

National Bureau of Standards

Certificate of Analysis

Standard Reference Material 2676a

Metals on Filter Media (Cd, Pb, Mn, Zn)

This Standard Reference Material is intended primarily for use as an analytical standard for the determination of cadmium, lead, manganese, and zinc in the industrial atmosphere. The SRM consists of a set of membrane filters on which have been deposited the indicated quantities of the following metals.

Filter	Metal Content, $\mu\text{g}/\text{filter}$			
	Cd	Pb	Mn	Zn
Series I	1.02 ± 0.03	6.96 ± 0.20	1.97 ± 0.06	9.86 ± 0.28
Series II	$2.50 \pm .02$	$15.23 \pm .15$	$9.89 \pm .10$	$49.52 \pm .48$
Series III	$10.18 \pm .10$	$29.64 \pm .20$	$19.70 \pm .30$	$99.22 \pm .99$

The filters were prepared by depositing onto the membrane surfaces 100 microliter aliquots of one of three composite solutions prepared by acid dissolution of appropriate weights of the high purity metals. All operations, including dissolution, loading, drying, and packaging, were carried out in a class 100 clean room.

The certified values are based upon the metal content of the solutions used and the known values of the volumes of the solutions deposited on the filters. The uncertainties represent the 95% tolerance limits for coverage of 95 percent of the filters based on measurement error and variability of the filters.* The filters were analyzed by atomic absorption spectroscopy and by polarography. The analytical values confirmed the certified value except for lead as determined by atomic absorption spectroscopy. In this case a small negative bias was observed, believed to be due to loss of lead during dissolution of the filter prior to analysis.

A unit of issue consists of four plastic petri dishes, each containing 2 identical white membrane filters and blue spacers. The latter should be discarded. The petri dishes labeled I, II, and III have metals deposited upon them, while the fourth dish contains two blank filters.

The filters were prepared by R. W. Burke and B. I. Diamondstone. Atomic absorption analyses were made by T. C. Rains. E. J. Maienthal performed the polarographic analyses.

The overall direction and coordination of the technical measurements leading to certification were under the chairmanship of J. K. Taylor.

The technical and support aspects involved in certification and issuance of this Standard Reference Material were coordinated through the Office of Standard Reference Materials by W. P. Reed.

*See page 14, The Role of Standard Reference Materials in Measurement System, NBS Monograph 148, 1975. The concept of tolerance limit is also discussed in Chapter 2, Experimental Statistics, NBS Handbook, 91, 1966. In brief, if measurements were made on all the units, at least 95 percent of these measured values would be expected to fall within the indicated tolerance limits with a confidence coefficient of 95 percent (or probability = .95).