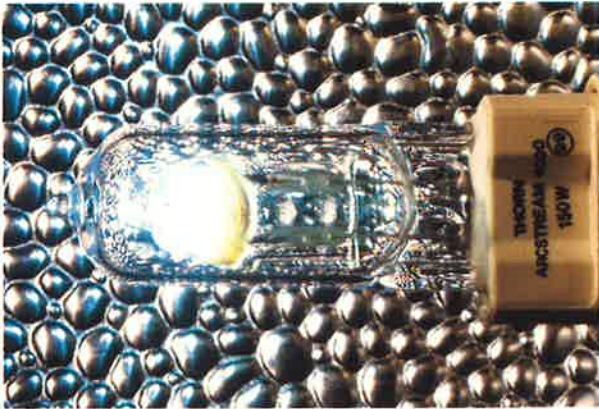




GE Thorn

ARCSTREAM

70 & 150W Metal halide lamps



Arcstream lamps are classified according to their Colour Rendering Index (Ra) and their Correlated Colour Temperature (CCT), thus:

Ra80+ CCT3000K = 830
Ra80+ CCT4000K = 840

The Colour Rendering Index indicates the accuracy of a light source to render colour. The scale of the index is in increments of 10, with 100 as the maximum.

The Correlated Colour Temperature, given in degree Kelvin (K), defines the apparent colour emitted by the light source.

With their new classification any Arcstream can therefore be readily selected to match or contrast with other light sources within an installation.

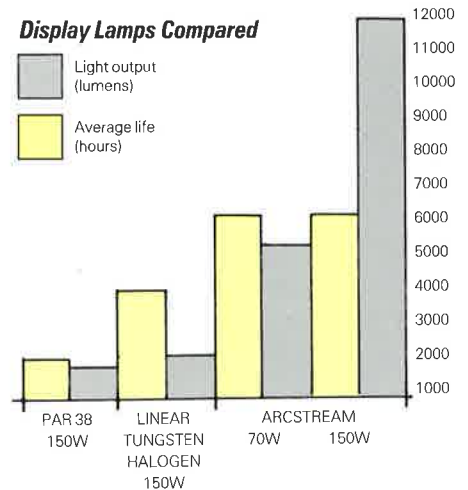
Arcstream is one of the smallest single-ended metal halide lamps in the world. Its arc gap of 4mm (70W) or 6mm (150W) gives a highly controllable point-source that may be easily and effectively employed in a variety of luminaires for indoor and outdoor lighting.

The addition of the 4000K version, together with the best colour stability for this type of lamp, provide the lighting designer with a metal halide source of colour appearance entirely compatible with incandescents and fluorescents.

Finally the 70W Arcstream will provide further benefits to manufacturers and users alike with the standardisation of luminaires and the greater range of lighting levels attainable.

Chromaticity coordinates on
 3000K: $x = 0.437, y = 0.402$
 4000K: $x = 0.380, y = 0.377$

Display Lamps Compared



70W

ARCSTREAM[▲] 830 (3000K)

ARCSTREAM[▲] 840 (4000K)



150W

ARCSTREAM[▲] 830 (3000K)

ARCSTREAM[▲] 840 (4000K)



The sealed PAR 64 Arcstream simplifies the construction and use of a luminaire. The choice of very narrow beam, with plain front glass, or wide beam lamp, with spread lens, enables rapid change of light intensity and distribution from the same luminaire.

The controllability of Arcstream's point source is demonstrated by the 300000 cd produced by the very narrow beam version and by the excellent distribution of colour throughout both beams' spreads.

150W PAR64

m	very narrow beam		wide beam	
	15°	lux	30°	lux
1	0.26	300000	0.54	50000
2	0.53	75000	1.07	12500
3	0.79	33333	1.61	5556
4	1.05	18750	2.14	3125
5	1.32	12000	2.68	2000
6	1.58	8333	3.22	1389
7	1.84	6122	3.75	1020
8	2.11	4688	4.29	781
9	2.37	3703	4.82	617
10	2.63	3000	5.36	500

beam width metre 50% peak beam width metre 50% peak

150W PAR64

ARCSTREAM[▲]830 (3000K) ARCSTREAM[▲]840 (4000K)



Universal burning and colour stability

In the second generation Arcstream major improvements in design and manufacturing ensure universal burning, colour stability and reliable life.

Electrodes

cranked design stabilises arc on electrode tip.

Pinch

stronger design for greater reliability.

Clip

removal reduces possible sources of contamination.

Outer filling gas

reduces sodium loss from arc tube.

Clean room environment

super pure quality.

Dosing

complex metal halide dose optimised for each lamp.

Colour uniformity will be affected by changes in supply voltage, difference in control components and reflector design as well as operating position. Where uniformity is paramount any such variables should be kept to a minimum.

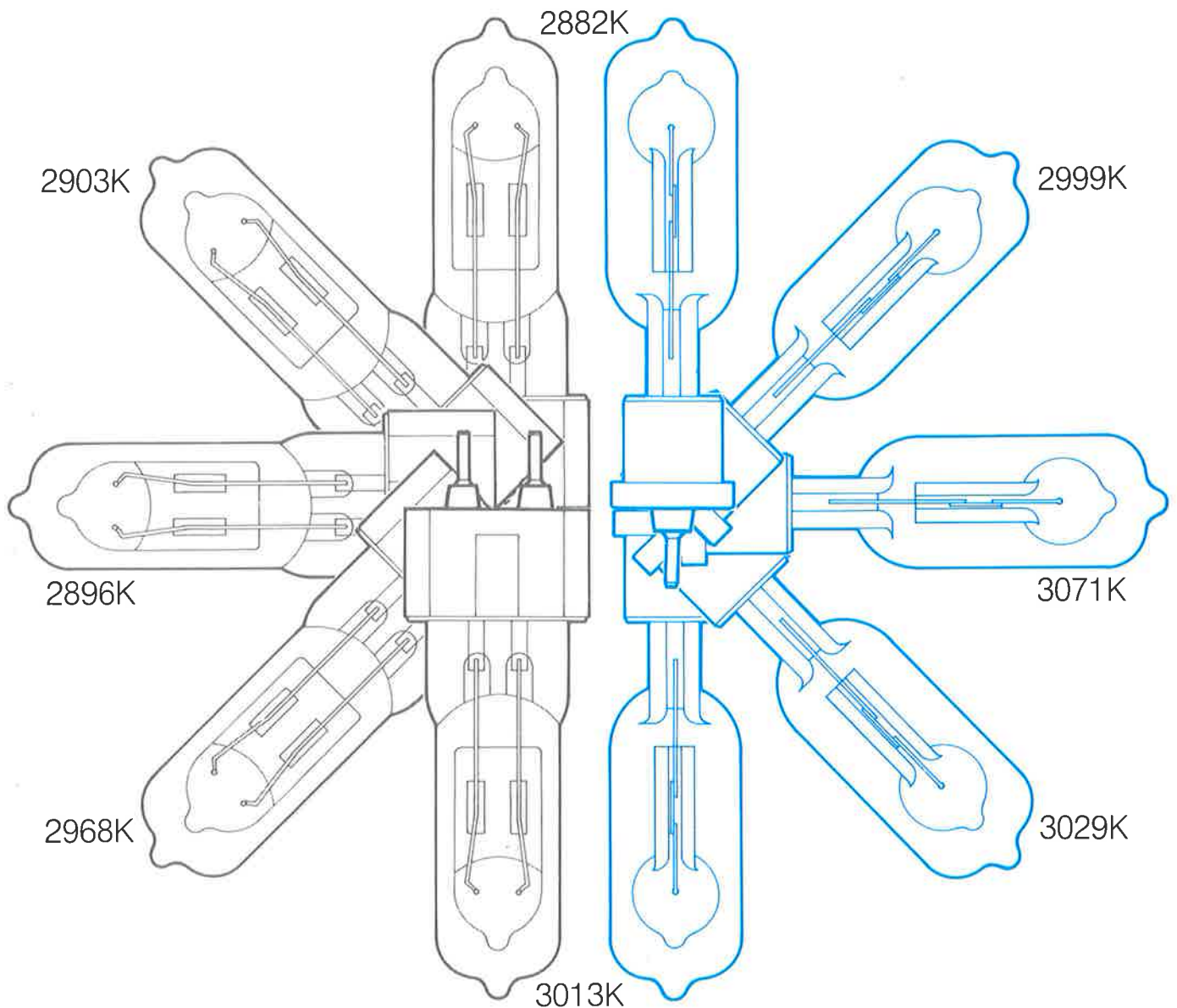
Colour Rendering Index

(Ra) 80 Din 5035 for 3,000K

(Ra) 85 for 4,000K

Colour Rendering Group 1B

The spread of colour appearance of Arcstream in a typical batch under standard conditions, will be within $\pm 200\text{K}$. The illustration gives values for the spread of colour temperatures in different operating positions of a particular 3,000K lamp.



The long life, colour stability and lumen maintenance qualities of Arcstream have already been proven in installations such as 'Next' in Kensington (illustrated) and Tobacco Dock in London. It has also been used for the floodlighting of the Tower of London.



Lighting and luminaire design with

ARCSTREAM ▲ 830 & 840

The GE Thorn Arcstream is a valuable new resource for the lighting engineer, architect and designer because it combines as never before the advantages of high luminous efficacy, for which high pressure discharge sources are noted, with the controllability of incandescent point sources.

The 69 lumens/80 lumens per watt (70W and 150W respectively) can be precisely directed by quite small reflectors in compact, unobtrusive luminaires easily styled to satisfy contemporary architectural needs.

The Colour Rendering Index of Ra80/85 makes Arcstream perfect for the lighting of stores and showrooms, banks or offices, hotels or churches.

With the appropriate luminaire design, Arcstream will produce a wide beam, with no glare, for ambient lighting to complement halogen accenting; or a medium-narrow beam for 'punch' required where a high level of light is present as with daylight; or very narrow beam for even the highest mounting height in malls, lobbies, atria.

The combination of all its attributes makes Arcstream the ideal source for the environment where 'modelling', colour rendering and appearance are requisite.

Reflector design

Due to non-uniform distribution of the metal halide vapour in the lamp, colour variations are possible in the light emitted in different directions.

In order to achieve a beam of even colour distribution, it is important to use a paraboloid reflector shape. The light should be spread using facetting and surface texture or by use of prismatic front windows, even for wide angle beams. The conventional use of ellipsoidal mirrors should be avoided.

Luminaire design

The luminaire design is critical not only for optimum lamp performance, but also for control gear.

Preferably, the ballast should be located in a separate compartment from that of the lamp/reflector.

If the ballast is too near the lamp, it is possible for the ballast's magnetic field to cause the arc of the lamp to move closer to the arc tube wall. This in turn will shorten lamp life, causing the arc tube to burn out.

Sufficient distance or a barrier of ferrous material is essential between lamp and ballast. The gear compartment should be well ventilated and designed to dissipate heat.

Temperature limits:
bulb maximum 600° C
cap/bulb interface maximum 150° C
lampholder 180° C
ignitor 85° C

Luminaire testing

When carrying out thermal testing on a luminaire, the test should be performed at $\pm 6\%$ of the nominal supply voltage. Ballast taps should be set at the nominal voltage. If the luminaire allows for variable positioning, then the test should be performed in the most adverse position, that is when the pinch is at its hottest.

If excesses of voltage or temperature are measured, the luminaire design should be checked to ensure that:

The lamp is not being overheated due to direct radiation from the reflector.

The arc is not being distorted due to magnetic influences from the ballast.

There is sufficient space in the lamp compartment for adequate ventilation.

Safety

Cover glasses must be incorporated in all luminaires using Metal Halide lamps. This is to ensure containment of hot material in the unlikely event of a non-quiescent failure. The lamp operates with a high internal pressure and there is a slight risk that the lamp may shatter, particularly if it is run beyond its rated life.

The outer bulb of the lamp is made of quartz which transmits UVA and UVB radiation. Lamps should always be operated in enclosed luminaires with UV absorbent cover glasses, and the luminaire should never be energised without the cover in place. Personnel should never be exposed to radiation from a bare lamp.

The luminaire should also incorporate a cutout switch, to prevent operation if the cover glass is removed.

Avoid touching the lamp with bare hands. If the lamp is touched, clean with spirit or alcohol and wipe with a clean cloth. If the outer bulb is broken or scratched, the lamp must not be operated.

Change lamps immediately at the end of life, which can be recognised by poor light output, severe colour shift, and lamps cycling. Failure to do so could lead to damage to the luminaire and/or its control components.

Always use lamps of the correct rating for the luminaire.

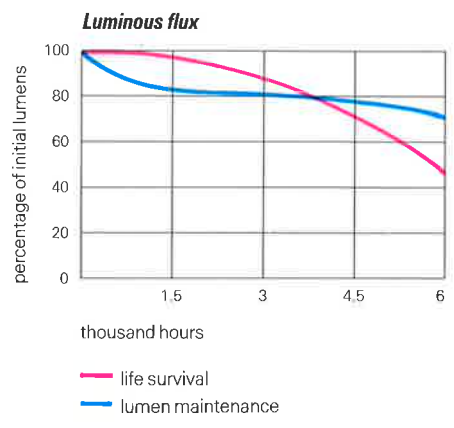
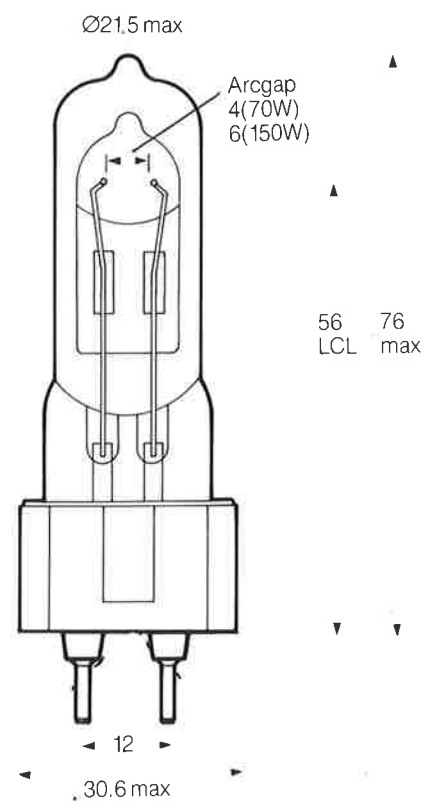
Parts of the lamp surface may, during operation, reach temperatures of up to 600° C, prevent liquid, condensation droplets, or water splashing onto the lamp as these may cause the bulb to shatter.

Quality assurance

GE Thorn holds BS5750 Part II quality assurance registration for the manufacture of Arcstream lamps, ensuring that every lamp has been made to the same demanding quality specification and every product will be a consistently high standard.

lamp	watts	lamp cap	rated life hrs	operating position	initial lumens nominal	lumens at 2000 hrs	luminescence efficacy lumens per watt	run up time to 90% L.O approx mins	colour temperature k	colour rendering index Ra	min starting temperature °C	electrode spacing mm
Arcstream 830	70	G12	6000	U	5200	4700	69	1	3000	80	-20	4±1
	150	G12	6000	U	12000	10000	80	1	3000	80	-20	6±1
	PAR64 150	GX16D	6000	U	12000	10000	80	1	3000	80	-20	6±1
EMEP												
Arcstream 840	70	G12	6000	U	5200	4700	69	1	4000	85	-20	4±1
	150	G12	6000	U	12000	10000	80	1	4000	85	-20	6±1
	PAR64 150	GX16D	6000	U	12000	10000	80	1	4000	85	-20	6±1
EMEP												

electrical data	objective lamp watts	lamp voltage	nominal lamp current amps	supply voltage	PFC capacitor µF	supply current amps	total circuit watts	power factor pf	% 3rd harmonic	capacitor current amps	recommended fuse rating amps
75	95 ± 10	0.95	220	10	0.46	87	0.87	20	0.69	4	
			240			19					0.75
150	95 ± 10	1.82	220	20	0.85	168	0.9	13	1.4	4	
			240			170					0.93



Supply Voltage

Variations of ± 5% are permissible for short periods only. In order to maximise lamp survival, lumen maintenance and colour uniformity, the supply voltage and ballast design voltage difference should be within ± 3%.

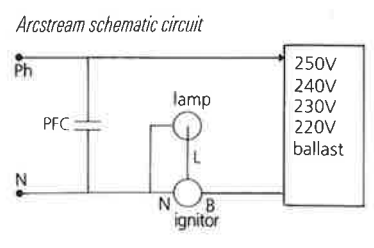
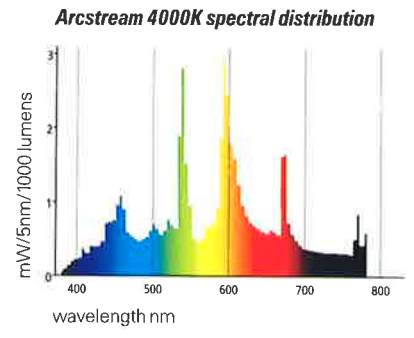
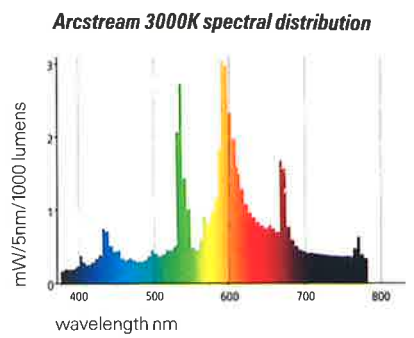
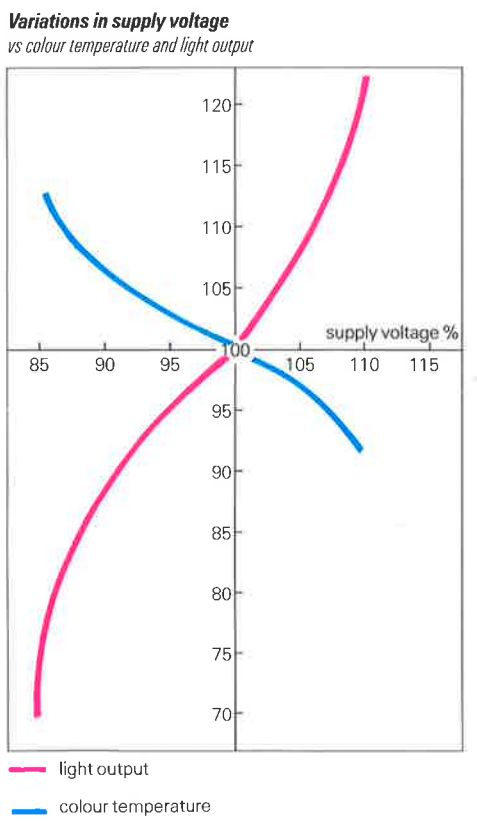
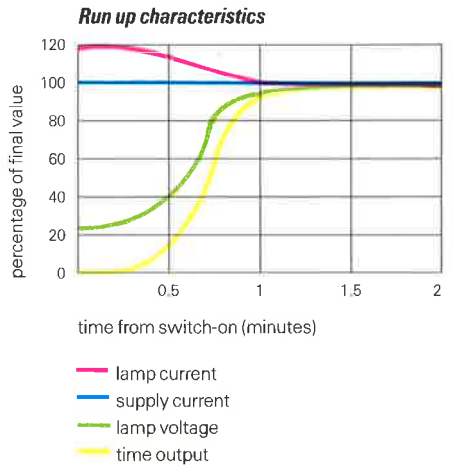
Fuse Data

Number of lamps	1	2	3	4	5	6
Fuse Rating HCB or MCB (A)	4	6	10	10	16	6

Track mounted luminaires must be fused individually.

Dimming

Arcstream lamps are not suitable for dimming. Dimming causes deterioration of colour rendering and reduction of lamp life.



Arcstream control gear requirements

Ballast Impedence

Ballasts designed to draft IEC Metal Halide specification, or to IEC 662 for use with 70W or 150W High Pressure Sodium lamps, will be suitable.

Supply voltage

Minimum rated supply voltage is 220V (50Hz or 60Hz). Tapping should be provided at $\pm 10V$ of rated supply voltage.

Ballast thermal protection

This is not specifically required for GE Thorn Arcstream lamps, but is required in the draft IEC Metal Halide specification.

Ignitor pulse requirement

$\pm 3.5KV$ (minimum) with pulses produced on both mains half-cycles between $60/90^\circ$ and $240/270^\circ$.

Timed Ignitor

Timed ignitors are not specifically required for GE Thorn Arcstream lamps, but do offer an optional safety feature and compatibility with other lamp types.

Approved gear sets:

- Thorn Ballasts G 53400 T
- G 53460 T
- G 53467 T
- Thorn Ignitor G 53459
- PF Capacitor GC.2331 (20 μ F)

Other approved ignitors:

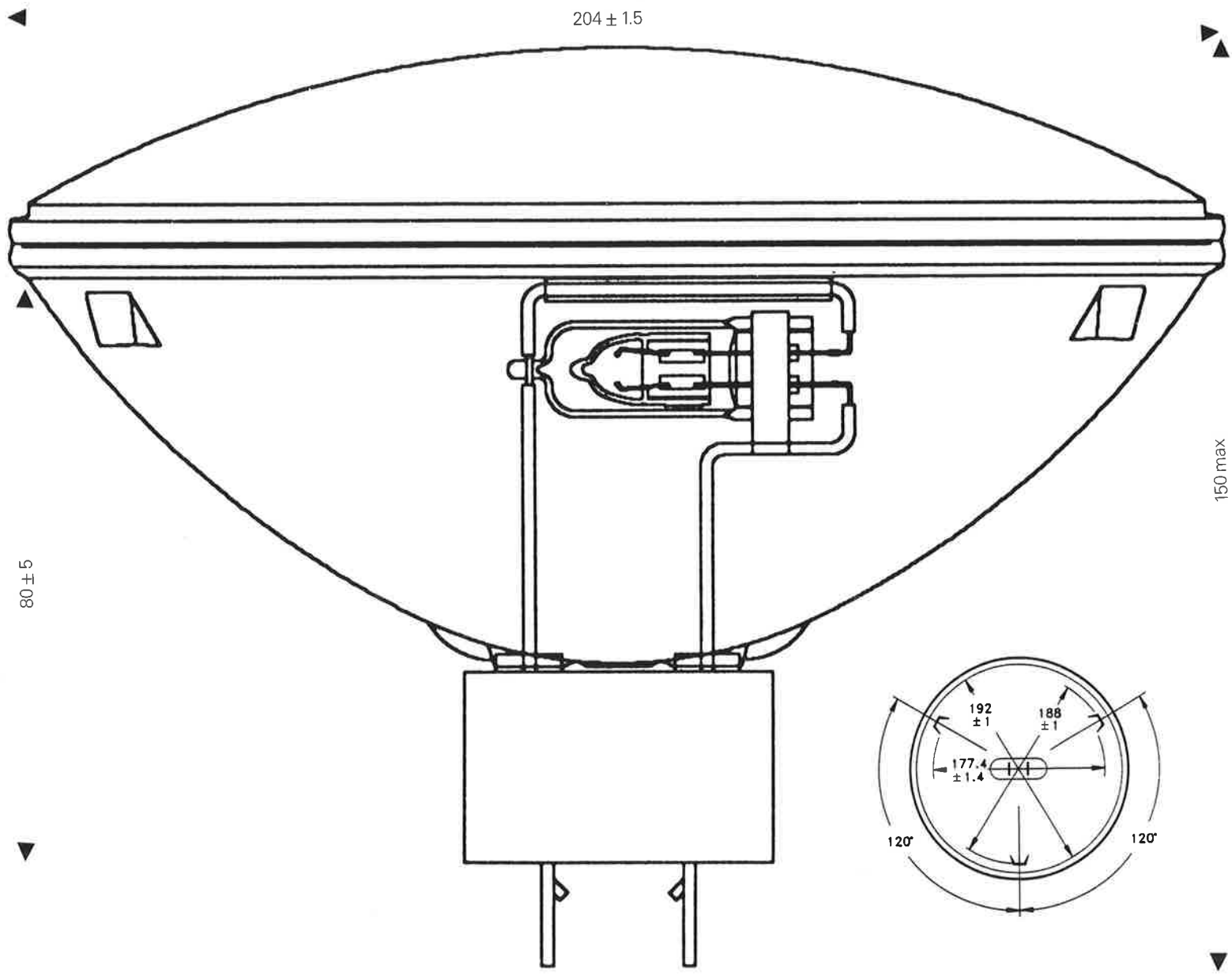
- BAG Turgi MZN 150.S
- MZN 250 SE
- Zumtobel ZRM 6ES
- ZRM 1.8ES/2
- May & Christe ZG4.5SE
- Parry PWE 400

Other approved gear sets:

- ADVANCE USA
- Ballast - 71A5480 for 120V and 277V 60Hz supplies
- Ignitor - L1520
- PFC - 16 μ F 330V
- OHYAMA Japan
- TM150TA for 100V 50Hz single piece ballast
- HERMES Japan
- QH1.5HIA for 100V 50Hz single piece ballast
- TOEI Japan
- TM-150TA for 100V 50Hz single piece ballast
- EYE Japan
- MT1.5TCPJA for 100V 50Hz single piece ballast

Specifications

Whilst great care is taken to give up to date information GE Thorn reserve the right to amend any specification without prior notification and all descriptions, illustrations in this publication shall not form part of any contract.



150 max

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