

PHOTRON LAMPS

SPECIALISTS IN LIGHT SOURCES





ISO 9001:2000 CERTIFIED



PHOTRON

specializes in research, development and manufacture of high quality light sources

for use in analytical spectroscopy. The principals of Photron each have more than 40 years of experience both in the design of spectroscopic instruments and light sources. The design for all lamps produced are based on actual use and experience with atomic absorption, UV-visible spectrophotometers and other spectroscopic instruments.

Constant development of alloys, intermetallic species and cathode surface technology ensures the analyst of the best possible line source for atomic absorption spectroscopy (AAS).

Stringent process conditions, modern and efficient high vacuum equipment coupled with intelligent selection of internal components provide Photron's Hollow Cathode lamps(HCL's) with fast warm-up times and an extended shelf life guaranteed for 5 years from the date of manufacture.

The successful development of the boosted discharge Hollow Cathode Lamp called the Super Lamp^{PAT} (see page 6) provides a simple and efficient equivalent to Electrodeless Discharge Lamps with a wider range of elements and considerable reduction in cost.

Photron's range of Deuterium Arc Lamps and coded lamps for some instruments (Varian, Perkin Elmer and Unicam) allows all users of spectroscopic instruments a complete range of high quality lamps.





37mm or 1.5" Diameter Coded and Uncoded Hollow Cathode Lamps

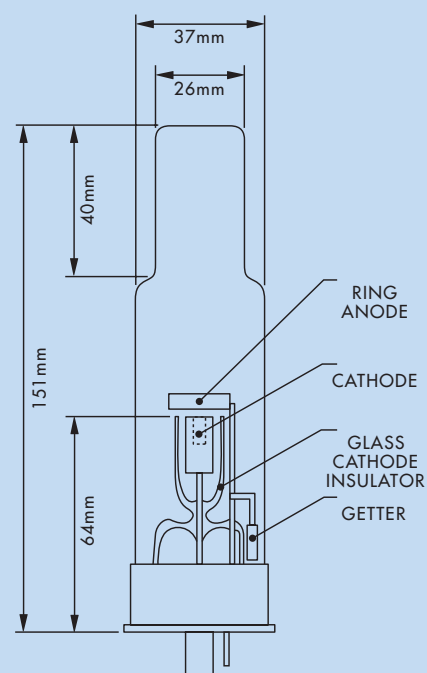
For Direct use in AAS systems manufactured by: GBC Scientific, Varian, Analytic Jena, Shimadzu, Hitachi, Thermo Jarrel Ash, Unicam, and all other makes. Use in Perkin Elmer instruments can be facilitated with the use of an adaptor kit (P204), however our 51mm HCL's are recommended.

Hollow cathode lamps produced by Photron are designed and manufactured to achieve all of the following fundamental requirements for a spectral line source.

- Intense emission of resonance (ground state derived) lines.
- Narrow line width, for maximum sensitivity and linearity.
- Minimal spectral interference from continuum emission, present in the cathode.
- Rapid warm up to produce stable long term light emission.
- Noise free operation.
- Long running life and a 5 year shelf life.
- Cathode materials and geometry achieve a combination of spectral purity and a suitable sputtering rate. (A high sputtering rate will give high intensity at the expense of lamp life, sensitivity and linearity).

SMITH-HIEFTJE background correction.

Photron lamps have been tested and found to work as well as lamps sold specifically for this technique, however due to the high energy pulse used, some elements will be consumed at a higher rate reducing lamp life.



CODED LAMPS

P800C - For GBC and Varian AAS with coded recognition.

P800UC - For thermo Unicam AAS with coded recognition.

Element Selection Table

ELEMENT	PART No.	PRIMARY WAVE LENGTH	ALTERNATIVE WAVE LENGTH	WINDOW MATERIAL
Al	P801	396.2	308.2 - 309.3	Q
Sb	P802	217.6	206.8 - 217.9	Q
As	P803	193.7	189.0 - 197.2	Q
Ba	P804	553.5	455.4 - 493.4	B
Be	P805	234.9	–	Q
Bi	P806	223.1	222.8 - 227.7	Q
B	P807	249.8	208.9	Q
Cd	P808	228.8	326.1	Q
Ca	P809	422.7	239.9	Q
Cs	P810	852.1	455.6	B
Ce	P811	520.0	569.7	B
Cr	P812	357.9	425.4 - 427.5	B
Co	P813	240.7	304.4	Q
Cu	P814	324.8	217.9 - 218.2	Q
Dy	P815	421.2	404.6	B
Er	P816	400.8	389.3	B
Eu	P817	459.4	462.7	B
Gd	P818	368.4	405.8 - 407.9	B
Ga	P819	294.4	403.3 - 417.2	Q
Ge	P820	265.2	271.0	Q
Au	P821	242.8	267.6	Q
Hf	P822	307.8	268.2	Q
Ho	P823	410.4	425.4 - 405.4	B
In	P824	303.9	325.6 - 410.2	Q
Ir	P825	208.9	264.0 - 266.5	Q
Fe	P826	248.3	248.8 - 372.0	Q
La	P827	550.1	403.7	B
Pb	P828	217.0	283.3 - 261.4	Q
Li	P829	670.8	323.3	B
Lu	P830	335.9	356.7 - 337.6	B
Mg	P831	285.2	202.5	Q
Mn	P832	279.5	279.8 - 280.1	Q
Hg	P833	253.7	–	Q
Mo	P834	313.3	320.9	Q
Nd	P835	492.5	463.4	B
Ni	P836	232.0	231.1 - 341.5	Q
Nb	P837	334.9	405.9 - 408.0	B
Os	P838	290.9	305.9 - 426.0	Q
P	P874	213.6	–	Q
Pd	P839	247.6	244.8 - 340.5	Q
Pt	P840	265.9	264.7 – 299.8	Q

Q =PURE FUSED SILICA (SPECTROSIL B) B=BOROSILICATE
By addition of suffix C or UC to part No., lamp will be coded for use with varian spectra series AA and GBC AAS OR Thermo Unicam AAS.
Add suffix A=Argon Fill Gas, H=Helium Fill Gas, X=Xenon Fill Gas, K=Krypton Fill Gas, Combination Gas Fill Available

ELEMENT	PART No.	PRIMARY WAVE LENGTH	ALTERNATIVE WAVE LENGTH	WINDOW MATERIAL
K	P841	766.5	404.4 - 769.9	B
Pr	P842	495.1	513.3	B
Re	P843	346.0	346.5	B
Rh	P844	343.5	328.1 - 369.2	B
Rb	P845	780.0	794.8	B
Ru	P846	349.9	392.6	B
Sm	P847	429.7	476.0	B
Sc	P848	391.2	390.8	B
Se	P849	196.0	204.0	Q
Si	P850	251.6	250.7 - 251.4	Q
Ag	P851	328.1	338.3	B
Na	P852	589.0	330.2 - 589.6	B
Sr	P853	460.7	407.8	B
Ta	P854	271.5	275.8	Q
Te	P855	214.3	225.9	Q
Tb	P856	432.7	431.9 - 433.8	B
Tl	P857	276.7	258.0	Q
Th	P858	371.9	–	B
Tm	P859	371.8	436.0 - 410.6	B
Sn	P860	235.5	224.6 - 266.1	Q
Ti	P861	364.3	365.4 - 399.0	B
W	P862	255.1	294.7 - 400.9	Q
U	P863	358.5	356.6 - 351.4	B
V	P864	318.5	306.6 - 318.4	Q
Yb	P865	398.8	346.4	B
Y	P866	410.2	414.2	B
Zn	P867	213.9	307.6	Q
Zr	P868	360.1	468.7 - 354.8	B
H2	P869	170-380	–	Q

Multi Element Lamps

Ca	P870	422.7	239.9	Q
Mg		285.2	202.5	
K	P871	766.5	404.4	B
Na		589.0	330.2	
Cu	P872	324.8	217.9	Q
Zn		213.9	307.6	
Cr	P873	425.4		Q
Co		240.7		
Cu		324.8		
Fe		248.3		
Mn		279.5		
Ni		232.0		

Photron's range of multi-element lamps are all designed to balance the output spectral line of each element equally.

(Note; For better detection limits, a single element lamp is recommended)

CODE	ELEMENT SYMBOL	CODE	ELEMENT SYMBOL	CODE	ELEMENT SYMBOL	CODE	ELEMENT SYMBOL
P501	Al/Mn	P516	Cr/Fe/Ni	P531	Fe/Ni	P545	Sn/Ag
P502	Al/Sb	P517	Cr/Ni/Mo	P532	Fe/Ni/Mn	P546	Te/Pb
P503	Al/Si	P519	Cu/Cd	P533	Hg/Ag	P547	Tl/Ag
P504	B/Ag	P520	Cu/Cr/As	P534	In/P/Ag	P548	Zn/Ag
P505	Al/Si/Fe	P521	Cu/Fe	P535	K/Ni	P549	Cd/Pb/Ag
P506	Ca/Mg/Al	P522	Cu/Fe/Mn/Ni	P536	Mn/Ni	P550	Cu/Fe/Ag
P507	Ca/Mg/Cu/Zn	P523	Cu/Fe/Cr/Zn	P537	Na/K/Ni	P551	Cr/Ni
P508	Ca/Mg/Fe	P524	Cu/Fe/Mn/Zn	P538	Ni/Mn/Cr/Cu	P553	Cr/Fe/Mn/Mo
P509	Cd/Ag	P525	Cu/Mn	P539	Pb/As	P554	W/Ag
P510	Cd/Mn/Cr/Co	P526	Cu/Mn/Zn	P540	Rh/Ag	P555	Tl/Ag
P512	Co/Mn	P527	Cu/Ni	P541	Cu/Co	P556	Cd/Zn/Cu
P513	Cr/Co/Fe/Mn/Mo	P528	Cu/Ni/Ag	P542	Se/Sn	P557	Cr/Ni/Al
P514	Cr/Fe	P529	Cu/Zn/Fe	P543	Si/Ag	P559	Pd/Au
P515	Cr/Fe/Mn	P530	Fe/Mn	P544	Si/Mo	P560	Cu/Fe/Ni

Other combination of elements can be ordered, please enquire.

Add suffix A=Argon Fill Gas, H=Helium Fill Gas, X=Xenon Fill Gas, K=Krypton Fill Gas, Combination Gas Fill Available



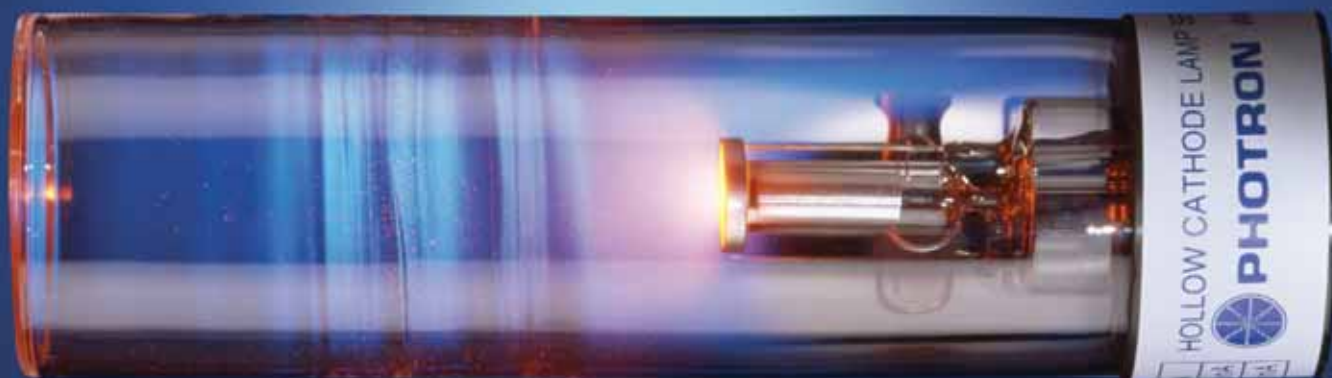
9 pins plug



4 pin plug



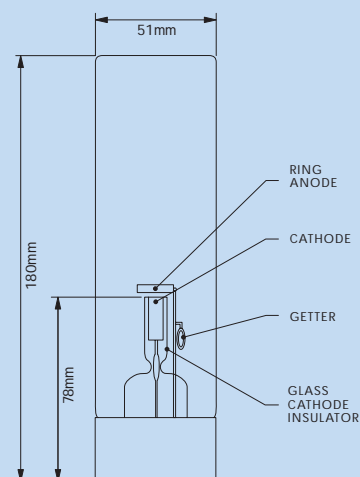
12 pin plug



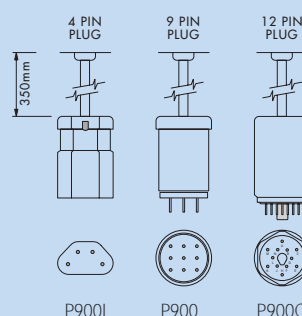
51mm or 2.0" Diameter Hollow Cathode Lamps for use with Perkin-Elmer Instruments

These hollow cathode lamps are produced to provide direct use without adapters in all Perkin Elmer AAS instruments. All windows on these lamps are fully fused and contain no "gassy" adhesives which drastically reduce shelf life.

- Totally hermetic glass seals ensures a clean fill gas and cathode for the life of the lamp and most importantly a shelf life longer than 5 years.
- The application of the same glass cathode shielding technique used in all Photron hollow cathode lamps gives maximum stability and reliability throughout lamp life.
- Due to the elegantly simple design of the electrode geometry of Photron lamps, less mass is present within the lamp, reducing outgassing and making the lamp more resistant to breakage from lateral shock.



NEW DATA CODED P900LL FOR AANALYST AAS.



Element Selection Table

ELEMENT	PART No.	PRIMARY WAVE LENGTH	ALTERNATIVE WAVE LENGTH	WINDOW MATERIAL
Al	P901	396.2	308.2 - 309.3	UV
Sb	P902	217.6	206.8 - 217.9	Q
As	P903	193.7	189.0 - 197.2	Q
Ba	P904	553.5	455.4 - 493.4	B
Be	P905	234.9	–	Q
Bi	P906	223.1	222.8 - 227.7	Q
B	P907	249.8	208.9	UV
Cd	P908	228.8	326.1	Q
Ca	P909	422.7	239.9	UV
Cs	P910	852.1	455.6	B
Ce	P911	520.0	569.7	B
Cr	P912	357.9	425.4 - 427.5	B
Co	P913	240.7	304.4	Q
Cu	P914	324.8	217.9 - 218.2	UV
Dy	P915	421.2	404.6	B
Er	P916	400.8	389.3	B
Eu	P917	459.4	462.7	B
Gd	P918	368.4	405.8 - 407.9	B
Ga	P919	294.4	403.3 - 417.2	UV
Ge	P920	265.2	271.0	UV
Au	P921	242.8	267.6	Q
Hf	P922	307.8	268.2	UV
Ho	P923	410.4	425.4 - 405.4	B
In	P924	303.9	325.6 - 410.2	UV
Ir	P925	208.9	264.0 - 266.5	Q
Fe	P926	248.3	248.8 - 372.0	UV
La	P927	550.1	403.7	B
Pb	P928	283.3	217.0 - 261.4	Q
Li	P929	670.8	323.3	B
Lu	P930	335.9	356.7 - 337.6	B
Mg	P931	285.2	202.5	UV
Mn	P932	279.5	279.8 - 280.1	UV
Hg	P933	253.7	–	UV
Mo	P934	313.3	320.9	UV
Nd	P935	492.5	463.4	B
Ni	P936	232.0	231.1 - 341.5	Q
Nb	P937	334.9	405.9 - 408.0	UV
Os	P938	290.9	305.9 - 426.0	UV
P	P974	213.6	–	Q
Pd	P939	247.6	244.8 - 340.5	Q
Pt	P940	265.9	264.7 – 299.8	UV
K	P941	766.5	404.4 - 769.9	B
Pr	P942	495.1	513.3	B

Q =PURE FUSED SILICA (SPECTROSIL B) B=BOROSILICATE UV = UV BOROSILICATE

CODE	DESCRIPTION
P204	Adaptor Kit, 37mm Lamps - PE AA (9 Pin)
P204C	Adaptor Kit, 37mm Lamps - PE Coded AA (12Pin)
P204L	Adaptor Kit, 37mm Lamps - PE AAnalyst (4 Pin)
P207	Adaptor, PE 12 Pin Lamp - PE AA (9 Pin)
P208	Adaptor, PE 9 Pin Lamp - PE AAnalyst (4 Pin)
P210	Adaptor, PE 12 Pin Lamp - PE AAnalyst (4 Pin)
P211	Adaptor, PE 9 Pin Lamp - PE Coded AA (12 Pin)
P215	Adaptor, PE AAnalyst (4 Pin) Lamp - PE Coded AA (12 Pin)
P216	Adaptor, PE AAnalyst (4 Pin) Lamp - PE AA (9 Pin)

ELEMENT	PART No.	PRIMARY WAVE LENGTH	ALTERNATIVE WAVE LENGTH	WINDOW MATERIAL
Re	P943	346.0	346.5	B
Rh	P944	343.5	328.1 - 369.2	UV
Rb	P945	780.0	794.8	B
Ru	P946	349.9	392.6	B
Sm	P947	429.7	476.0	B
Sc	P948	391.2	390.8	B
Se	P949	196.0	204.0	Q
Si	P950	251.6	250.7 - 251.4	Q
Ag	P951	328.1	338.3	UV
Na	P952	589.0	330.2 - 589.6	UV
Sr	P953	460.7	407.8	B
Ta	P954	271.5	275.8	UV
Te	P955	214.3	225.9	Q
Tb	P956	432.7	431.9 - 433.8	B
Tl	P957	276.7	258.0	UV
Th	P958	371.9	–	B
Tm	P959	371.8	436.0 - 410.6	B
Sn	P960	235.5	224.6 - 266.1	Q
Ti	P961	364.3	365.4 - 399.0	B
W	P962	255.1	294.7 - 400.9	UV
U	P963	358.5	356.6 - 351.4	B
V	P964	318.5	306.6 - 318.4	Q
Yb	P965	398.8	346.4	B
Y	P966	410.2	414.2	B
Zn	P967	213.9	307.6	Q
Zr	P968	360.1	468.7 - 354.8	B

Add suffix, C, L or LL for desired electrical connection. (see page 4)

Multi Element Lamps

Ca	P970	422.7	239.9	Q
Mg		285.2	202.5	
K	P971	766.5	404.4	UV
Na		589.0	330.2	
Cu	P972	324.8	217.9	Q
Zn		213.9	307.6	
Cr	P973	425.4		Q
Co		240.7		
Cu		324.8		
Fe		248.3		
Mn		279.5		
Ni		232.0		

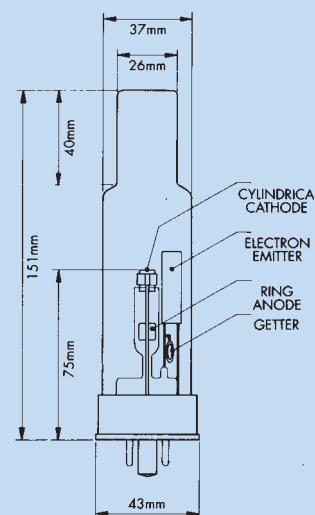


Super Lamp^{PAT.} High Intensity Sharp Line Source for AAS and AFS Spectroscopy

The Super Lamp is particularly recommended for the following determinations in Atomic Absorption Spectroscopy.

- Elements with resonance spectra in the far UV where instrumental efficiency is reduced e.g. Arsenic and Selenium.
- Elements with complex spectra, where the enhanced resonance line reduces the interference of background radiation, allowing the use of wider slit widths further reducing signal to noise. e.g. Nickel and Iron.
- For determinations at or near the detection limit, in some cases a 10 fold improvement in detection limit can be achieved.
- This lamp produces intense spectra with narrow line widths!

Super Lamps are also used in Atomic Fluorescence Spectroscopy.



Super Lamp^{PAT.} High Intensity Sharp Line Source for Perkin Elmer Instruments

Photron's Perkin Elmer Size Super Lamps produce intense spectra with narrow line widths and is available for a wider range of elements than Electrodeless Discharge Lamps.

Simple Operation – The Super Lamp and power supply have been designed for ease of operation. Simply select the instrument lamp current as for a normal hollow cathode lamp then adjust the boost current to peak energy level or minimum noise condition.

Compatibility – The Super Lamp and power supply are compatible with most commercial atomic absorption instruments, either by direct connection or with adaptor kits available (see page 10). Once the power supply is installed normal hollow cathode lamps can be used in the same position without disconnecting the power supply.

Low Cost – The Super Lamp system provides a high intensity light source at much lower cost than Electrodeless Discharge Lamps, warm up is faster and generally more stable.

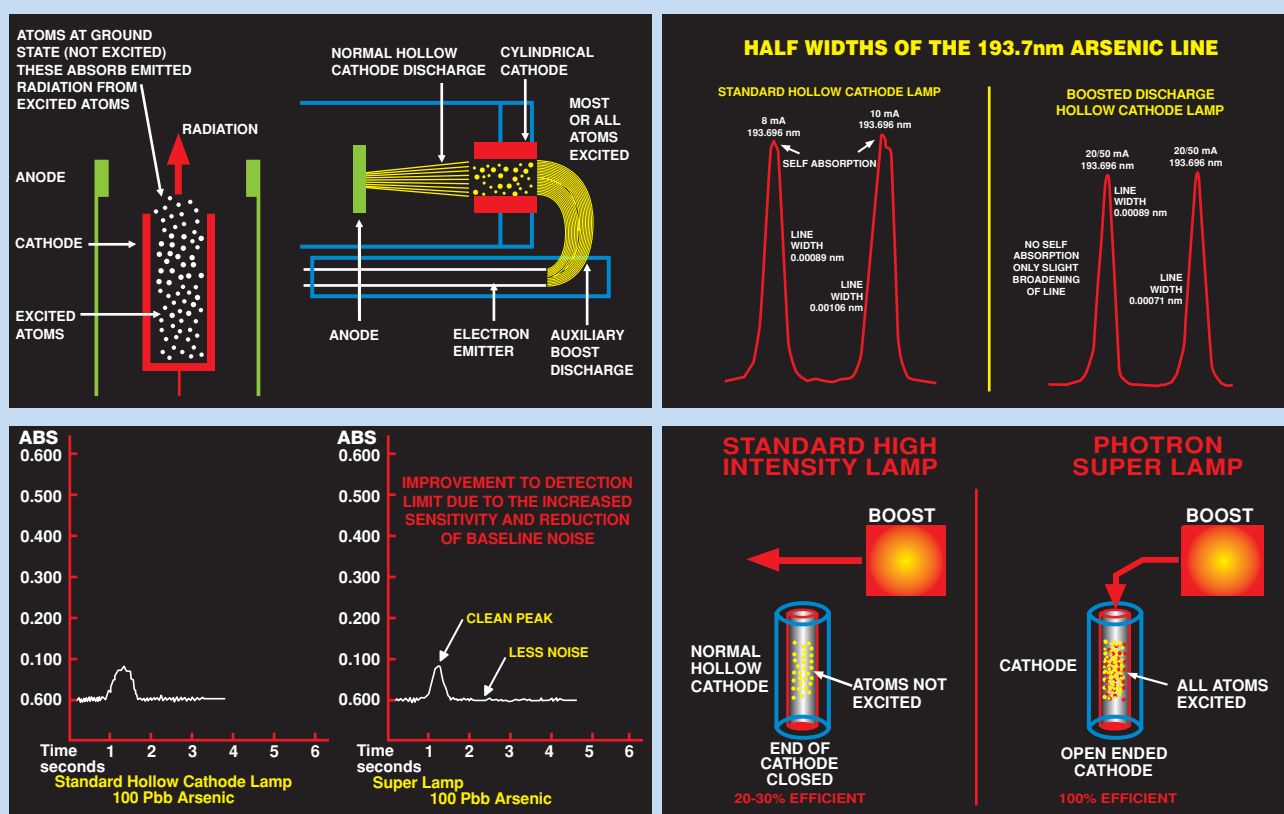
Principle of Operation – As illustrated the lamp consists of an anode situated behind an open ended cylindrical cathode. A second “hot” cathode is mounted externally and provides a secondary discharge through the primary cathode. The normal sputtering discharge operates between the cylindrical cathode and the anode and is obtained using the standard hollow cathode lamp supply from the AA spectrophotometer, an auxiliary power supply provides the heater current and current for the secondary discharge.

Resonance Line Width – This secondary discharge excites all atoms sputtered that are present in the discharge plasma allowing much higher currents to be used without any self-absorption broadening.

Background Radiation – Fortunately this increase in excitation only affects the primary resonance lines of the sputtered atoms, all other emitted spectra such as ion and gas lines become a much smaller component of total lamp intensity. The result is an improvement in linearity and the ability to use wider bandpass for elements with lines close to the resonance line, e.g. Ni.

Linearity – The narrow line width and the large reduction in non resonance spectra provides the analyst with an almost linear calibration curve. This means for most determinations only 1 standard is required for calibration.

The Result – The comparison of a hollow cathode lamp and a Super Lamp for a furnace determination of Arsenic clearly illustrates the performance achieved.



Super Lamp^{PAT.} Selection Table

ELEMENT SYMBOL	DIAMETER		WAVE LENGTH	IMPROVEMENT IN DETECTION LIMIT
	37mm	51mm		
Sb	P802S	P902S	217.6	X 10
As	P803S	P903S	193.7	X 6
Fe	P826S	P926S	248.3	X 10
Pb	P828S	P928S	217.0	X 6
Mn	P832S	P932S	279.5	X 5
Ni	P836S	P936S	232.0	X 6
P	P874S	P974S	213.7	X 5

ELEMENT SYMBOL	DIAMETER		WAVE LENGTH	IMPROVEMENT IN DETECTION LIMIT
	37mm	51mm		
Se	P849S	P949S	196.0	X 8
Te	P855S	P955S	214.3	X 8
Tl	P857S	P957S	276.8	X 10
6 Multi	P873S	P973S	HCL Table	X 5
Cd	P808S	P908S	228.8	X 10
Zn	P867S	P967S	213.9	X 10
Ir	P825S	P925S	208.9	X 6

Other elements available upon request.



P702

P701



P703

Deuterium Arc Lamps

Applications – UV-Visible Spectroscopy, Spectrofluorimetry UV detectors attached to HPLC instruments, Colorimetry, Refractometry and as a non atomic source for background correction in Atomic Absorption Spectroscopy.

Range – A number of configurations are available including different filament voltages, terminal connectors, aperture sizes and brackets to suit many different instruments.

P701 – GBC	P706 – Varian
P702 – GBC	P712 – Perkin Elmer
P703 – Hitachi	P716 – Waters

Hour timers available.



Add suffix T to our D2's part numbers to have a miniature elapsed Timer installed to the lamp.



P706

Design Criteria

PHOTRON

has spent some years in the development and evaluation of deuterium arc lamps in order to avoid the shortfalls of traditional lamp design. This work has resulted in a reliable economical UV source.

Photron deuterium arc lamps have the following technical advantages:

Stable Filament – The use of a horizontally mounted filament across two firm short wire supports, reduces mechanical vibration. This avoids the destruction or degradation of the emission cathode during shipping or handling which often causes premature lamp failure.

Sputter Shielding – Careful prevention from deposits of materials from the cathode onto the window and discharge cup during running life is achieved by special shielding. This feature assists in decreasing the loss of intensity over the life of the lamp.

Envelope – Use of UV transmitting borosilicate instead of quartz reduces cost and no long term deterioration of the window area occurs (solarisation). No diffusion loss of deuterium occurs.

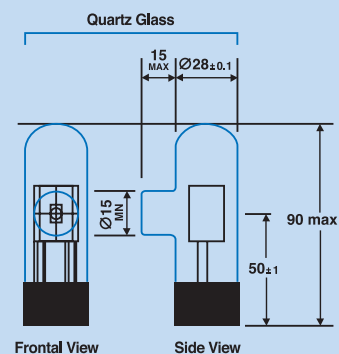
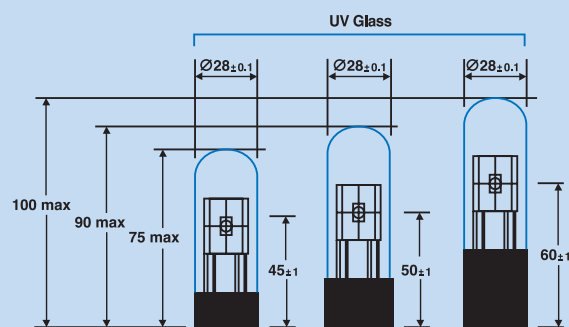
Lifetime – Each deuterium arc lamp should maintain 50% of initial energy for 1000 Hrs at 300 mA DC.

Note: for pulsed systems with a short duty cycle where the peak current exceeds 600 mA life will be less than the above. Elapsed time indicators are supplied on request.

P712



P716





Photron Power Supply and Accessories

The Photron Super lamp power supply adds a boost discharge for use with Super lamps, the lamp uses existing spectrophotometer lamp current, the power supply adds a boost discharge to increase excitation of atoms sputtered by the instrument lamp supply (see Page7). This boost current is linked by circuitry inside the power supply and the boost discharge is transmitted at the same rate as the instrument.

The boost discharge when increased from zero will reach a peak light intensity and then cause the level to drop off. This effect means that instruments with different electronic systems will require different boost currents to achieve the peak signal output. With the simple operation of setting the boost, makes the Superlamp a fast more sensitive and cost efficient than other systems.

Photron's Superlamp power supply can be fitted to many Atomic Absorption instruments including: Varian, Perkin Elmer, GBC Scientific, Unicam, Hitachi, Shimadzu, Analytic Jena and many others. Photron also offers adaptors which may be required to fit the power supply to some instruments. The Superlamp power supply has obtained **CE** mark certification.

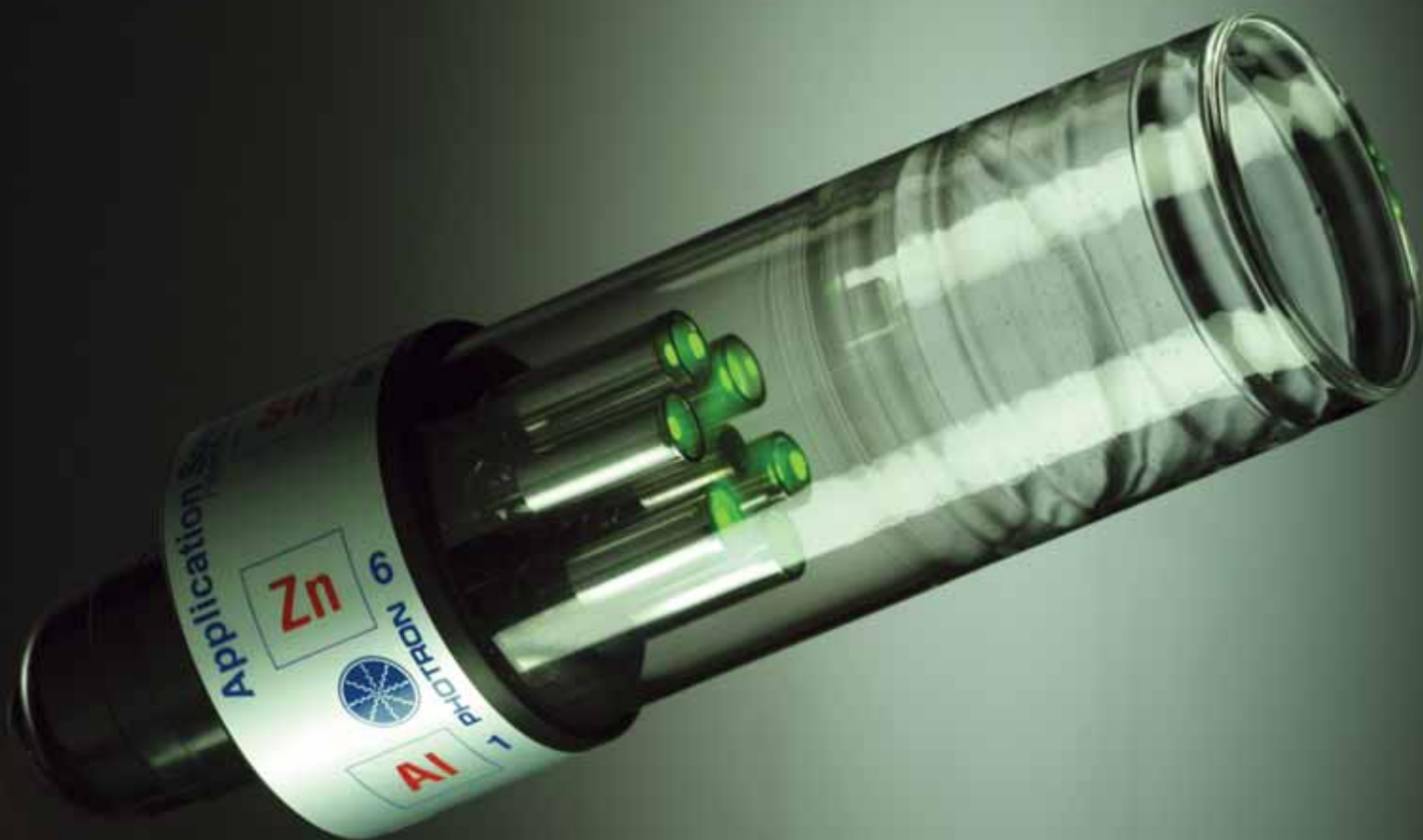
Power Supply Specifications

Input voltage: 100,110,220,240, 50/60Hz 150VA

Dimensions: 360 x 310 x 135 mm, weight: 6kg.

Controls: Mains switch, boost current control, 0-100mA meter.

CODE	DESCRIPTION
P200	Photron's Super Lamp Power Supply
P201	Varian Adaptor Kit (To fit Power Supply)
P202	Varian Adaptor Kit Spectra Series (To fit Power Supply)
P203	Hitachi Adaptor Kit (To fit Power Supply)
P205	GBC Adapter Kit (To fit Power Supply – Turret instruments)
P209	Hollow cathode lamp power supply
P220	Adaptor, Super Lamp Power Supply - PE AA (9 Pin)
P220C	Adaptor, Super Lamp Power Supply - PE Coded AA (12 Pin)
P220L	Adaptor, Super Lamp Power Supply - PE AAnalyst (4 Pin)



Application Source lamp

This new product has 6 individual cathodes in a single envelope. This provides either 6 single elements with the same spectral purity and intensity as a single element lamp or 2 or more elements per cathode allowing many analytical laboratories to have all their element range provided for in one longer life lamp. Choose from the following 11 standard Application Sources or design your own from the instructions overleaf.

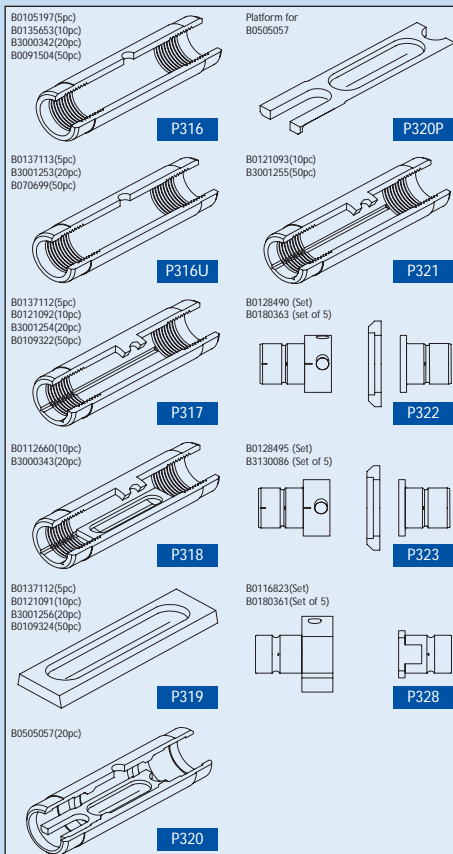
P401	As Cd Hg Pb Se Tl	Environmental, Toxicology
P402	Al Fe Ni Si Ti V	Petrochemical
P403	Ag As Au Cu Pb Zn	Mining
P404	Al Co Fe Mg Mn Ni	Base Metals
P405	Ca Cu K Mg Na Zn	Clinical alkali Earths Soil & plant
P406	Cr Cu Fe Ni Pb Zn	Base Metals #2
P407	Co Cr Cu Mn Mo Ni	Stainless Steel
P408	Al Bi Mn Na Si V	Steel
P409	Al Cu Mn Pb Sn Zn	Alloys
P410	Special	Customised to clients requirement
P411	AsPb-SeSn-TlAg-CdZn-Hg-CrCo Cu FeMnNi	Toxic & Trace Elements



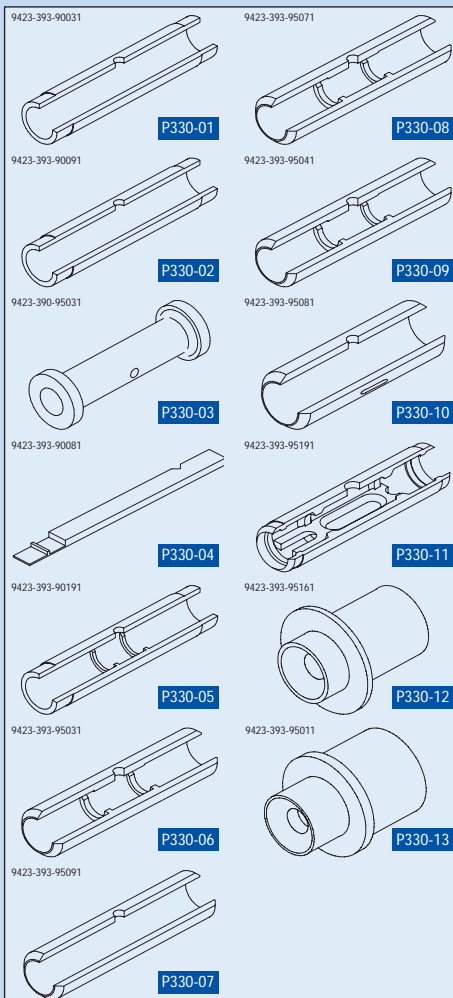
Currently this lamp is only directly usable in a GBC 932, 932plus and a Sensor AA atomic absorption Spectrophotometer

Graphite Products for AAS.

PERKIN ELMER TUBES



THERMAL ELEMENTAL TUBES



Photron can supply graphite products for various instrument manufacturers, which include Varian, Perkin Elmer, GBC, Thermo Elemental, Thermo Jarrel Ash, Hitachi and Shimadzu instruments.

LEDGEND

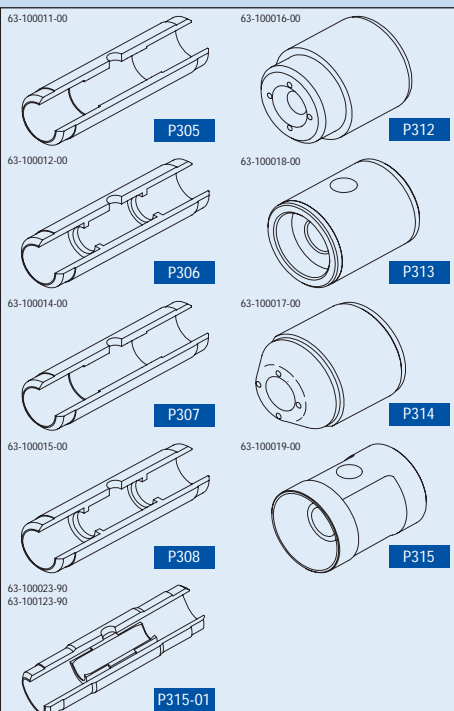
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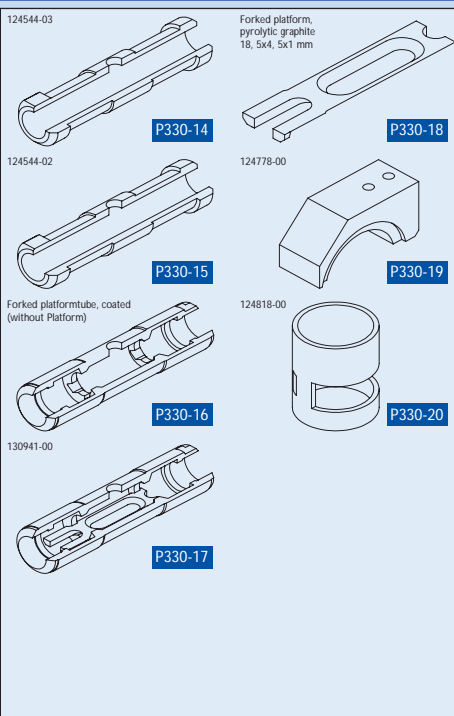


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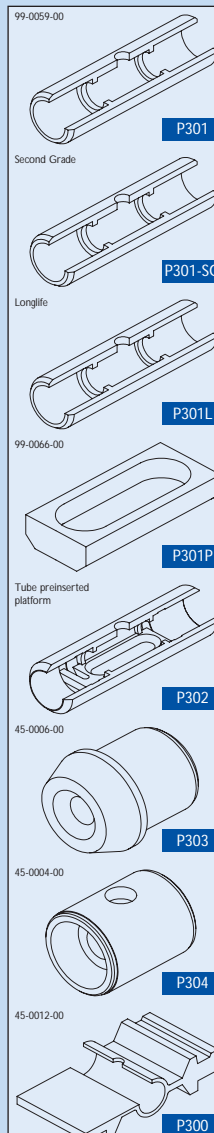
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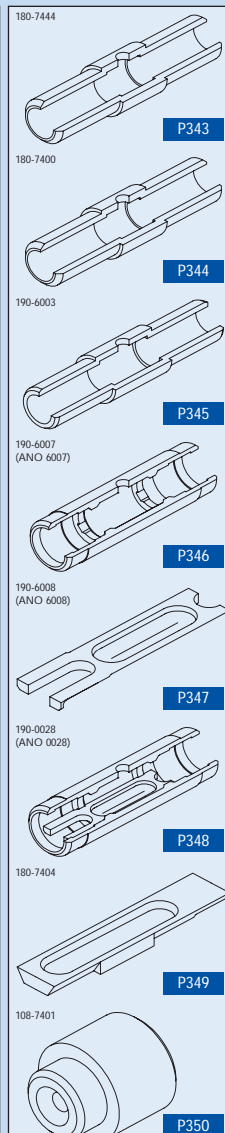
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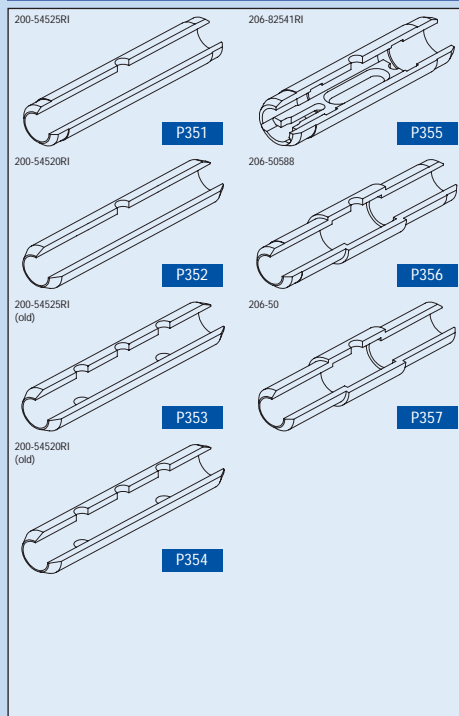
GBC TUBES



HITACHI TUBES



SHIMADZU TUBES



Photrons Quality Policy

PHOTRON

is engaged in the design and production of highly specialised items of equipment for incorporation in atomic absorption spectrometers

for use in chemical analysis. In particular, Photron Pty Ltd is highly skilled in the art of manufacturing atomic spectral lamps, which can emit ultra-violet and visible radiation characteristics of any selected element. Photron is one of the worlds leaders in the manufacture of such lamps which are sold world wide.

The motivation that drives Photron Pty Ltd is simple; we want to make a better product than our competitors. Photron Pty Ltd quality commitment is demonstrated by:-

- ♦ Routine in house and field testing and quality conformance checking.
- ♦ Attention to detail and committed to customer needs.
- ♦ Maintaining contact with our customers to ensure their satisfaction with the quality of our goods and services.
- ♦ Maintaining a quality management system which meets the requirements of Australian Standard AS/NZS ISO 9001:2000.

Improvement in the quality of our performance can only result from a total team effort. Our aim will only be achieved by properly motivated, trained and appreciated staff who are conscious of "doing it right the first time".

Every member of the Photron Pty Ltd organisation has a responsibility for quality.



Jim Green

Managing Director

Photron Pty Ltd

Photron Warranty

Hollow Cathode Lamps

All Photron hollow cathode lamps and the Super Lamp^{pat.} are warranted to be free of material and manufacturing defects when operated at the correct current for each instrument detailed on the lamp operating data sheet supplied for each element.

The operational lifetime of all of the above is rated at 5000mA Hrs based on the currents specified in the data sheet, e.g. lamp run at 10mA last 500Hrs.

The use of currents higher than specified particularly on instruments where high peak currents are used, will shorten the life for some elements. Those affected either have a high vapour pressure (Hg As Se) or high sputtering rate (Au Cd Zn).

Warranty claims regarding lamp failure will be considered up to 2 years from date of purchase.

Warranty claims must accompany a completed warranty card. If a free replacement lamp is supplied the validity of guarantee shall date from shipment of the first lamp.

The shelf life of unused lamps are warranted for 5 years from the original purchase, any hollow cathode lamp found faulty before any use will be replaced.

Deuterium Arc Lamps

Deuterium Lamps will maintain 1000Hrs at 300mA DC these lamps should maintain more than 50% of initial intensity. Where lamps are used in pulsed systems with short duty cycle that have excessive peak currents >600mA, life will be less than the above.

Warranty is considered up to 1 year from purchase. Any replacements will date from the purchase of the original lamp.



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CLV-190**



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**SYSMEX
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OLYMPUS CLV-190



**OLYMPUS
CLV-180 MD-631**



**OSRAM XBO R
181W45C**



**EOS BRAVO
BCS000032**



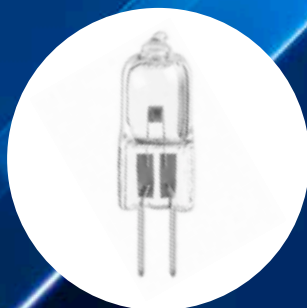
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