Agilent Hollow Cathode Lamps for PerkinElmer AA Systems

Recommended Operating Conditions

Single Element Lamps

Agilent hollow cathode lamps for PerkinElmer AA instruments are equivalent to the Lumina hollow cathode lamps and are compatible with PerkinElmer's entire range of atomic absorption spectrometers.

They are designed for optimal performance and characterized by good sensitivity and spectral response, combined with stable light output, low noise, and long lifetime.

All cathode materials are selected from the highest purity available–usually 99.99% or better–to ensure high spectral line intensity, stability, and low noise with good analytical sensitivity.

All of these lamps are element coded for automatic lamp recognition, preventing errors. These coded lamps incorporate a unique electronic configuration which the instrument recognizes and uses to set the default operating conditions for that element. The parameters may be overridden by the operator, if desired.

Operation

A number of factors affect successful lamp operation. These relate to lamp warm-up time, lamp intensity, and the isolation of the preferred analytical line. Each hollow cathode lamp is different in these respects. For example, the warm-up characteristics, line intensity, and spectral isolation for arsenic are quite different to those for copper or iron.

Warm-up

Particularly with a single-beam instrument, it is important to allow at least ten minutes of lamp warm-up before attempting an analytical measurement. Some elements, or lamps that use higher operating currents, may require longer times. This time will allow the lamp to reach a relatively stable output. With double-beam operation, the warm-up period is not observable. Nevertheless, it is wise to allow for warm-up before attempting any analytical measurements.

Intensity

Each analytical line from a hollow cathode lamp has a characteristic intensity that relates to the observable signal-to-noise level of the atomic absorption instrument. The greater the intensity of the analytical line, the lower the noise level. Such differences in the measured noise level between different lamps are quite normal.

Fill Gas

All lamps are filled with neon gas for freedom from interfering lines at the most sensitive wavelengths, except the Ag, Ba, Eu, Nb, Re, Rh and Sr lamps, which are filled with argon.

Window material

Lamps for most elements use high quality quartz, except for Sr which uses borosilicate glass.

Operating Conditions Table

This table lists operating conditions for each analytical wavelength, under the following headings:

- Recommended current—provides an adequate intensity. Higher currents will always reduce the working life of the lamp and for some elements will produce a reduction in absorption signal.
- Maximum current—to prevent permanent lamp damage, never exceed this value.
- Wavelengths—the wavelengths indicated are those most commonly used in atomic absorption.
- Recommended slit—the recommended spectral bandpass at each wavelength for the recommended current. Where there is an adjacent line, a smaller slit may provide a more sensitive and linear calibration, but a higher noise level is likely. Conversely, a larger slit will reduce noise, but a less sensitive calibration with greater curvature may be obtained.
- Relative sensitivity—of alternative wavelengths is an approximate indication of the reduction in absorbance signal that may be expected relative to the most sensitive line. The most sensitive wavelength is assigned a value of 1. Alternative wavelengths are used to avoid sample dilution when the element is present in high concentrations.
- Relative intensity—an indication of the lamp signal intensity at each wavelength using the recommended current and slit. The most intense wavelength is assigned a value of 100.

Single Element Lamps

Element		Coded Part Number	Current (mA) Rec.	Current (mA) Max.	Wavelengths (nm)	Recommended Slit (nm)	Relative Sensitivity	Relative Intensity
Ag	Silver	8003-0928	5	10	328.1	0.7	1	100
					338.3	0.7	2	90
Al	Aluminium	8003-0712	25	30	309.3	0.7	1	70
					396.2 (Z)	0.7	2	90
					394.4	0.7	4	100
As	Arsenic	8003-0714	18	18	193.7	0.7	1	50
					197.2	0.7	2	100
					189.0	0.7	0.5	54
Au	Gold	8003-0901	10	20	242.8	0.7	1	60
					267.6	0.7	2	100
B	Boron	8003-0889	25	30	249.8	0.7	1	100
					208.9	0.2	2	40
Ba	Barium	8003-0715	25	30	553.6	0.2	1	100
					350.1	0.2	600	20
Be	Beryllium	8003-0716	20	30	234.9	0.7	1	100
Bi	Bismuth	8003-0888	12	15	223.1	0.2	1	15
					306.8	0.7	4	100
Ca	Calcium	8003-0891	8	10	422.7	0.7	1	100
					239.9	0.7	200	10
Cd*	Cadmium	8003-0890	6	10	228.8	0.7	1	40
					326.1	0.7	400	100
Co	Cobalt	8003-0893	30	40	240.7	0.2	1	20
					242.5 (Z)	0.2	2	100
					304.4	0.2	15	45
Cr	Chromium	8003-0892	10	12	357.9	0.7	1	40
					429.0	0.7	7	100
Cu	Copper	8003-0894	15	20	324.8	0.7	1	100
					327.4 (Z)	0.7	2	50
Eu	Europium	8003-0897	25	30	459.4	0.2	1	100
					333.4	0.2	300	10
Fe	Iron	8003-0906	30	30	248.3	0.2	1	15
					372.0	0.2	10	100
Ga	Gallium	8003-0899	15	20	287.4	0.7	1	60
					403.3	0.7		100
Gd	Gadolinium	8003-0898	25	30	368.4	0.2	1	60
					419.1	0.2	1.5	100
Ge	Germanium	8003-0900	25	30	265.2	0.2	1	100
					269.1	0.2	5	15
Hg	Mercury	8003-0912	6	8	253.7	0.7	1	100
In	Indium	8003-0904	20	25	303.9	0.7	1	100
					451.1	0.7	3	80
Ir	Iridium	8003-0905	25	30	208.9	0.2	1	5
					264.0 (Z)	0.2	3	100
K	Potassium	8003-0920	10	12	766.5	0.7	1	100
					404.4	0.7	400	5
La	Lanthanum	8003-0907	25	30	550.1	0.2	1	100
					418.7	0.2	2	40
Li	Lithium	8003-0909	15	20	670.8	0.7	1	100
					323.3	0.7	400	0.2
Mg	Magnesium	8003-0910	6	10	285.2	0.7	1	100
					202.6	0.7	30	3
Mn	Manganese	8003-0911	20	30	279.5	0.2	1	90
					403.1	0.2	12	100
Mo	Molybdenum	8003-0913	30	40	313.3	0.7	1	100
					390.3	0.7	4	80
Na	Sodium	8003-0929	8	10	589.0	0.2	1	100
					330.3	0.4	500	2
Nb	Niobium	8003-0916	40	40	334.9	0.2	1	20
					358.0	0.2	1	100
Nd	Neodymium	8003-0914	25	30	492.5	0.2	1	100
					490.2	0.2	5	70
Ni	Nickel	8003-0915	25	30	232.0	0.2	1	50
					305.1	0.2	4	100
P	Phosphorus	8003-0918	20	25	213.6	0.2	1	100
Pb	Lead	8003-0908	12	15	217.0	0.7	1	20
					283.3 (Z)	0.7	2	100
Pd	Palladium	8003-0917	20	25	244.8	0.2	1	1
					247.6	0.2	2	1
					340.5	0.2	7	100
Pt	Platinum	8003-0919	20	25	265.9	0.7	1	30
					299.8	0.2	6	100
Re	Rhenium	8003-0922	25	30	346.0	0.2	1	100
					345.2	0.2	3	40
Rh	Rhodium	8003-0923	25	30	343.5	0.2	1	100
					365.8	0.2	5	80
Sb	Antimony	8003-0713	20	25	217.6	0.2	1	20
					231.2	0.7	2	100
Sc	Scandium	8003-0925	25	30	391.2	0.2	1	90
					408.2	0.2	7	100
Se	Selenium	8003-0926	15	15	196.0	2.0	1	100
					204.0	0.7	15	60
Si	Silicon	8003-0927	35	40	251.6	0.2	1	100
					250.7	0.7	3	60
Sm	Samarium	8003-0924	25	30	429.7	0.2	1	20
					476.0	0.2	2	100
Sn	Tin	8003-0936	30	30	224.6	0.2	1	30
					233.4	0.7	6	70
					300.9	0.7	4	100
Sr	Strontium	8003-0930	15	20	460.7	0.2	1	100
Ta	Tantalum	8003-0931	30	40	271.5	0.2	1	80
					277.6	0.2	2	100
Te	Tellurium	8003-0932	30	30	214.3	0.2	1	10
					225.9	0.2	15	100
Ti	Titanium	8003-0937	25	30	364.3	0.2	1	100
					399.0	0.2	2	90
Tl	Thallium	8003-0934	8	10	276.8	0.7	1	80
					377.6	0.7	2	100
V	Vanadium	8003-0939	30	40	318.4	0.7	1	100
					305.6	0.2	4	80
W	Tungsten	8003-0938	30	40	255.1	0.2	1	5
					400.9	0.5	4	100
Y	Yttrium	8003-0941	25	30	410.2	0.2	1	80
					362.1	0.2	2	100
Zn	Zinc	8003-0942	15	20	213.9	0.7	1	100
					307.6	0.7	4000	60
Zr	Zirconium	8003-0943	30	40	360.1	0.2	1	80
					351.9	0.2	4	100

(Z) Recommended wavelength for Zeeman AA

*These lamps contain Cd above 0.1% by weight. As with all hollow cathode lamps, handle with care and dispose of properly following local regulations.

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