

MHS-15 Mercury/Hydride System



Manual Mercury/Hydride System

Minimum investment and low operating costs

The MHS-15 Mercury/Hydride System is a manual accessory for high-sensitivity determination of mercury and hydride-forming elements, such as As, Se, Sb, Te, Bi and Sn, by flame Atomic Absorption Spectrometry (AAS). Mercury/hydride atomic absorption is the preferred technique for trace determination of mercury and the metallic hydride-forming elements, because it offers the best possible detection limits, down to the ng range, while minimizing capital investment and operating costs. The technique is simple, easy-to-handle, and reliable which has been proven in tens of thousands of laboratories worldwide.

Simple operation

The MHS-15 system includes an analyzer assembly and a quartz

cell assembly. The analyzer is free-standing and is placed adjacent to the AA spectrometer sample compartment. It includes a reaction flask, a reservoir for the reducing agent, and all pneumatic components for carrier transportation of the metallic vapors to the quartz cell.

The cell mounts on a standard 10-cm PerkinElmer burner head, permitting the cell to be heated in the spectrometer flame. The quartz cell is positioned in the sample light beam of the spectrometer and alignment is provided by the instrument's burner adjustment controls. Its quartz cell can be easily tilted out of the flame using a swivel mount.

Due to the reaction chemistry in the mercury/hydride process, the analyte is completely separated from its matrix during analysis, eliminating interferences.

Key Benefits:

- Minimum investment
- Low operating costs
- Simple operation
- Works with all PerkinElmer atomic absorption spectrometers

Operating procedure

During analysis, the sample containing the analyte in ionic form is placed in the reaction flask. The flask is then installed into the analyzer assembly. By manually actuating a pneumatic valve, an argon stream transports the reducing agent (NaBH_4) from a reservoir into the sample. The special conical form of the immersion tube and reaction flask provides excellent mixing of

the sample and NaBH_4 , guaranteeing spontaneous reaction. No stirring device is required for this procedure.

Hydrogen, liberated during the reaction, reduces the metal ions to gaseous hydrides. In the case of mercury determination, NaBH_4 reduces mercury into its metallic state. Excess hydrogen and the argon carrier gas transport the hydride (or metallic mercury) vapor into the quartz cell where the absorption of

the metal is measured. During mercury determination, the cell remains at ambient temperatures. Mercury determination can also be performed using stannous chloride (SnCl_2) as the reducing agent. For the determination of hydride-forming elements, the quartz cell is heated by an air/acetylene flame to thermally decompose the metal hydrides.

Detection Limits Using the MHS-15 With AAnalyst™ 700 AAS

(EDL lamps were used for all elements)

Element	Absolute (ng) (in 10-mL volume)	Relative ($\mu\text{g/L}$) (in 50-mL volume)
As	1.0	0.02
Se	1.0	0.02
Bi	2.0	0.10
Sb	5.0	0.10
Te	2.0	0.05
Hg	1.0	0.02

Technical Data

Absorption Cell	Quartz cell, 165 mm long, 12 mm diameter
Cell Heating	Up to approx. 1000°C with air/acetylene flame
Reaction Flask	Polypropylene flask with special, conically formed inner side. Connection to the analyzer assembly with special joint with O-ring gasket.
Sample Volume	Max. 50-mL volume
Reducing Agent	NaBH_4 or SnCl_2
Inert Gas Supply	Argon, inlet pressure 2.5 – 3.5 bar (36 – 51 psig) approx. consumption 1.1 L/min
Power Supply	No electrical supply is required.
MHS-15	70 mm wide x 160 mm deep x 375 mm high Dimensions
Weight	Approximately 4.3 kg

Ordering Information

Part Number	Description
B314-0760	MHS-15 Mercury/Hydride System. Manually operated system for the high-sensitivity determination of Hg and metallic hydride-forming elements such as As, Bi, Sb, Sn, Se, and Te. Includes analyzer with sample flask and reagent reservoir. Manual selection of NaBH_4 or SnCl_2 reductant solution. Also includes a quartz cell, which may be heated with an air-acetylene flame. No electrical connections are required. For use with all PerkinElmer flame AAS instruments.
B300-0350	Cell Holder. To mount an MHS-15 quartz cell on the burner system.
B009-4321	Reaction Flask for MHS-15. Specially formed polypropylene reaction vessel with cover.
B008-7354	Reductant Reservoir for MHS-15
B009-4415	Quartz Cell for MHS-15. Complete with graphite cooling rings and silicone rubber sleeves.

PerkinElmer Life and Analytical Sciences
710 Bridgeport Avenue
Shelton, CT 06484-4794 USA
Phone: (800) 762-4000 or
(+1) 203-925-4600
www.perkinelmer.com

