

Hollow Cathode Lamp Information

Why select Varian Hollow Cathode Lamps?

Varian offers an extensive range of hollow cathode lamps, including single element and multi-element lamps, as well as high-performance UltrAA lamps. Only Varian has the experience required to consistently produce high performance lamps. Varian first developed a range of reliable hollow cathode lamps in the 1960s during development of the AA technique. Since then, we have had continuous experience in the development, production and improvement of quality hollow cathode lamps.

Benefits of Varian lamps

- ✓ Automatic lamp recognition enables the software to identify the lamp and select the recommended operating conditions.
- ✓ Optimum warm-up time with good stability during operation
- ✓ High spectral purity, because of exceptionally pure materials and extended processing cycles
- ✓ Consistent performance is assured. No lamp leaves our factory without having satisfied our demanding standards for intensity and stability.
- ✓ Unlimited shelf life because of the totally sealed, all glass construction
- ✓ Simple lamp identification from any angle using the element symbol on the lamp base
- ✓ Operating conditions are conveniently listed on the lamp base.

Single-element hollow cathode lamps

Varian hollow cathode lamps are compatible with all (including non-Varian) atomic absorption (AA) spectrometers. Coded versions are available for automatic lamp recognition. Lower priced Uncoded versions are available.

Single Element	Part number		
	Coded	Uncoded	UltrAA
Ag (Silver)	5610105200	5610127200	<u>multi-element</u>
Al (Aluminium)	5610100100	5610122000	<u>multi-element</u>
As (Arsenic)	5610100300	5610122200	5610108100 and <u>multi-element</u>
Au (Gold)	5610102100	5610124000	5610109000
Be (Beryllium)	5610100500	5610122400	-
B (Boron)	5610100700	5610122600	5610135700
Ba (Barium)	5610100400	5610122300	-
Bi (Bismuth)	5610100600	5610122500	5610134200
Ca (Calcium)	5610101000	5610122900	<u>multi-element</u>
Cd (Cadmium)	5610100800	5610122700	<u>multi-element</u>
Ce (Cerium)	5610101100	5610123000	-
Co (Cobalt)	5610101300	5610123200	5610134100 and <u>multi-element</u>
Cr (Chromium)	5610101200	5610123100	<u>multi-element</u>
Cs (Cesium)	5610100900	5610122800	-

Single Element	Part number		
	Coded	Uncoded	UltrAA
Cu (Copper)	5610101400	5610123300	5610109100 and <u>multi-element</u>
Dy (Dysprosium)	5610101500	5610123400	-
Er (Erbium)	5610101600	5610123500	-
Eu (Europium)	5610101700	5610123600	-
Fe (Iron)	5610102700	5610124600	5610108600 and <u>multi-element</u>
Ga (Gallium)	5610101900	5610123800	
Gd (Gadolinium)	5610101800	5610123700	
Ge (Germanium)	5610102000	5610123900	5610134300
Hf (Hafnium)	5610102200	5610124100	-
Hg (Mercury)	5610103400	5610125300	-
Ho (Holmium)	5610102300	5610124200	-
In (Indium)	5610102500	5610124400	-
Ir (Iridium)	5610102600	5610124500	-
K (Potassium)	5610104200	5610126200	-


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Single-element and Multi-element hollow cathode lamps

Varian hollow cathode lamps are compatible with all (including non-Varian) atomic absorption (AA) spectrometers. Coded versions are available for automatic lamp recognition. Lower priced Uncoded versions are available. Varian multi-element lamps are combinations of compatible elements in one cathode that extend the versatility of any AA spectrometer.

Single Element	Part number		
	Coded	Uncoded	UltrAA
La (Lanthanum)	5610102800	5610124700	-
Li (Lithium)	5610103000	5610124900	-
Lu (Lutetium)	5610103100	5610125000	-
Mg (Magnesium)	5610103200	5610125100	multi-element
Mn (Manganese)	5610103300	5610125200	5610133700 and multi-element
Mo (Molybdenum)	5610103500	5610125400	multi-element
Na (Sodium)	5610105300	5610127300	-
Nb (Niobium)	5610103800	5610125700	-
Nd (Neodymium)	5610103600	5610125500	-
Ni (Nickel)	5610103700	5610125600	5610108500 and multi-element
Os (Osmium)	5610103900	5610125800	
P (Phosphorus)	5610107700	5610126000	
Pb (Lead)	5610102900	5610124800	5610108200 and multi-element
Pd (Palladium)	5610104000	5610125900	5610135800
Pr (Praseodymium)	5610104300	5610126300	-
Pt (Platinum)	5610104100	5610126100	5610135900
Rb (Rubidium)	5610104600	5610126600	-
Re (Rhenium)	5610104400	5610126400	-
Rh (Rhodium)	5610104500	5610126500	-
Ru (Ruthenium)	5610104700	5610126700	-
Sb (Antimony)	5610100200	5610122100	5610108000
Sc (Scandium)	5610104900	5610126900	-
Se (Selenium)	5610105000	5610127000	5610108300 and multi-element
Si (Silicon)	5610105100	5610127100	5610133400 and multi-element
Sm (Samarium)	5610104800	5610126800	-
Sn (Tin)	5610106100	5610128100	5610133900
Sr (Strontium)	5610105400	5610127400	-

Single Element	Part number		
	Coded	Uncoded	UltrAA
Ta (Tantalum)	5610105500	5610127500	-
Tb (Terbium)	5610105700	5610127700	-
Te (Tellurium)	5610105600	5610127600	5610134000
Ti (Titanium)	5610106200	5610128200	-
Tl (Thallium)	5610105800	5610127800	5610108400
Tm (Thulium)	5610106000	5610128000	-
V (Vanadium)	5610106500	5610128500	-
W (Tungsten)	5610106300	5610128300	-
Y (Yttrium)	5610106700	5610128700	-
Yb (Ytterbium)	5610106600	5610128600	-
Zn (Zinc)	5610106800	5610128800	multi-element
Zr (Zirconium)	5610106900	5610128900	-

Multi-Element	Part number		
	Coded	Uncoded	UltrAA
Ag/Cd/Pb/Zn	5610108700	-	5610108900
Ag/Cr/Cu/Fe/Ni	5610109500	-	5610134900
Al/Ca/Mg	5610108800	-	5610133600
As/Cu/Fe	-	-	5610135300
Ba/Cr	-	5610133500	-
Ca/Mg	5610107100	5610129100	-
Co/Cr/Cu/Fe/Mn/Ni	5610107600	5610129200	5610134500
Co/Mo/Pb/Zn	5610109800		5610135200
Cu/Zn	5610119200	5610129300	5610134600
Cu/Fe/Mn/Zn	5610109600	-	5610135000
Cu/Fe/Si/Zn	5610109700	-	5610135100
Na/K	5610107000	5610129000	-
Ni/Se	-	-	5610135400


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UltrAA Single-element and Multi-element hollow cathode lamps

UltrAA hollow cathode lamps are high-performance lamps that require an external control module. They are compatible with all Varian AA models. For further information you can download the paper "Evaluation of high intensity lamps for AAS" (Varian AA at Works AA-124).

UltrAA Single- Element	Part number		
	Coded	Uncoded	UltrAA
As (Arsenic)	Y	-	5610108100
Au (Gold)	Y	-	5610109000
Bi (Bismuth)	Y	-	5610134200
B (Boron)	Y	-	5610135700
Co (Cobalt)	Y	-	5610134100
Cu (Copper)	Y	-	5610109100
Fe (Iron)	Y	-	5610108600
Ge (Germanium)	Y	-	5610134300
Mn (Manganese)	Y	-	5610133700
Ni (Nickel)	Y	-	5610108500
Pb (Lead)	Y	-	5610108200
Pd (Palladium)	Y	-	5610135800
Pt (Platinum)	Y	-	5610135900
Sb (Antimony)	Y	-	5610108000
Se (Selenium)	Y	-	5610108300
Si (Silicon)	Y	-	5610133400
Sn (Tin)	Y	-	5610133900
Te (Tellurium)	Y	-	5610134000
Tl (Thallium)	Y	-	5610108400

UltrAA Multi- Element	Part number		
	Coded	Uncoded	UltrAA
Ag/Cd/Pb/Zn	Y	-	5610108900
Ag/Cr/Cu/Fe/Ni	Y	-	5610134900
Al/Ca/Mg	Y	-	5610133600
As/Cu/Fe	-	Y	5610135300
Co/Cr/Cu /Fe/Mn/Ni	Y	-	5610134500
Co/Mo/Pb/Zn	Y	-	5610135200
Cu/Zn	Y	-	5610134600
Cu/Fe/Mn/Zn	Y	-	5610135000
Cu/Fe/Si/Zn	Y	-	5610135100
Ni/Se	-	Y	5610135400


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Typical % Gain and EHT values for Varian hollow cathode lamps

These values are typical results for a conventional single element lamp, based on the standard operating conditions for each lamp. They are not guaranteed specifications as such, but have been issued as a guide to typical performance. Some variation from these figures would be considered "normal".

Element Symbol	Element	SpectrAA 50/55/110/220/AA240/AA280 Flame Instruments % Gain	SpectrAA 800/880 Flame Instruments EHT Volts
Ag	Silver	26	231
Al	Aluminium	25	221
As	Arsenic	51	284
Au	Gold	39	285
B	Boron	47	298
Ba	Barium	32	235
Be	Beryllium	48	251
Bi	Bismuth	61	376
Ca	Calcium	25	225
Cd	Cadmium	57	283
Co	Cobalt	51	331
Cr	Chromium	42	259
Cs	Cesium	64	258
Cu	Copper	35	255
Dy	Dysprosium	49	276
Eu	Europium	39	238
Fe	Iron	66	365
Ga	Gallium	46	301
Gd	Gadolinium	64	334
Ge	Germanium	56	317
Hf	Hafnium	59	338
Ho	Holmium	48	285
Hg	Mercury	33	260
In	Indium	44	
Ir	Iridium	55	272
K	Potassium	62	279
La	Lanthanum	52	293
Li	Lithium	24	
Mg	Magnesium	23	205
Mn	Manganese	51	307
Mo	Molybdenum	40	279

Element Symbol	Element	SpectrAA 50/55/110/220/AA240/AA280 Flame Instruments % Gain	SpectrAA 800/880 Flame Instruments EHT Volts
Os	Osmium	53	303
Na	Sodium	35	223
Ni	Nickel	66	389
Nb	Niobium	56	
Nd	Neodinium	63	321
Pb	Lead	46	296
Pd	Palladium	67	377
P	Phosphorous	42	281
Pr	Praesodinium	67	368
Pt	Platinum	49	274
Rb	Rubidium	78	316
Re	Rhenium	30	237
Rh	Rhodium	40	265
Ru	Ruthenium	50	295
Sb	Antimony	64	382
Se	Selenium	46	304
Si	Silicon	55	316
Sr	Strontium	31	233
Sn	Tin	61	373
Ta	Tantalum	52	304
Tb	Terbium	56	
Te	Tellurium	65	
Ti	Titanium	51	227
U	Uranium	49	
V	Vanadium	35	248
W	Tungsten	61	351
Y	Yttrium	41	273
Yb	Ytterbium	49	303
Zn	Zinc	34	270
Zr	Zirconium	48	270


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