7°	lux
1	.05	.12	53000
2	.10	.24	13250
3	.16	.37	5889
4	.21	.49	3313
5	.26	.61	2120
6	.31	.73	1472
7	.37	.86	1082
8	.42	.98	828
9	.47	1.10	504
10	.52	1.22	530

Beam Ø 50% 10% peak

50W

TAL139

m	4°	8°	lux
1	.07	.14	55000
2	.14	.28	13750
3	.21	.42	6111
4	.28	.56	3438
5	.35	.70	2200
6	.42	.84	1528
7	.49	.98	1128
8	.56	1.12	859
9	.63	1.26	679
10	.70	1.40	550

50% 10% peak

50W

TAL140

m	21°	lux
1	.37	3330
2	.74	833
3	1.11	370
4	1.48	208
5	1.85	133
6		
7		
8		
9		
10		

50% peak

75W

TAL141

m	18°	lux
1	.32	6750
2	.63	1688
3	.95	750
4	1.27	422
5	1.58	270
6		
7		
8		
9		
10		

50% peak

For the very-narrow-beam versions, the cones give the angle at which intensity of the beam is at 50% and 10% of peak illuminance (lux)

For the medium-beam versions, the cones are at 50% of peak. Beam diameters are given for planes at right angles and at various distances from the lamp.

Lamp comparisons

m	50W TAL139		150W Metal Halide*		50W 111mm Metal	
	4°	lux	58°	lux	5°	lux
1	.07	55000	1.11	7820	.09	80000
2	.14	3750	2.22	1955	.17	7500
3	.21	6111	3.33	869	.26	3333
4	.28	3438	4.43	489	.35	1871
5	.35	2200	5.54	313	.44	1200
6	.42	1528	6.65	217	.52	833
7	.49	1128	7.76	160	.61	612
8	.56	859	8.87	122	.70	469
9	.63	679	9.98	97	.79	370
10	.70	580	11.09	78	.87	300

Beam Ø 50% peak

50% peak

50% peak

*Typical distribution of luminaire with 150W MBI-T Metal Halide.

Capsule lamps: 6, 12 & 24V



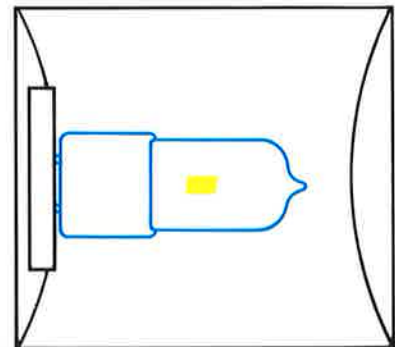
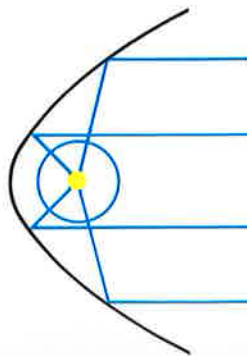
The range of GE Thorn capsules goes from 10 watt to 250 watts. All have found favour in contemporary lighting applications for their excellent colour, sparkle and long life.

There is also choice of Axial or Transverse filaments; amongst the latter the M91 at 12W will produce dramatic effects, at a very low energy cost, in decorative chandeliers or in bare-lamp linear or cluster arrays for hotel, restaurant or public areas.

The M95 35W will serve equally well in reflector or bare-lamp luminaires and will provide a useful energy saving alternative to the popular 50W M32.

The Axial filament capsules have been specifically developed to satisfy the demand for a wide smooth beam with good cut-off, from a miniature linear reflector, for the uniform lighting of vertical surfaces, for efficient table lamps for task lighting, or for wall mounted or portable uplighters. With all wattages having the axial filament at the same light-centre, one luminaire design may cover a range of illuminances for a variety of residential and commercial requirements.

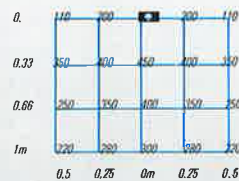
When used in spot reflectors these lamps may also be more efficient alternatives to transverse filament types, because a substantial portion of the axial filament will always be in focus.



Vertical Illuminances

(lux)

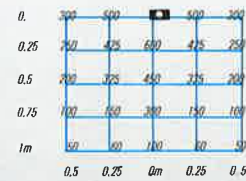
Typical distribution from 50w M74 lamp in a linear reflector mounted at 1m from wall.



Horizontal Illuminances

(lux)

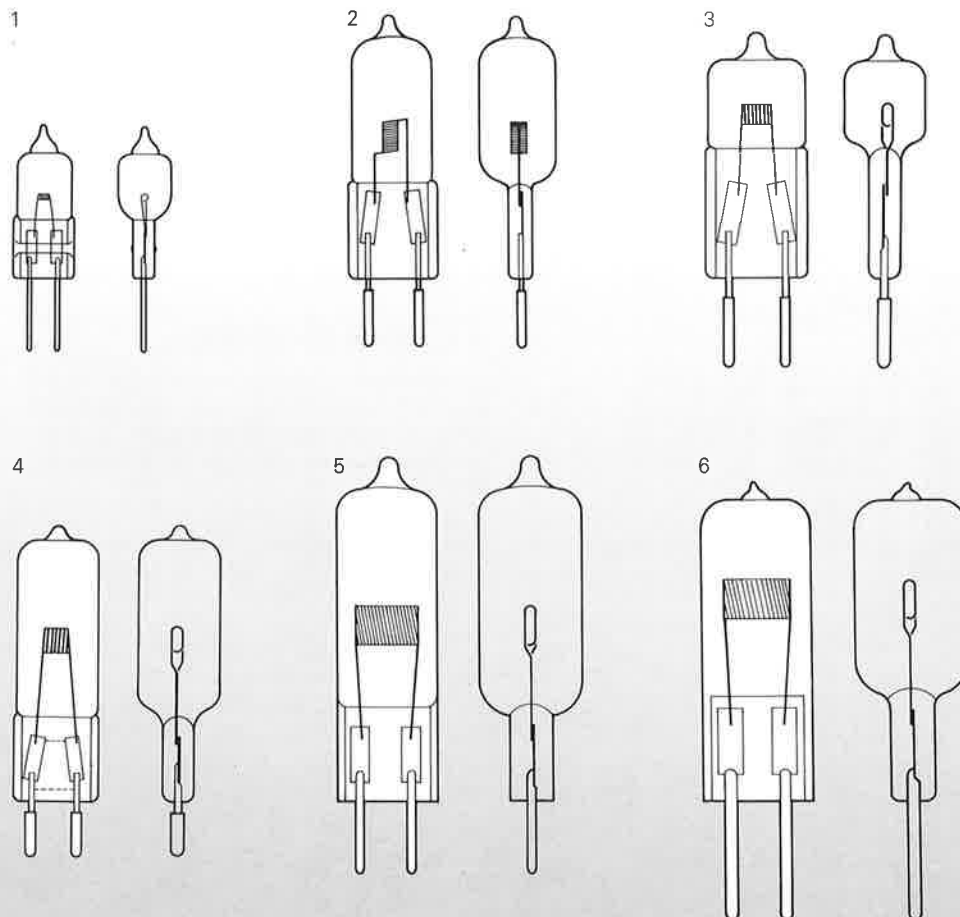
Typical distribution from 50w M74 lamp in a linear reflector mounted at 0.5m above task surface.



Capsule lamps

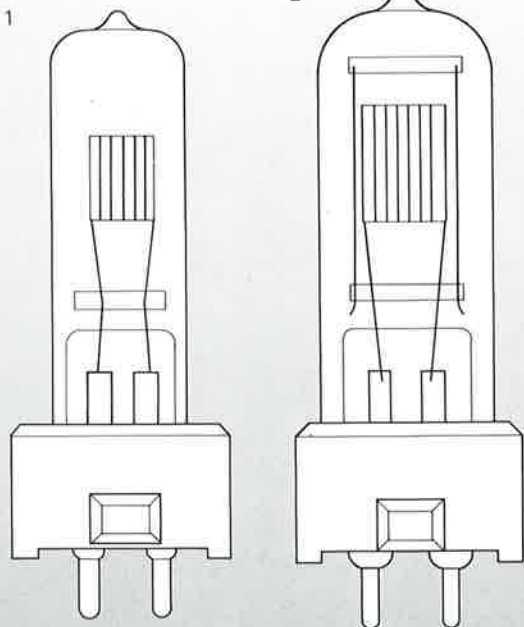
lamp	ANSI code	voltage	wattage	lamp cap	average life hrs	nominal lumens	light centre length	length mm max	width mm	colour K	operating position	filament type	bulb finish	illustration	box qty
M29	ESA	6	10	G4	100	210	19.5	30	10	3200	univ	trans	clear	1	10
M30	ESB	6	20	G4	100	420	19.5	30	10	3200	univ	trans	clear	1	10
M34	FHE	..	..	..	2000	350	..	..	..	3000	..	..	..	..	..
M91	—	12	12	G4	2000	150	19.5	32	10	2950	univ	trans	clear	1	10
M47	—	12	20	G4	2000	350	19.5	30	10	3000	univ	trans	clear	1	10
M35	—	..	..	..	200	400	..	..	..	3100	..	..	..	..	..
M76*	—	12	20	GY6.35	3000	300	30.0	44	12	3000	univ	axial	clear	2	10
M75*	—	12	35	GY6.35	3000	600	30.0	44	12	3000	univ	axial	clear	2	10
M95	—	..	..	..	..	550	..	..	..	..	..	trans	..	3	..
M32	—	12	50	GY6.35	3000	850	30.0	44	12	3000	univ	trans	clear	3	10
M74*	—	..	..	..	..	900	..	..	..	..	..	axial	..	2	..
M73*	—	12	75	GY6.35	3000	1350	30.0	44	12	3000	univ	axial	clear	2	10
M28*	EVA	12	100	GY6.35	2000	2400	30.0	44	12	3000	univ	flatgrid	clear	4	10
M67	—	24	..	..	..	1800	..	..	..	3200	VBD ±90	trans	..	..	..
M33	—	24	250	GY6.35	300	8400	33.0	55	13.5	3000	VBD ±90	flatgrid	clear	5	10
M36	—	..	..	..	2000	5750	37.0	58	16	..	VBD	..	..	6	..

*Heat sink required in the base-up
± 90° position VBD = vertical
base down



Mains voltage lamps:

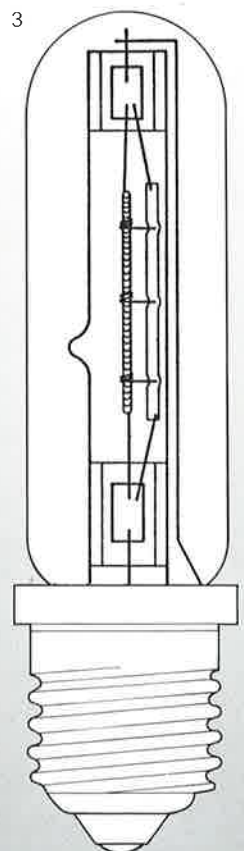
PAR64, capsules & single ended tubular lamps



K13 & K16 lamps

The axial filament of these lamps minimises the light lost in the lamp cap and its brilliance makes it an excellent source for lead-crystal chandeliers. In addition, their 4000 hours life makes them an economical alternative to the General Lighting Service lamp.

These single-cap, double jacket lamps utilise the award-winning quartz spine support for the filament which permits an improved halogen cycle longer life and universal burning position. The lamps are also internally fused; this together with all other features permits the design of luminaires of substantially cheaper construction.*



** see illustration page 22*

	lamp	voltage	wattage	lamp cap	average life hrs	nominal lumens	light centre length	length mm max	width mm max	colour K	operating position	illustration	box qty
Capsule	M38	120 220/230 240/250	300	GY9.5	2000	5000	45.5	80	28.5	2900	univ	1	10
	M40	..	500	..	..	8500	..	85	30	..	..	2	..
Class K single-ended tubular lamps	K13*	120 220/230 240/250	150	E27	4000	2100	69	110	28	2850	univ	3	16
	K16*	..	100	..	..	1350	..	..	..	2900	..	..	..
PAR 64	M165	220 240	500	EMEP	2000	96000	12 × 9	150	205	2750	univ	4	10
	M166	..	..	Extended	..	36000	25 × 13	..	..	..	..	..	..
	M167	..	..	Mogul	..	12000	51 × 20	..	..	..	..	..	..
	M168	..	..	End Prong	..	6000	64 × 66	..	..	..	..	..	..
	..	..	..	..	GX1 6D	..	..	..	..	..	..	..	..

* These lamps are internally fused with a ballast fuse. Bulb finish – clear.

Lumen figures are for 220/230 and 240/250 volt lamps. For 120 volt lamps add 10%.

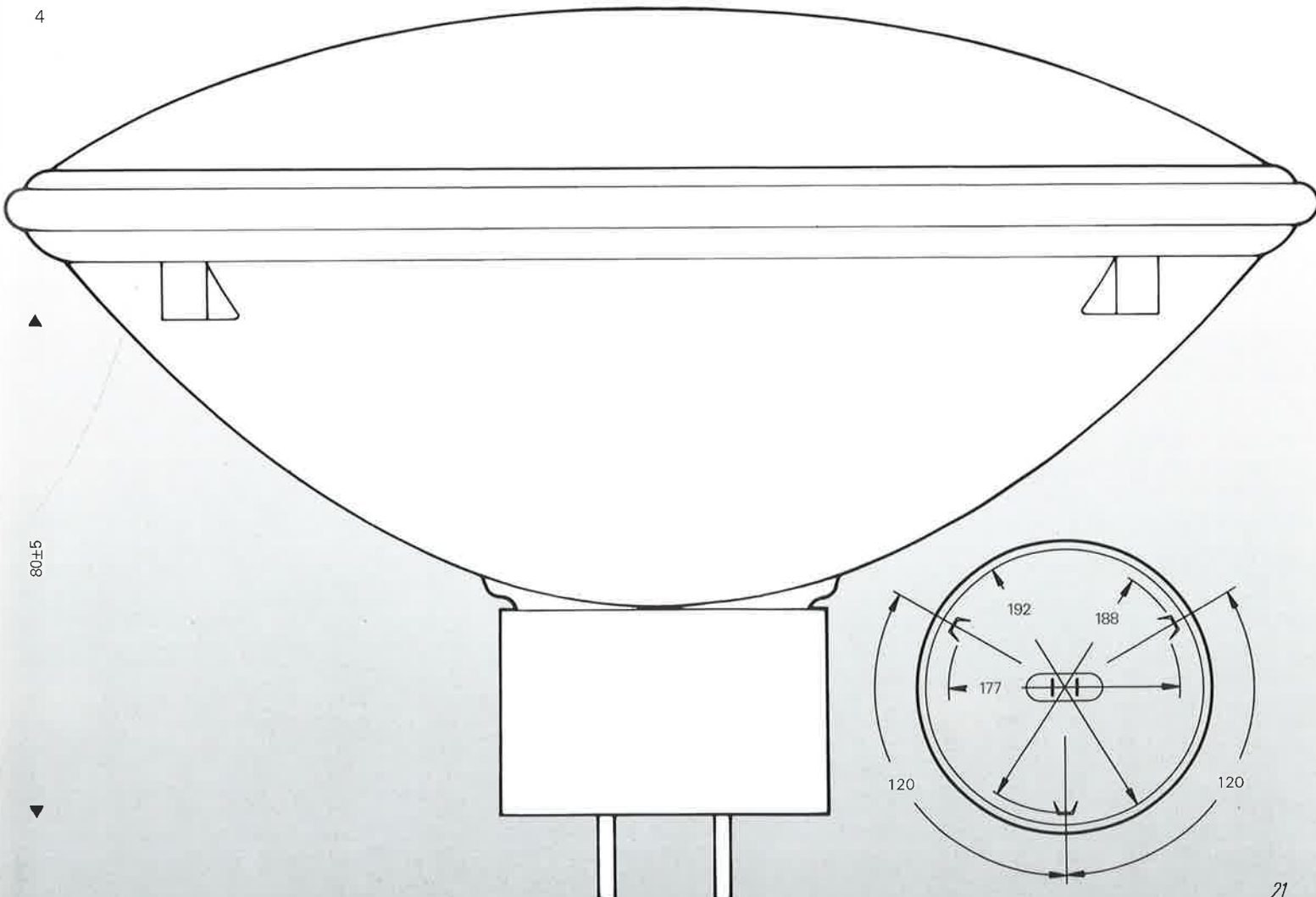
500W PAR 64

m	M165				M166				M167				M168						
	vertical axis 9°		horizontal axis 12°		vertical axis 13°		horizontal axis 25°		vertical axis 20°		horizontal axis 51°		vertical axis 66°		horizontal axis 64°				
5	79	3840	1.05	3840	5	1.14	1440	2.22	1440	5	1.76	480	4.77	480	5	6.49	240	6.25	240
10	1.57	960	2.10	960	10	2.28	360	4.43	360	10	3.53	120	9.54	120	10	12.99	60	12.50	60
15	2.36	430	3.15	430	15	3.42	160	6.65	160	15	5.29	53	14.31	53	15	19.48	27	18.75	27
20	3.15	240	4.20	240	20	4.56	90	8.87	90	20	7.05	30	19.08	30	20	25.98	15	24.99	15

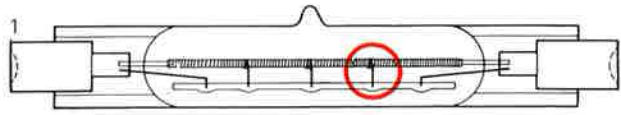
4

80±5

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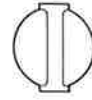
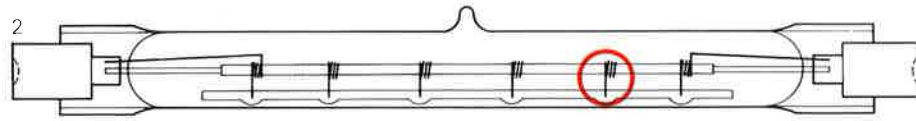


Double ended linear lamps

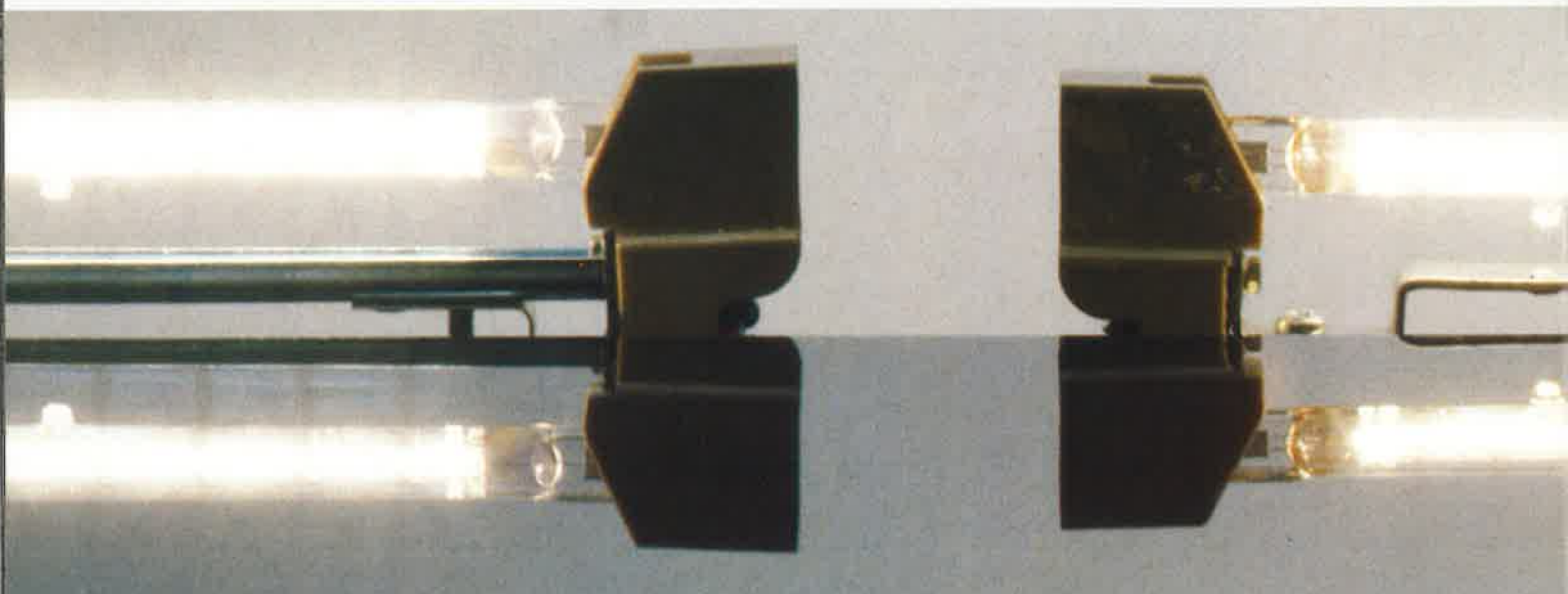
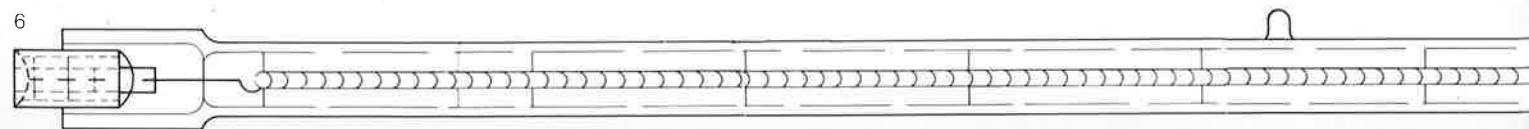
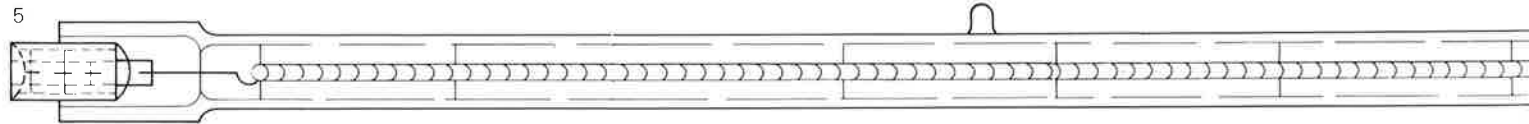
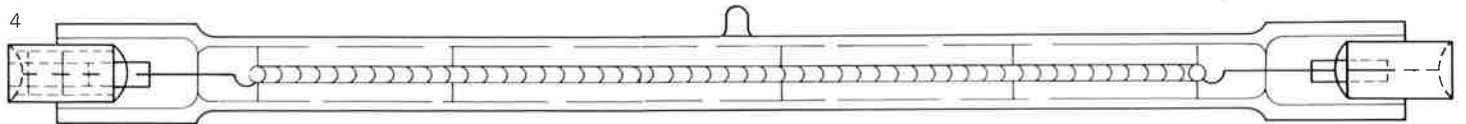
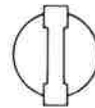
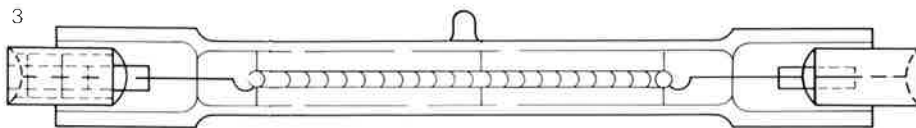
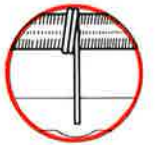


4000 hrs
average hours life

These lamps utilise the award-winning quartz spine filament support system. The supporting technique allows an improved halogen cycle which permits a greater efficiency and longer life. The spine allows universal burning of the lamp.



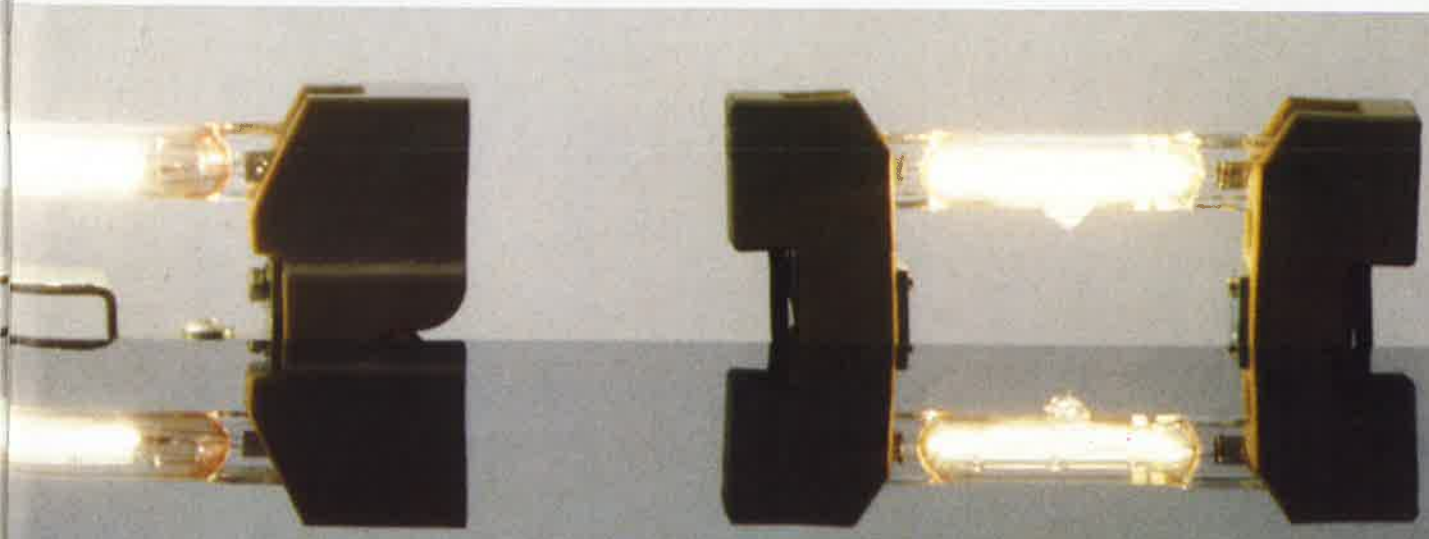
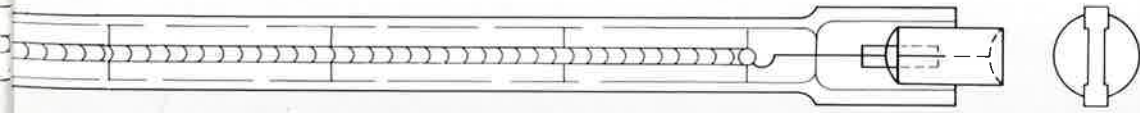
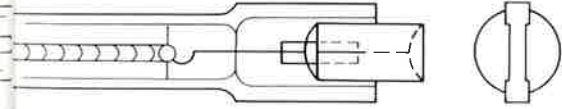
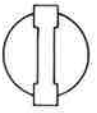
4000 hrs
average hours life



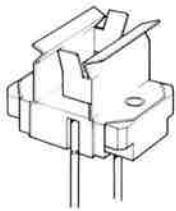





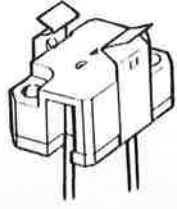



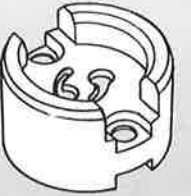
	lamp	voltage	wattage	lamp cap	average life hrs	nominal lumens	contact to ceramic	length mm max	diameter mm max	colour K	operating position	illustration	box qty
78mm	K14	120 220/230 240/250	100	R7s	4000	1350	78.3	80.3	12	2850	univ	1	10
	K12	..	150	..	..	2100	..	..	..	2850	..	..	..
	K15	..	250	..	..	4000	..	..	..	2900	..	..	..
117mm	K11	120 220/230 240/250	200	R7s	4000	3200	117.6	119.6	11	2900	univ	2	10
	K9	110/115 220/230	300	..	4000	5000	..	..	..	..	..	2	..
	K1	110 120 220/230 240	500	..	2000	9500	..	..	..	..	horiz ±4deg	3	..
Other	K3	220/230 240	750	R7s	2000	15000	189.1	191.1	12	3000	horiz ±4deg	4	10
	K4	110 220/230 240/250	1000	..	..	21000	..	..	..	..	..	..	10
	K10	220/230 240/250	1000	..	..	21000	254.1	256.1	..	..	..	5	10
	K5	..	1500	..	..	33000	..	..	..	..	..	..	10
	K8	..	2000	..	..	44000	331.0	333.0	..	..	..	6	1

Fusing
All these lamps are fused internally above 120 volts, in order to prevent arcing. This is not necessary below 120 volts: or in lamps greater than 117mm in length, where an arc is unable to travel the length of the tube. All lamps should be operated with a suitable HBC fuse.

All lumen figures are for 220/230 and 200/250 volt lamps. For 120V lamps add 10%.



Lampholders for low voltage lamps

lampholder	PTFE lead length mm	lamp base	description	illustration	
GL1228/70	70	GX5.3	with flying leads and lamp support clips	H1	fc: fixing centres in mm
GL1228/110	110	or GU5.3	Solid nickel contacts, steatite ceramic body		H1 fc 21
GL1228/150	150		Nickel-plated steel side spring		
GL1228/250	250		Polytetrafluoroethylene (PTFE) lead wire insulation		
GL1228/400	400		Lead — 19 strand 0,25mm nickel plated copper		
GL1228/2000	2000		Maximum current: 35V, 10A Universal operating position		
GL1218/70	70	GX5.3	with flying leads	H2	
GL1218/110	110	or GU5.3	Solid nickel contacts, steatite ceramic body		
GL1218/165	165		Polytetrafluoroethylene (PTFE) lead wire insulation		
GL1218/250	250		Lead — 19 strand 0,25mm nickel plated copper		
GL1218/400	400		Maximum current: 35V, 10A Universal operating position		
GL1219/70	70	GX5.3	with flying leads and mounting lugs	H3	
GL1219/110	110	or GU5.3	Solid nickel contacts, steatite ceramic body		
GL1219/165	165		Polytetrafluoroethylene (PTFE) lead wire insulation		
GL1219/250	250		Lead — 19 strand 0,25mm nickel plated copper		
GL1219/400	400		Maximum current: 35V, 10A Universal operating position		
GL1241/70	70	G4/GZ4	with flying leads and lamp support clips	H4	
GL1241/120	110	or GU4	Solid nickel contacts, steatite ceramic body		
GL1241/150	150		Nickel-plated steel side spring		
GL1241/250	250		Polytetrafluoroethylene (PTFE) lead wire insulation		
GL1241/400	400		Lead — 19 strand 0,25mm nickel plated copper Maximum current: 35V, 10A Universal operating position		
GL1211/70	70	G4/GZ4	with flying leads	H5	
GL1211/110	110	or GU4	Solid nickel contacts, steatite ceramic body		
GL1211/165	165		Polytetrafluoroethylene (PTFE) lead wire insulation		
GL1211/250	250		Lead — 19 strand 0,25mm nickel plated copper		
GL1211/400	400		Maximum current: 35V, 10A Universal operating position		
GL1212/70	70	G4/GZ4	with flying leads and mounting lugs	H6	
GL1212/110	110	or GU4	Solid nickel contacts, steatite ceramic body		
GL1212/150	150		Polytetrafluoroethylene (PTFE) lead wire insulation		
GL1212/250	250		Lead — 19 strand 0,25mm nickel plated copper		
GL1212/400	400		Maximum current: 35V, 10A		
GL1212/2000	2000		Universal operating position		
GL1123A	NA	G4	with lamp support clips	H7	
			Solid nickel contacts, steatite ceramic body		
			Maximum current: 35V, 6A		
			Universal operating position		
GL1223	NA	SBC	with flanged mount	H8	
			Solid nickel contacts, brass body		
			Maximum current: 250V, 6A		
			Universal operating position		
GL1224	NA	SBC	with pendant mount	H9	
			Solid nickel contacts, brass body		
			Maximum current: 250V, 6A		
			Universal operating position		
GL1079W	165	GY6.35	with flying leads	H10	
			Solid nickel contacts, steatite ceramic body		
			Maximum current: 35V, 6A		
			Universal operating position		
GL1079SLW	165	GY6.35	with flying leads and lamp support clips	H11	
			Solid nickel contacts, steatite ceramic body		
			Maximum current: 35V, 6A		
			Universal operating position		
TAL lampholder					
GL1252/150	150	GU7	with flying leads	H12	
GL1252/250	250	GU7	Nickel contacts, steatite ceramic body,		
			PTFE lead wire insulation. Lead 19 strand 0,25mm		
			nickel plated copper. Max current: 35V, 10A.		
			Universal operating position.		
			Note: All the lampholders are designed to operate with a maximum lamp pinch temperature of 350°C. For lamp pinch temperature limits see IEC357. Lampholder leads should not be plated.		

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