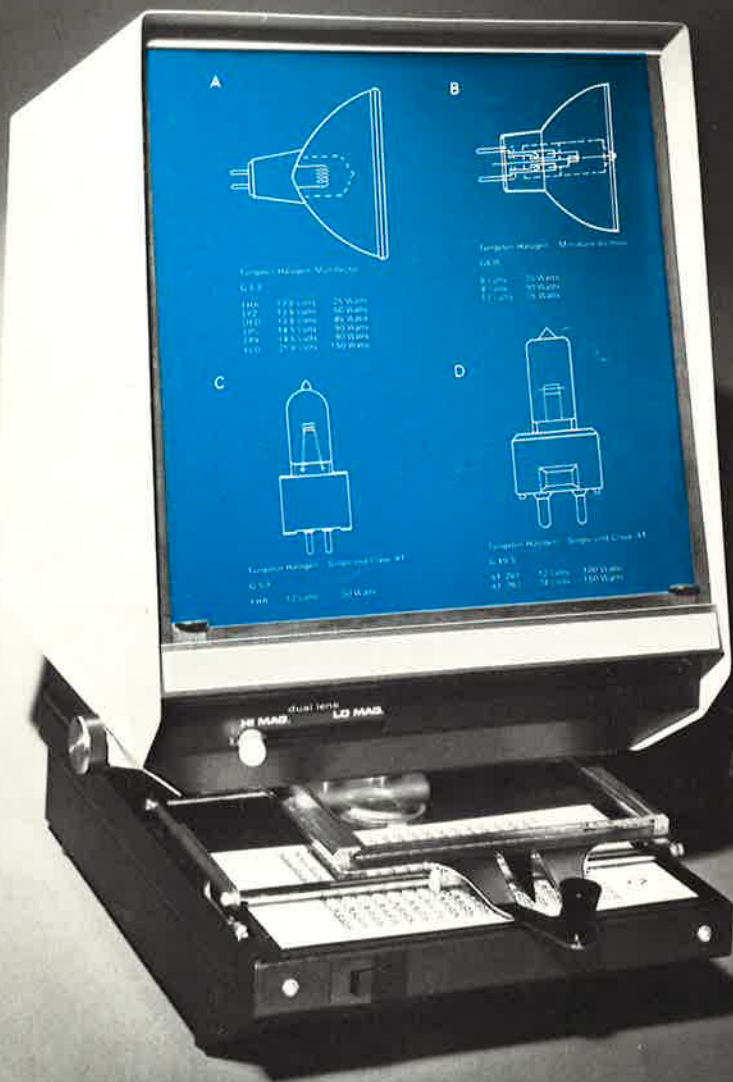


# THORN Micrographic Lamps



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With our advanced technology many developments are continually taking place anticipating the demands of micrographics equipment manufacturers.

Amongst Thorn Lighting's latest developments is a range of Tungsten Halogen Lamps primarily introduced for micrographic applications, the latest of which incorporate "Multiflector" mirrors giving more even distribution of light on the screen.

Also included in this catalogue are the conventional hard glass lamps; linear, segmented and non segmented Tungsten Halogen photocopying lamps and also Graph-X Hytek lamps.

Should you be interested in micrographic lamps not included in this catalogue, then please contact Thorn Lighting Ltd, Head Office, with details of your requirements and anticipated annual usage.

## Index

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<sup>TM</sup> = Thorn Trade Mark.

## Symbols



Nominal lumens ( $\times 1000$ )



Filament formations



Average life hours



Special features



Operating positions

A\*

Overall width

B\*

Overall length

C\*

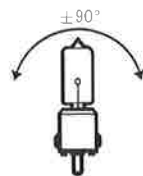
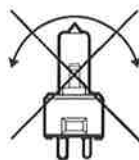
Light centre length

D\*

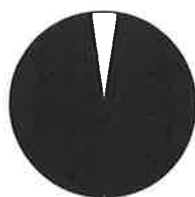
Focal distance

\*Dimensions in millimetres

## Operating Positions



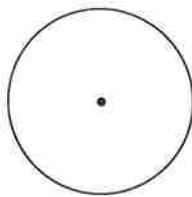
BD



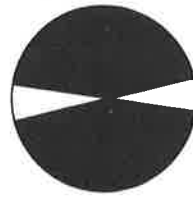
BD $\pm 90^\circ$



ANY



HOR $\pm 4^\circ$



## LAMP CAPS



B15s  
S.C.C.



G4



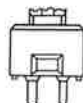
G5.3  
(Multiflector)



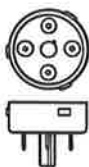
G5.3  
(FH-IR)



G6.35



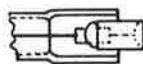
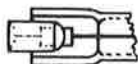
GY9.5



G17q

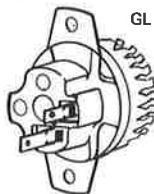


P28s



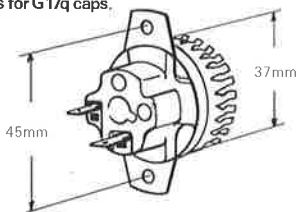
R7s

## LAMP HOLDERS



GL 1042-HV  
For lamp voltages over 21.5V.

GL 1042 series for G17q caps.



GL 1042-LV  
up to and including 21.5V



GL 1177  
for GY9.5 caps

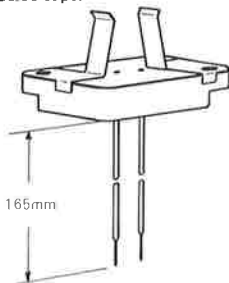


GL 1123-A  
for G.4 caps.

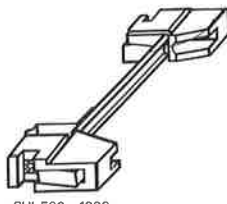
GL 1079 series for G6.35 caps.



GL 1079-W



GL 1079-SLW



SUL 500 or 1000  
for R7s caps

## FILAMENT FORMATIONS



A



B



C



D



E



F



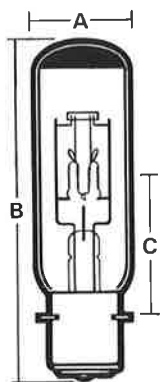
G



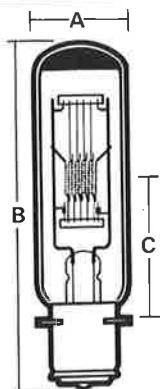
H



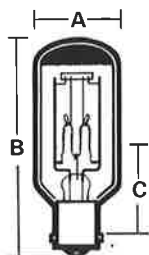
J



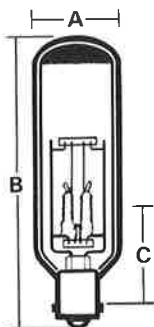
1



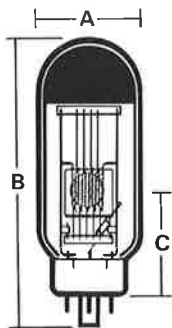
2



3



4



5

## Conventional Lamps – Class 'A1'



### P28s

Lamp Ref.*	Volts	Watts	A	B	C	D						Diag. Ref.
A1/61	115	300	33	135	55.5 ± 0.5	—	7.4	F3	25	AB	BD	1
A1/71	115	500	33	135	55.5 ± 0.5	—	12.5	C8	25	AB	BD	2
A1/91	115	750	39	140	55.5 ± 0.5	—	19.5	C8	25	AB	BD	2



### B15s S.C.C.

A1/21	115	100	26	78	35 ± 1.0	—	1.85	F3	25	A	BD	3
A1/37	115	300	28	105	35 ± 1.0	—	7.4	F3	25	AB	BD	4



### G17q

A1/205†	115	500	33	103	39.7 ± 1.0	—	—	C8	25	ABCE	BD	5
A1/206†	115	750	39	118	39.7 ± 1.0	—	—	C8	25	ABCE	BD	5
A1/207	115	1000	39	118	39.7 ± 1.0	—	—	C8	25	ABCE	BD	5

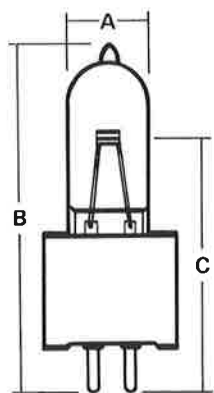
\* A Obscured top

B Forced cooling necessary. Maximum bulb wall temperature 500 °C

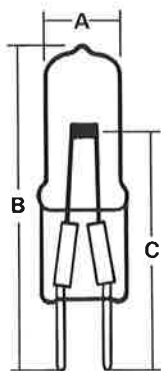
C Due to integral mirror nominal lumens not indicated.

E Internal proximity reflector.

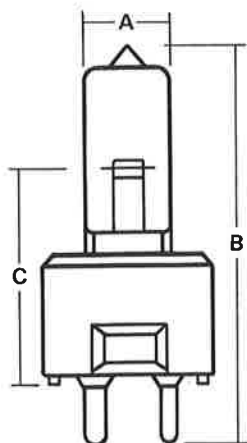
† Minimum production quantity.



6



7



8

3



## Tungsten Halogen – Single end Class 'A1'



### G5.3

Lamp Ref.	Volts	Watts	A	B	C	D				*		Diag. Ref.
FHR	12	50	11.5	44	29.4 ± 0.25	—	1.4	J	50	DF	BD ± 90	6



### G6.35

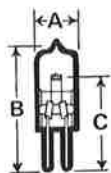
A1/220	12	50	11.5	44	30 ± 0.25	—	1.4	J	50	DF	BD ± 90	7
A1/215	12	100	11	44	30 ± 0.25	—	3.0	J	50	DF	BD ± 90	7
A1/216	24	150	13.5	47	32 ± 0.25	—	5.0	J	50	DF	BD ± 90	7



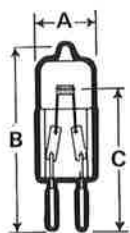
### GY9.5

A1/261	12	100	13	57	27 ± 0.25	—	3.0	J	100	DF	BD ± 90	8
A1/262	24	150	15	60	33.3 ± 0.25	—	5.0	J	100	DF	BD ± 90	8

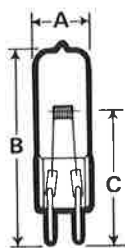
\* D Operates on Tungsten Halogen principle.  
 F. Minimum bulb wall temperature 250 °C.



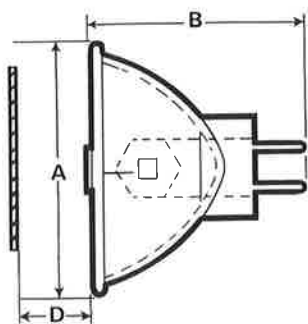
9



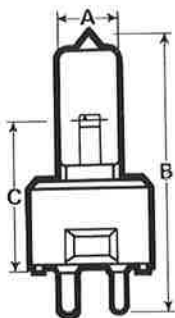
10



11



12



13

## Tungsten Halogen – Single end Class 'M'



### G4

Lamp Ref.	Volts	Watts	A	B	C	D				*		Diag. Ref.
M29	6	10	8.5	30	19.5 ± 0.25	—	0.21	D	100	DF	ANY	9
M30	6	20	8.5	30	19.5 ± 0.25	—	0.42	D	100	DF	ANY	9
M34	6	20	8.5	30	19.5 ± 0.25	—	0.35	D	2000	DF	ANY	9
M35*	12 13.2	20 23	8.5	30	19.5 ± 0.25	—	0.45 0.60	D	250 100	DF	ANY	9



### G6.35

M32	12	50	12	44	30 ± 0.25	—	0.90	J	2000	DF	ANY	10
M37	12	55	50	42	—	32	—	D	750	DFG	ANY	12
M28	12	100	11	45	30 ± 0.25	—	2.15	J	2000	DF	ANY	11



### GY9.5

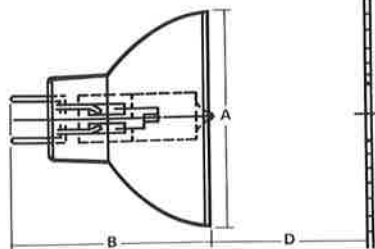
M46	12	100	13	57	27 ± 0.25	—	2.5	J	2000	DF	BD ± 90	13
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\* D Operates on Tungsten Halogen principle.

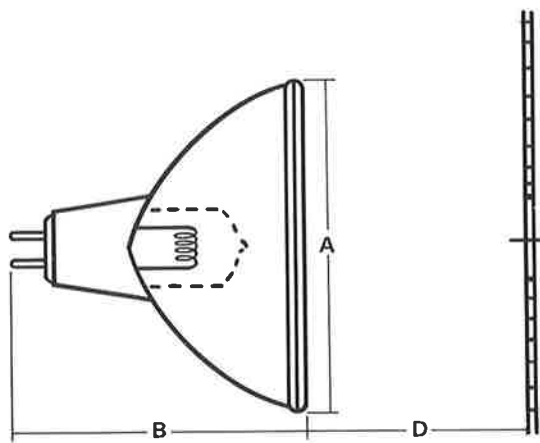
F Minimum bulb wall temperature 250 °C.

G Due to integral mirror, nominal lumens not shown.

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



14



15

## NEW



### G 6.35 Tungsten Halogen – Miniature dichroic

Lamp Ref.	Volts	Watts	A	B	C	D				*		Diag. Ref.
-†	6	35	35	32,5	—	50	—	H	1000	DFG	ANY	14
-†	8	50	35	32,5	—	26	—	H	50	DFG	ANY	14
-†	12	75	35	32,5	—	26	—	H	50	DFG	ANY	14

### Tungsten Halogen – 'Multiflector'™



### G 5.3

FHX	13,8	25	50,67	44,45	—	108	—	G	250	DFGH	BD ± 90	15
EPZ	13,8	50	50,67	44,45	—	108	—	G	1000	DFGH	BD ± 90	15
DED	13,8	85	50,67	44,45	—	165,1	—	G	1000	DFGH	BD ± 90	15
EPV	14,5	90	50,67	44,45	—	155	—	G	500	DFGH	BD ± 90	15
EPX	14,5	90	50,67	44,45	—	165	—	G	500	DFGH	BD ± 90	15
ELD	21,0	150	50,67	44,45	—	165	—	G	40	DFGH	BD ± 90	15

\* D Operates on Tungsten Halogen principle.

F Minimum bulb wall temperature 250°C.

G Due to integral mirror, nominal lumens not shown.

H External, integral dichroic 'Multiflector' mirror.

† Minimum production quantity.

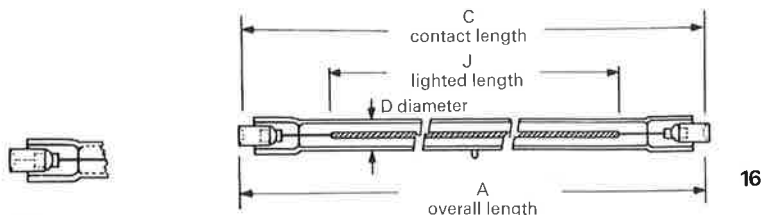
TM—Thorn Lighting Ltd. – Trade Mark.

## Tungsten Halogen – Photoprinting


A number of office copying machines require a linear light source of relatively high colour temperature, and for these applications linear tungsten halogen lamps are the ideal sources. The advantage of tungsten halogen lamps is that the light output remains constant throughout life, and so the speeds of copying remain unchanged throughout the lamp life.

For the larger sizes of lamps it is desirable to obtain even illumination across the length of the lamps, and this is achieved by the use of "segmented filaments" where the filaments are wound with different gaps to avoid fall off of light at the ends of the lamp,

### NON-SEGMENTED FILAMENT TYPES

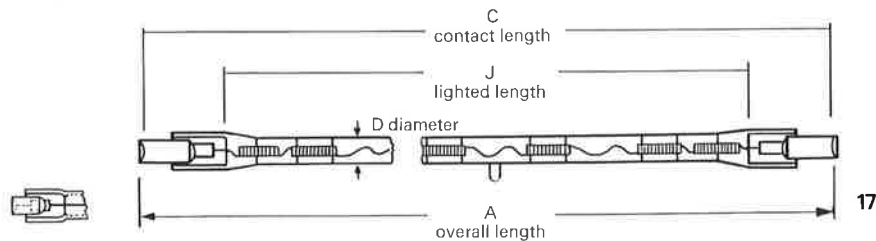


#### R7s


Lamp Ref.	Volts	Watts	Colour Temp.	A	C	D	J Nom		Diag. Ref.
85-1202	110	500	10,5 3000°K	117 ± 2,5	114,2 ± 1,6	12 max	60	HOR ± 4°	16
85-1203	120	500	10,5 3000°K	117 ± 2,5	114,2 ± 1,6	12 max	60	HOR ± 4°	16
87-7104	120	500	13,0 3200°K	117 ± 2,5	114,2 ± 1,6	8,5 max	60	HOR ± 4°	16
87-6234	220	800	20,6 3200°K	117 ± 2,5	114,2 ± 1,6	12 max	67	HOR ± 4°	16
87-6235	240	800	20,6 3200°K	117 ± 2,5	114,2 ± 1,6	12 max	67	HOR ± 4°	16

Min. life of above lamps 50,000 switchings at 6 seconds on 6 seconds off.

### SEGMENTED FILAMENT TYPES

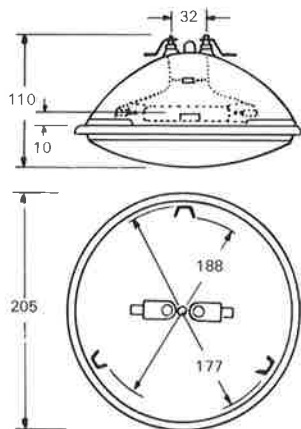


#### R7s

Lamp Ref.	Volts	Watts	Colour Temp.	Nom Length Inch	A	C	D	J Nom		Diag. Ref.
87-7178	220/250	650	14,3 3200°K	12½	320 max	315 ± 1,6	8,5 max	276	HOR ± 4°	17
87-7179	204/250	650	14,3 3200°K	12½	320 max	315 ± 1,6	8,5 max	276	HOR ± 4°	17
87-7278	220/230	1000	23,0 3200°K	10½	269 max	264 ± 1,6	8,5 max	220	HOR ± 4°	17
87-7280	240/250	1000	23,0 3200°K	10½	269 max	264 ± 1,6	8,5 max	220	HOR ± 4°	17
87-7285	220/230	1000	23,0 3200°K	12½	320 max	315 ± 1,6	8,5 max	270	HOR ± 4°	17
87-7287	240/250	1000	23,0 3200°K	12½	320 max	315 ± 1,6	8,5 max	270	HOR ± 4°	17
87-7429	220/230	1500	32,25 3200°K	14½	370 max	365 ± 1,6	8,5 max	320	HOR ± 4°	17
87-7430	240/250	1500	32,25 3200°K	14½	370 max	365 ± 1,6	8,5 max	320	HOR ± 4°	17

Min. life of above lamps 50,000 switchings at 6 seconds on 6 seconds off.

# Graph-X400w Metal Halide Sealed Beam Photoprinting lamp MBI PAR 64



Dimensions of sealed beam lamp in mm.

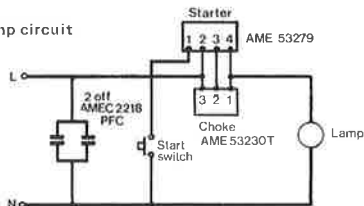
The lamp (Ref. No. 91-9826) with its flying tagged leads can be supported on a simple ring or mounting plate permitting easy replacement.

The lamp may be used in a horizontal position face down or face up, it can also be used vertically providing that the arc tube in the sealed beam lamp is horizontal.

## Lamp and circuit characteristics

Supply voltage	220-240V
Lamp watts	400W
Arc volts	105V
Arc current	4.4A
Supply p.f.	0.9 p.f. (240V) 0.88 p.f. (220V)
Supply current	2.2A 2.4A
Diameter	205 mm (8 in)
Overall depth	110 mm (4.375 in)
Run up time	1½ - 2 min
Re-strike time	7 - 10 min (dependent upon ventilation)
Life	1,000 hours nominal
Operating position	Any, providing arc tube is horizontal

## Lamp circuit



The lamp operates from a simple mains voltage ballast with a starter unit as shown in diagram above. PTFE insulated cable is recommended between the lamp and the choke which carries a high voltage pulse to the lamp.

Thorn Lighting can also supply the associated Lamp Housing Unit for this Sealed Beam Lamp. The Unit is complete with Ballast and Starter Units, as shown in the Lamp Circuit diagram above.

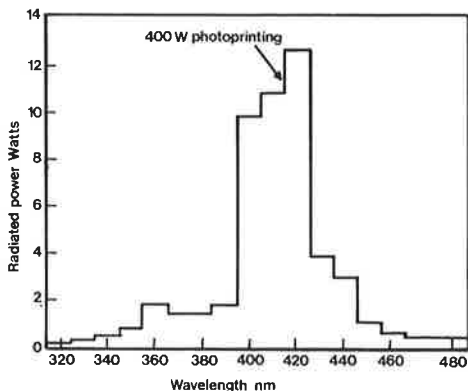
## Fast-exposure time

Dramatic decreases in exposure time are made possible on materials like diazo, colour proofing, photo resists, etch resists and others. Even higher gains of more than 10X are shown when compared with pulsed Xenon lamps. Heating effect is substantially reduced and the resolving power with the Graph-X lamp is high. Some typical results for similar format areas are shown below.

Material	Light Source	Exposure Time	Gain
Ammonium bichromate emulsion (Deep etch)	45 amp carbon arc (approx 2½ kW)	8 min	
	400W Graph-X	9 min	5X
Silk Screen	50 amp carbon arc (approx 2½ kW)	6 min	
	400W Graph-X	5 min	7½X
Diazo coated aluminium	1 kW Mercury	4 min	
	400W Graph-X	1.25 min	8X
Photo Resists	500W Mercury	25 min	
	400W Graph-X	3 min	10X

## Spectral power

The Graph-X lamp has been designed to radiate its peak energy at 417 nanometers making it particularly suitable for many materials used in Graphic Arts processing and for photo resist materials. Because of the unique sealed beam optical system undercutting is substantially reduced. The ultra violet utilisation is high and any harmful radiation is filtered out. As the excitation of the metal halide additive makes the light highly actinic giving shorter exposure times with a low lamp power, the heating effect on the materials under exposure is also reduced, which avoids any expansion problems in registration.



## Microfilm Reader – Substitution Guide

Thorn	Volts	ANSI	Osram	Philips	Diag. Ref.	Section
A1/6	115	CXK	58.8581/91	6131C	1	2
A1/7	115	CZX/DAB	58.8980/90	6152C	2	2
A1/9	115	DDB	58.8980/90	6153C	2	2
A1/21	115	CDS	58.8175/92	6158N	3	2
A1/37	115	CLS/CLG	58.8575/85	7212N	4	2
A1/205	115	CZA	58.8897	6294C	5	2
A1/206	115	CWA	58.8996	6295C	5	2
A1/207	115	CTT/DAX	58.8998	6296C	5	2
A1/215	12	FCR	64625	7023	7	3
A1/216	24	FCS	64640	7158	7	3
A1/220	12	BRL	64610	7023	7	3
A1/261	12	FDT	—	5973	8	3
A1/262	24	DZE/FDS	—	5974	8	3
ELD	21	ELD	—	—	15	3
EPV	14.5	EPV	—	—	15	3
EPX	14.5	EPX	—	—	15	3
EPZ	13.5	EPZ	—	—	15	3
DED	13.8	DED	—	—	15	3
FHR	12	FHR	—	—	6	3
FHX	13.8	FHX	—	—	15	3
M28	12	EVA	—	7724	11	3
M29	6	ESA	64225	7387	9	3
M30	6	ESB	64250	7388	9	3
M32	12	—	—	13512	10	3
M34	6	FHE	—	—	9	3
M35	12/13.2	—	—	—	9	3
M37	12	—	—	—	12	3
M46	12	DZZ	—	—	13	3



## “Which Fits What”

This guide contains an alphabetical list of micrographics equipment manufacturers (or importers, cross referenced where practicable). Under each is listed that manufacturer's models. To order correctly you need only to obtain the following information: manufacturer's name and model number of machine or the voltage and catalogue number of the lamp required. Thorn lamp types printed **bold** operate on the Tungsten Halogen principle.

\*Check code number of lamp to be replaced for lamp type depends on serial number of machine. Data listed is based on the latest information available. There may be errors or omissions for which we cannot be responsible. We will welcome additions, corrections and suggestions for inclusion in future editions. The code R/P following a model reference denotes a reader printer unit.

Manufacturer	Model Ref.	Thorn Replacement Lamp	ANSI Ref.
<b>A. B. Dick Co.</b>	<b>810</b>	<b>*A1/262</b>	DZE/FDS
A. B. Dick/Scott	400, 410, 420, 430 502 (R/P)	<b>*A1/216</b>	FCS
<b>Agfa-Gevaert, Inc.</b>	Copex L-16, L-16M Copex L-35 Copex LK-200 (R/P) Copex LP-1 Copex LP-3 <b>Copex LP-4</b>	<b>A1/215</b>	<b>FCR</b>
Alan Gordon Enterprises Inc.	AGE Plan Vu AGE Plan Vu 11 AGE Gordon G2	<b>A1/216</b> <b>A1/215</b> <b>A1/216</b>	<b>FCS</b> FCR FCS
A-M Corp., Bruning Div.	95, 96, 97 100A, 150, 200, 220, 500 Multi Focus 920, 950, 4010	<b>A1/216</b> <b>A1/216</b> A1/207 <b>A1/216</b>	FCS FCS CTT/DAX FCS
<b>Bell &amp; Howell</b>	517E Reporter (R/P) 650 Autoload (R/P) 920, 950, 995, -6-7 4010 ABR SR-1, -2, -3, -4, -5 Spacemaster	<b>A1/216</b>	<b>FCS</b>
<b>Beta of St. Louis</b>		<b>A1/216</b>	FCS
Buhl Projector Co. (Division of Bergen Laboratories)	MF-72, MIVR	<b>A1/262</b>	DZE/FDS
CAL-COMP	Microfilm viewer	<b>ELD</b>	<b>ELD/EJN</b>
Canon U.S.A., Inc.	<b>NP-Matic 200, 45 (R/P's)</b> 200, 200W, 300, 300 Universal, 300L, 300S Duo/Duplex 201 301A, 302, 303, 400, 400T, 400T4 330F, 330FT, 330MB-11 (R/P's) CR360T, CP370 (R/P) Canorama 370, 370-4 (R/P) Canorama 400T-4, 400-8 450F, 450TB (R/P's) 301	<b>A1/216</b>          <b>A1/215</b>	FCS          FCR
Caps	A-1, A-2 (R/P) Orion (R/P) PJ-12	<b>A1/216</b> <b>A1/215</b>	FCS FCR
Commicromatom	Beescan	<b>EPX</b>	<b>EPX</b>
Datagraphix	Datamate 100, 175, 200 1500 (R/P)	DED <b>A1/216</b>	DED FCS
Data View, Inc.	All models (except portable)	<b>A1/216</b>	FCS
<b>Dietzgen Universal</b>	<b>4313A, 4313AR</b> 4322, 4323, 4324	<b>A1/7</b> <b>A1/262</b>	<b>CZX/DAB</b> DZE/FDS
<b>Dioptrix</b>	<b>COM 1</b>	<b>ELD</b>	<b>ELD</b>
Dukane Corp.	27A25B, Explorer 14 27A50	<b>A1/215</b> <b>A1/220</b>	FCR BRL
Dymat Photomatrix Corp.	300 series, 400 series 600 502, 601	<b>A1/262</b> <b>EPX</b>	DZE/FDS EPX

Manufacturer	Model Ref.	Thorn Replacement Lamp	ANSI Ref.
Eastman Kodak	Trimlite Series F, R, RC	A1/215	FCS
	2610, FRF-1600, FRF-3500	ELD	ELD
	MKG, MKG-1	A1/77	CZX/DAB
	PFCs, PFCD, Ektron	A1/216	FCS
	PGR	A1/205	CZA
	Easamatic 40, 11	A1/216	FCS
	Startech SP3.2	A1/220	BRL
	Micro Pak (Jacket Filler)	EPX	EPX
Ednalite Corp.	1624, 1625, 1640	A1/262	DZE/FDS
Federal	Portable Reader Projector	A1/21	CDS
Fuji	RFP-2 Reader	A1/220	BRL
GAF (ANSCO)	500 (R/P)	A1/216	FCS
	7500A, 7502, 7504	}	FCS
	7511, 7524		
	7700DMR, 7800DMR	A1/262	DZE/FDS
	7630C (Microbox)	}	FCS
	7630C Series II (Microbox)		
	7800 DER		
7810DMR, 7820DMR	EPV	EPV	
9000 (R/P)	EPX	EPX	
		A1/216	FCS
Information Design, Inc.	201	A1/216	FCS
itek (Itek Graphic Products)	F100A, F150, F200, F1200	A1/216	FCS
K & E (Keuffel & Esser Co.)	7724	}	FCS
	PJ-12 (Caps)		
Koboy - (See Reslabs)			
Kodak 2 (See Eastman Kodak)			
Library Microfilms & Materials Co.	LMM Superior Library Rdr	A1/262	DZE/FDS
	LMM Advantage	ELD	ELD
Map	MLF-3, 4	}	DED
	MLF 2		
MC-Microfilm	Informant	EPV	EPV
	Mini Cat TV	ELD	ELD
Micro Design (A Division of Bell & Howell Co.)	100, 100A, 150, 175A	}	FCS
	200, 250, 1200,		
	COM-150, -200, -400, -1200		
	500 Aperture card reader		
	900, 910, 950 (fan type)	}	FCS
	RP550, 4010, 4020		
	COM 150F (fanless)		
900, 910, 950 (fanless)	A1/215	FCS	
Portable	FHR	FHR	
Microfilm Equipment Mfg. (MEM)	16mm Retrieval Reader	A1/215	FCS
Microfilm Recording Co. (MRC)	Personal Briefcase	EPZ	EPZ
	900, 1200, 1217, 1600, 1800, 1800E,	}	ELD
	2300, Executive		
Microform Communications, Ltd.	Minor (16mm)	A1/215	FCS
Micro Information Systems (MISI)	2001 (R/P)	*ELD	ELD
Micro Scan	Commander 1000	A1/262	DZE/FDS
Micro Vue Products Inc. (M.V.P.)	280 355, 460	DED	DED
Mille File	Mark V	A1/216	FCS
Minolta	R-103, 403 (R/P) RP 405, -407	}	FCS
	PR101-CS, Type C, Type D		
3M (Minnesota Mining & Manufacturing)	110, 111, 112	EPX	EPX
	114	*EPX, A1/262	EPX, DZE/FDS
	2800, 3550, 4600	DED	DED
	Consultant 114	EPX	EPX
MS-Mikrofilm	NMI-75	EPX	EPX
	NM-190	ELD	ELD
NB Jackets Company	Reader Filler II	ELD	ELD
	162	EPX	EPX
	1600, 3500	ELD	ELD
	1600T Automaster	ELD	ELD

Manufacturer	Model Ref.	Thorn Replacement Lamp	ANSI Ref.
NCR Corp. (Micrographic Systems)	200	A1/261	FDT
	456-3, -200, -242, -300, -500	*A1/262, A1/215, A1/216, A1/261	DZE/FDS
	400, 800, 900	A1/262	FDT
	455-PCM1		FCR
			FCS
	456-400	A1/215	FCR
	456-800	A1/216	FCS
	458-500	M46	DZZ
Northwest Microfilm, Inc. (NMI)	NMI-11-14	EPX	EPX
	NMI 90	*ELD	ELD
	NMI 75	EPX	EPX
Océ-Industries, Inc.	3530, 3531	*EPX, A1/262	EPX, DZE/FDS
	3533, 3534	*EPX, EPZ	EPX, EPZ
	3600, 3710, 3720, (R/P's)	A1/216	FCS
	3650 3695	ELD	ELD
Phototronics	Scan Executive 10/40	A1/206	CWA
Prestoseal Mig.	300X	A1/21	CDS
Quantor Corporation	105, 305	A1/261	FDT
	307, 308, 310	EPZ	EPZ
Realist, Inc.	3320, 3330	*A1/262	DZE/FDS
	3332, 3333, 3335		
	3351, 3352 Vantage I & II	EPX	EPX
	3351, 3352 Vantage III & IV	A1/215	FCR
	3360 Swinger (bright)	A1/215	FCR
	3361, -2, 3371, -2 Swinger	EPX & EPZ	EPX & EPZ
	3373 Valiant	EPX	EPX
	Seminar	EPZ	EPZ
Valiant			
Remington	210	A1/216	FCS
Reslabs (formerly Koboy)	RL90, RL Executive	*EPX	EPX
	RL120, -160	ELD	ELD
	RL180A	*ELD, EPX	ELD, EPX
Seaco	210, 310 (R/P)	A1/216	FCS
SFS	LG16FC-A	DED	DED
Situs (formerly Data View)	All models (except portable)	A1/216	FCS
Stromberg Datagraphix (See Datagraphix)			
Synergraphics, Inc	COM-150, COM-200	A1/216	FCS
	Normandale, Northstar I, II	A1/262	DZE/FDS
Taylor-Merchant	300XF, 400	A1/21	CDS
Teledyne-Post	640	ELD	ELD
Terminal Data Corp.	VMI 16/105	A1/207	CTT/DAX
Unimic	3000	DED	DED
University Microfilms (Xerox/University)	320, 322	*EPX, A1/262	EPX, DZE/FDS
	340	ELD	ELD
	1212 (Bright)	*A1/215	FCR
	1212 (Standard)		
	1414, 350		
3360 Elite			
Viewlex	Viewlex	A1/7	CZX/DAB
Visidyne Inc.	Show-Kit	A1/261	FDT
WSI (Washington Scientific Industries)	Informant I, II	EPV	EPV
	Minicat (Mod I-III, DOD, TN)	ELD	ELD
	Normandale ND	*A1/262	DZE/FDS
	Northstar 1, -11		
	Renaissance	A1/215	FCR
Xerox (Xerox University) (See also University Microfilms)	Cheshire 740 (R/P)	EPX	EPX
Zuetschel	250	EPZ	EPZ
Zytron Corp.	NMI-90	*ELD	ELD

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