

National Bureau of Standards

Certificate

Standard Reference Material 2676c

Metals on Filter Media

This Standard Reference Material (SRM) is intended primarily for use as an analytical standard for use in the determination of selected toxic metals in industrial atmospheres. SRM 2676c consists of a set of eight membrane filters each containing known concentration levels of cadmium, manganese, lead, and zinc at three levels plus a blank. The certified metal content for each level is given in Table 1. The less than values for the blank filters are not certified but are given for information only.

Table 1
Metal Content, $\mu\text{g}/\text{filter}$

| <u>Filter No.</u> | <u>Cadmium</u> | <u>Manganese</u> | <u>Lead</u> | <u>Zinc</u> |
|-------------------|--------------------|------------------|-----------------|------------------|
| Ic | $0.954 \pm .014^a$ | $2.11 \pm .03$ | $7.47 \pm .11$ | $9.99 \pm .15$ |
| IIc | $2.83 \pm .04$ | $9.92 \pm .15$ | $14.92 \pm .22$ | $49.68 \pm .75$ |
| IIIc | $10.09 \pm .15$ | $19.85 \pm .30$ | $29.81 \pm .45$ | 99.28 ± 1.50 |
| Blank | (<0.01) | (<0.01) | (<0.01) | (<0.01) |

^aThe listed uncertainties are 1.5% of the certified concentrations, are based on scientific judgement, and are meant to approximate two standard deviations of the certified values. The uncertainties include filter-to-filter variabilities as well as all other known sources of error.

The membrane filters are mixed esters of cellulose acetate and nitrate. Each filter containing the added metals was prepared by depositing onto the membrane surfaces a fixed volume of a composite solution. The composite solution was prepared by dissolving high-purity metals, Cd, Pb, Mn, and Zn, in dilute nitric acid. The blank filters were prepared by depositing onto the membrane surfaces a fixed volume of blank solution, dilute nitric acid. The procedure is described in NBS report NBSIR 73-256.

The certified values are based on the weight/volume compositions of the composite solutions, the densities of these solutions, and the average weights of the aliquot volumes deposited on the filter. The certified values were substantiated by analyzing a selected number of filters at each level using atomic absorption spectrometry.

The filters are packaged in plastic petri dishes, and are labelled Ic, IIc, IIIc, and Blank. Each petri dish contains duplicate membrane filters at each of the certified levels in Table 1.

Note: In all instances, an entire filter must be dissolved for each set of measurements as the metals may not be uniformly distributed on the filter.

SRM 2676c was prepared and certified in the NBS Inorganic Analytical Research Division by T.A. Butler, L. Keiler, J.R. Moody, T.C. Rains, and T.A. Rush.

The statistical assessment of the certification data was performed by R.C. Paule of the National Measurement Laboratory.

The technical and support aspects involved in the certification and issuance of this Standard Reference Material were coordinated through the Office of Standard Reference Materials by T.E. Gills.