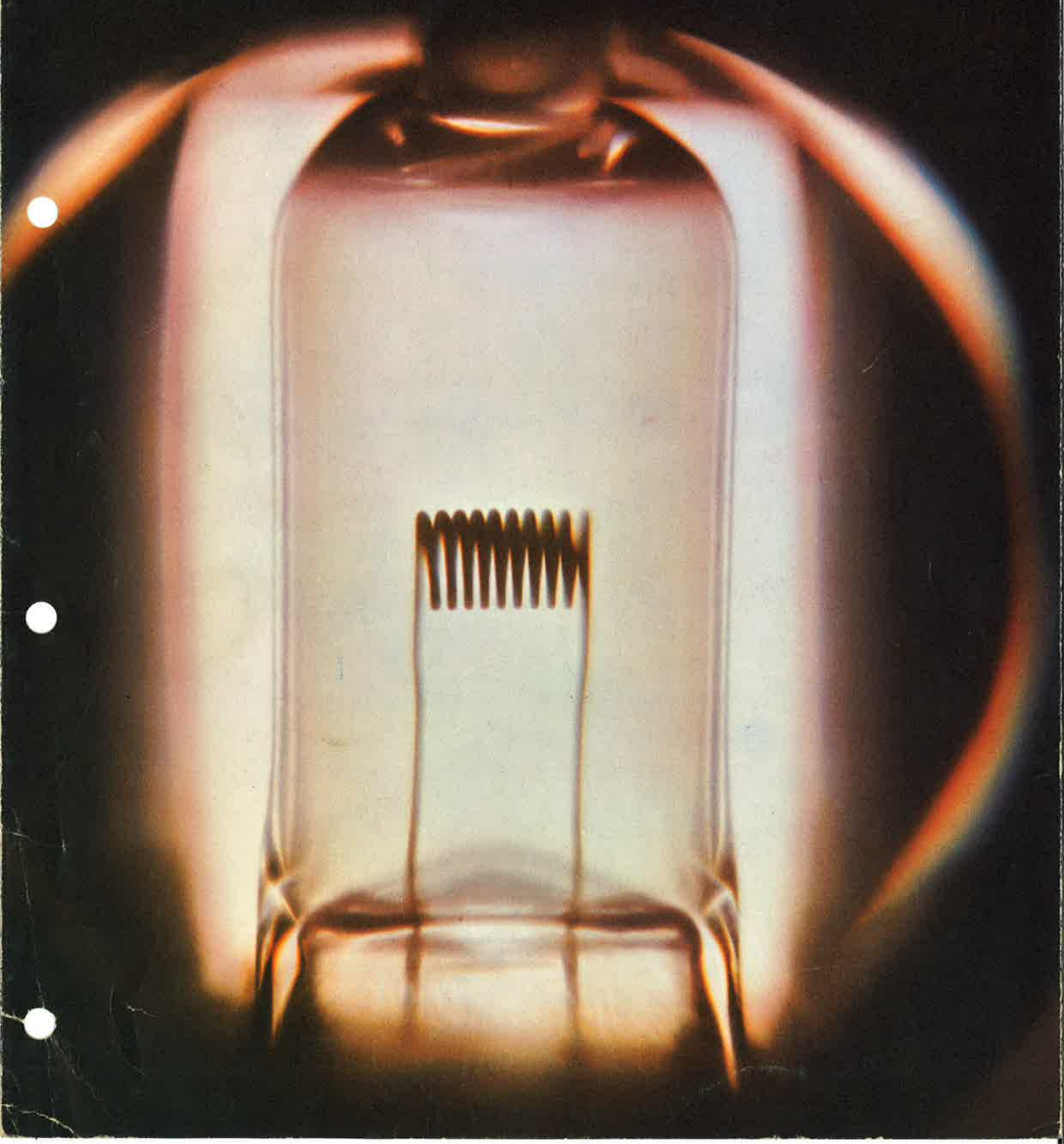


## Tungsten Halogen Lamps



## Tungsten Halogen Lamps

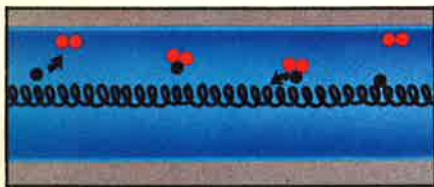
Tungsten halogen lamps have been commercially available since the early 1960-s when they were first used for such applications as car headlamps, airfield approach lighting and for photographic projection. Now applications too numerous to list have been developed because of the main advantages these lamps have over conventional tungsten filament lamps—longer life with higher and constant light output throughout.

In conventional tungsten filament lamps the tungsten which evaporates from the filament because of the high operating temperature is deposited on the bulb wall. This causes darkening of the glass and consequent loss of efficiency after the lamp has been in service for some time. Additionally the filament becomes thinner as this migration takes place and eventually it fails.

By adding a trace of the halogen chemical family (iodine, chlorine, bromine or fluorine) to the inert gas, with which the lamp is filled, a chemical action is induced.

For example if iodine is used, the tungsten, which evaporates from the filament above 250°C, combines with the iodine to form tungsten iodide which does not settle on the bulb wall. As the tungsten iodide molecules diffuse back into the high temperature zone of the filament the tungsten is deposited back on to it and the halogen is released to recommence the cycle.

The advantages are easily appreciated—by elimination of blackening of the lamp wall a high light output is maintained throughout life and bulb sizes may be greatly reduced allowing smaller fittings and better optical control.



Single-ended tungsten halogen lamps are manufactured for use in photographic projectors being extremely small in size with accurately formed filaments. Their brilliant white light enhances the colours in transparencies and movie films.



Among other uses for the single-ended versions are traffic lights, Studio lamps, theatre spotlamps, floodlights and automobile lighting.



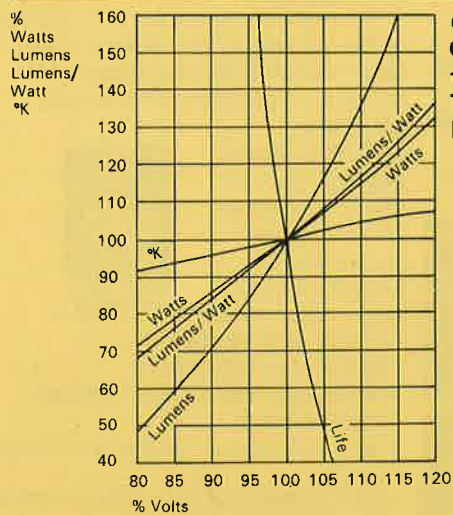
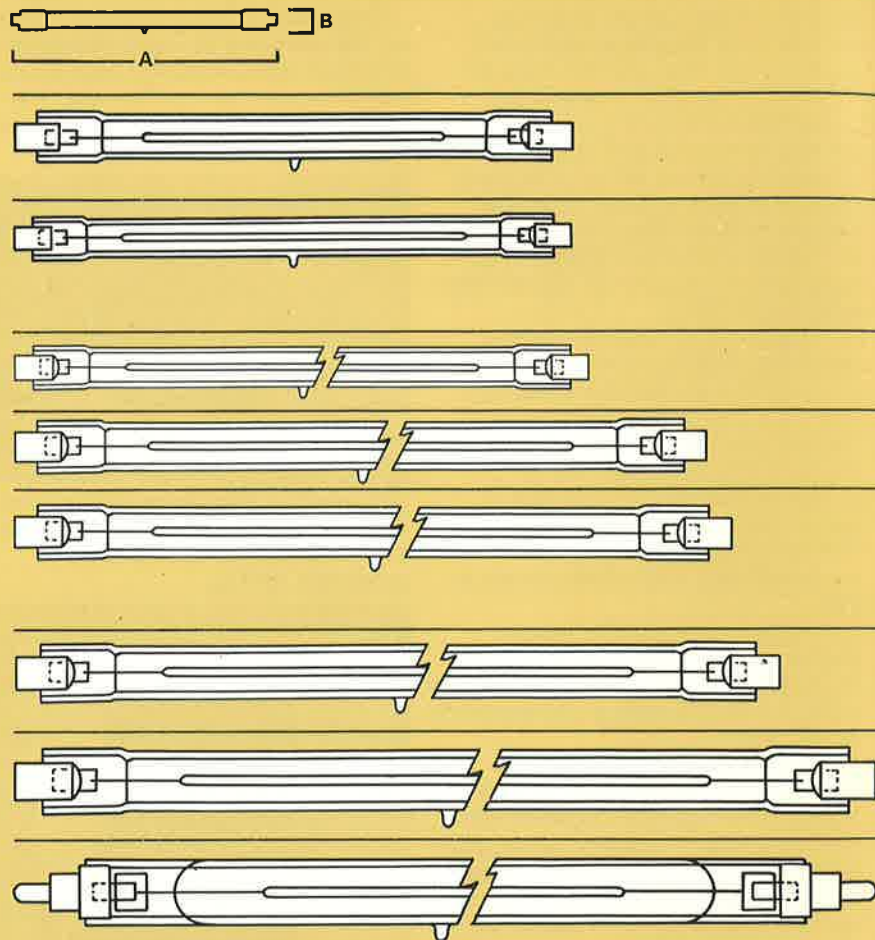
The double-ended linear versions have all the advantages of the single-ended types with applications in copying machines, floodlights and overhead projectors.

In 1972 Thorn Lighting received the Queen's Award for technological innovations in tungsten halogen lamps comprising:



- The development of Bromophosphonitrile
- 300W and 500W linear tungsten halogen lamps
- 'U'-tube tungsten halogen photoflood lamps
- 24V 250W lamp with dichroic mirror for cine projectors
- Miniature tungsten halogen lamps (6V 10W, 6V 20W)
- The development of the photo-etched molybdenum frame mount embodied in the H4 tungsten halogen car headlamp

## Double-ended Lamps



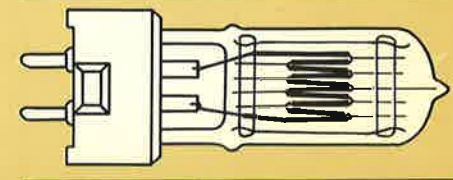
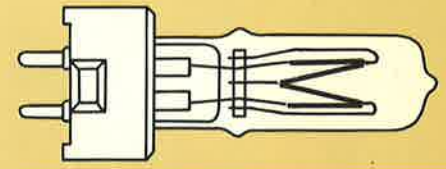
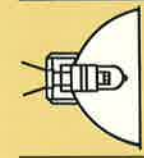
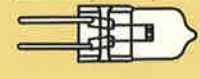
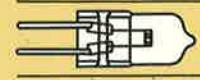
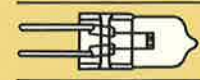
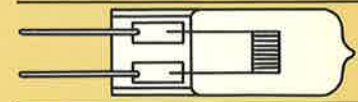
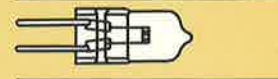
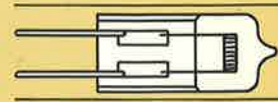
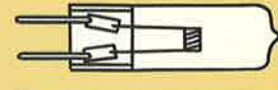
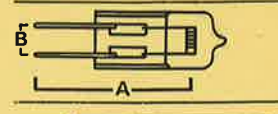
**Operating Characteristics for Linear Tungsten Halogen Lamps**

### Operating temperatures

During operation the temperature of the lamp pinch seal should not exceed 350°C, while the bulb wall temperature must not drop below 250°C in order to maintain the tungsten-halogen cycle.

# Single-ended Lamps

Lamp Type	Volts	Watts	Nom Length (A) mm	Filament Type	Max Dia (B) mm	Caps	Rated Life (Hrs)	Nom Lumens	Colour Temp K	Operating Position*
<b>K9</b>	110/115	300	117	SC	9.0	R7s	2000	5250	2900	Horizontal
	200/230	300	117	CC	9.0	R7s	2000	5000	2900	Horizontal
	240/250	300	117	CC	9.0	R7s	2000	5000	2900	Horizontal
<b>K1</b>	110	500	117	SC	11.0	R7s	2000	10 500	2900	Horizontal
	120	500	117	SC	11.0	R7s	2000	10 500	2900	Horizontal
	200/230	500	117	CC	11.0	R7s	2000	9500	2900	Horizontal
	240/250	500	117	CC	11.0	R7s	2000	9500	2900	Horizontal
<b>K2</b>	200/230	750	178	SC	11.0	R7s	2000	15 000	3000	Horizontal
	240/250	750	178	SC	11.0	R7s	2000	15 000	3000	Horizontal
<b>K3</b>	200/230	750	189	SC	11.0	R7s	2000	15 000	3000	Horizontal
	240/250	750	189	SC	11.0	R7s	2000	15 000	3000	Horizontal
<b>K4</b>	110	1000	189	SC	11.0	R7s	2000	22 000	3000	Horizontal
	120	1000	189	SC	11.0	R7s	2000	22 000	3000	Horizontal
	200/230	1000	189	SC	11.0	R7s	2000	21 000	3000	Horizontal
	240/250	1000	189	SC	11.0	R7s	2000	21 000	3000	Horizontal
<b>K5</b>	200/230	1500	254	SC	11.0	R7s	2000	33 000	3000	Horizontal
	240/250	1500	254	SC	11.0	R7s	2000	33 000	3000	Horizontal
<b>K8</b>	200/230	2000	331	SC	11.0	R7s	2000	44 000	3000	Horizontal
	240/250	2000	331	SC	11.0	R7s	2000	44 000	3000	Horizontal
<b>K6</b>	200/230	2000	334	SC	12.0	Fa4	2000	44 000	3000	Horizontal
	240/250	2000	max	SC	12.0	Fa4	2000	44 000	3000	Horizontal



\*Operating position: ±15°

SC=Single Coil CC=Coiled Coil

Lamp Type	Volts	Watts	Overall Length Max (mm)	LCL (A) (mm)	Min Protruding Pin Length (mm)	Pin Dia (mm)	Pin Centres (B) (mm)	Max Dia (mm)	Cap	Rated Life (Hrs)	Nom Lumens	Colour Temp K	Operating Position
M28	12	100	45.0	29.75-30.25	7.5	1.25	6.1-6.6	11.0	2 Pin GY6.35	2000	2150	3000	Base down to base horizontal
M32	12	50	44.0	29.75-30.25	12.0	1.25	6.1-6.6	12.0	2 Pin GY6.35	2000	900	2900	Any
M34	6	20	30.0	19.25-19.75	7.5	0.7	3.75-4.25	8.5	2 Pin G4	2000	350	2900	Any
M36	24	250	58.0	36.75-37.25	12.5	1.0	6.1-6.6	15.0	2 Pin G6.35	2000	5750	3000	Base down to base horizontal
M30	6	20	30.0	19.25-19.75	7.5	0.7	3.75-4.25	8.5	2 Pin G4	100	420	3200	Any
M29	6	10	30.0	19.25-19.75	7.5	0.7	3.75-4.25	8.5	2 Pin G4	100	210	3200	Any
M35	12	20	30.0	19.25-19.75	7.5	0.7	3.75-4.25	8.5	2 Pin G4	250	450	3200	Any
	13.2*	23								100	600	3300	Any
M37 With ellipsoidal dichroic reflector	12	55	42.0	32.0 to focal plane	7.5	1.0	6.1-6.6	50.0	2 Pin GZ6.35	750	—	—	Any
M39 With ellipsoidal reflector	6	20	39.0	32.0 to focal plane	—	—	5.7	49.8	2 Tab	2000	—	2900	Any
M41 With parabolic reflector	6	20	40.0		—	—	5.7	57.0	2 Tab	2000	—	2900	Any
M38	115/120	300	80.0	45.5-47.5			9.25-9.75	30.0	2 Pin GY9.5	2000	5000	2800	Any
	220/230	300											
	240/250	300											
M40	115/120	500	85.0	45.5-47.5			9.25-9.75	30.0	2 Pin GY9.5	2000	8500	2900	Any
	220/230	500											
	240/250	500											

\*M35 can be operated at 13.2 volts. The characteristics for such operating are as above.

For more detailed information on Thorn Tungsten Halogen Lamps please consult your nearest Thorn Lighting office.

### Thorn Lighting Limited UK Branches

#### Belfast

Prince Regent Road, Castlereagh  
Belfast BT5 6QR  
Telephone 0232-54122  
Telex Thornlite Belfast 74695

#### Birmingham

Thorn House, Aston Church Road  
Saltley Trading Estate, Birmingham B81 BE  
Telephone 021-327 1535  
Telex Thornlite Birmingham 33235

#### Cardiff

Thorn House, Penarth Road  
Cardiff, Wales CF1 7YP  
Telephone 0222-44200  
Telex Thornlite Cardiff 49334

#### Glasgow

Thorn House, Lawmoor Street  
Glasgow G5 0TT  
Telephone 041-429 6222  
Telex Thornlite Glasgow 77630

#### Leeds

Thorn House, 3 Ring Road  
Lower Wortley, Leeds LS12 6EJ  
Telephone 0532-636321  
Telex Thornlite Leeds 55110

#### London

Victoria Trading Estate, Victoria Way  
Charlton, London SE7 7PA  
Telephone 01-858 3201 (order office) or  
01-858 3281 (all other enquiries)  
Telex Thornlite Charlton 896171

#### Manchester

Thorn House, 2 Claytonbrook Road  
Clayton, Manchester M11 1BP  
Telephone 061-223 1322  
Telex Thornlite Manchester 668642

#### Reading

10 Richfield Avenue, Reading RG1 8PA  
Telephone 0734-53257

#### Southampton

West Quay Trading Estate, West Quay Road  
Southampton SO9 1FF  
Telephone 0703-27401

#### Government Contracts & Order Office

Atlas House, Great Cambridge Road  
Enfield EN1 1UL  
Telephone 01-363 5353

#### Theatre Lighting Division

Angel Road Works, 402 Angel Road  
Edmonton, London N18 3AJ  
Telephone 01-807 9011  
Telex Thornlite Edmonton 23157

#### Airfield Lighting Division

Regency House, 154 Caledonian Road  
London N1 9RD  
Telephone 01-837 4391/3

#### Head Office and Showroom

Thorn House, Upper Saint Martin's Lane  
London WC2H 9ED  
Telephone 01-836 2444  
Telex Thorn London 24184/5

### Thorn Lighting Limited Overseas Companies

#### Australia

Thorn Lighting Industries Pty Limited  
210 Silverwater Road, Lidcombe, NSW 2141

#### Austria

Thorn Electrical Industries GmbH  
Erzherzog-Karl-Strasse 57, A-1220 Vienna

#### Belgium

SA Thorn Benelux NV  
14 Rue General Tombeur  
1040 Brussels

#### Canada

Thorn Lighting Canada Limited  
7621 Bath Road, Mississauga  
Ontario L4T 3T1

#### Denmark

Thorn Lampe A/S  
Fabriksparken 4, 2600 Glostrup, Copenhagen

#### France

Thorn Electrique SA  
26 Rue de la Baisse, F-69625 Villeurbanne

#### Germany

Thorn Licht Beleuchtungsges mbH  
D-2000 Hamburg 61, Borsteler Chaussee 287

#### Italy

Società Industriale Vicentina Illuminazione SpA  
Casella Postale 604, I-36100 Vicenza

Società Italiana Distribuzione Articoli  
Illuminazione SpA, Via Venezia, 55, Padua,  
I-35100

#### New Zealand

Thorn Electrical Industries (NZ) Limited  
PO Box 15150, New Lynn, 13a Veronica Street  
Auckland 7

#### Norway

Norske Thorn A/S  
Pilestredet 75c, Postboks 7065, Oslo 3

#### Republic of Ireland

Thorn Lighting Limited  
Grand Canal Place, Dublin 8

#### South Africa

Thorn Lighting (SA) (Pty) Limited  
PO Box 43075,  
corner Watt and Edison Streets  
Industria, Transvaal

#### Sweden

Thorn Belysning AB  
Anderstorpsvägen 2-6, Fack  
S-171 04 Solna

#### USA

Thorn Lighting (US) Inc  
23 Leslie Court, Whippany  
New Jersey 07981

#### Thorn Lighting Limited

#### International Division Head Office & Showroom

Thorn House, Upper Saint Martin's Lane  
London WC2H 9ED  
Telephone 01-836 2444  
Telex Thorn London 24184/5  
Cables Eleclampo WC2

Thorn Lighting Limited is constantly developing and improving its products. All descriptions, illustrations, drawings and specifications in this publication present only general particulars and shall not form part of any contract. The right is reserved to change specifications without prior notification or public announcement. The majority of the products described herein are manufactured in the United Kingdom, products not so manufactured will bear an appropriate indication. All goods supplied by the Company are supplied subject to the Company's General Conditions of Sale, a copy of which is available on request.

# THORN LIGHTING

A member of the Thorn Group

Printed in Great Britain by R Pearce & Co  
Designed by Alan Crow Associates



THE QUEEN'S AWARD FOR  
TECHNOLOGICAL ACHIEVEMENT



THE QUEEN'S AWARD FOR  
EXPORT ACHIEVEMENT