

STANDARDS AUSTRALIA

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RECONFIRMATION

OF

AS 2365.6—1995

Methods for the sampling and analysis of indoor air

**Method 6: Determination of formaldehyde—Impinger sampling—Chromotropic acid method**

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RECONFIRMATION NOTICE

Technical Committee EV-007 has reviewed the content of this publication and in accordance with Standards Australia procedures for reconfirmation, it has been determined that the publication is still valid and does not require change.

Certain documents referenced in the publication may have been amended since the original date of publication. Users are advised to ensure that they are using the latest versions of such documents as appropriate, unless advised otherwise in this Reconfirmation Notice.

Approved for reconfirmation in accordance with Standards Australia procedures for reconfirmation on 9 September 2014.

The following are represented on Technical Committee EV-007:

Australian Aluminium Council  
Australian Bureau of Meteorology  
Australian Chamber of Commerce and Industry  
Australian Industry Group  
Clean Air Society of Australia and New Zealand  
CSIRO Marine and Atmospheric Research  
Department of Environment and Conservation, WA  
Department of Science, Information Technology, Innovation and the Arts, Qld  
Environment Protection Authority, Vic.  
National Association of Testing Authorities Australia  
Office of Environment and Heritage, NSW

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## NOTES

# Australian Standard®

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## Methods for the sampling and analysis of indoor air

### Method 6: Determination of formaldehyde— Impinger sampling—Chromotropic acid method

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#### PREFACE

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee CH/19 on Methods for Examination of Air as part of the AS 2365 series on sampling and analysis of indoor air.

The objective of this Standard is to provide those involved in the sampling and analysis of indoor air with a standardized method for the determination of formaldehyde content in indoor air.

This Standard is the result of a consensus among representatives on the Joint Committee to produce it as an Australian Standard.

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#### METHOD

**1 SCOPE** This Standard sets out a spectrophotometric method for the determination of formaldehyde in indoor air using impinger collection. The method is applicable to formaldehyde concentrations in air in the approximate range 0.01 p.p.m. to 1 p.p.m. Sampling periods of 1 h to 4 h are normally used.

NOTE: Phenol results in significant negative interference if present at more than about 30–40% of the formaldehyde concentration. This method is not recommended if it is known or suspected that phenol may be present. Other substances reported to cause negative interference, if present in concentrations in excess of the formaldehyde concentration are ethanol, ethylene, propylene, methyl butadiene and some aromatic hydrocarbons, though these chemicals are unlikely to be present at concentrations in excess of formaldehyde.

**2 REFERENCED DOCUMENTS** The following documents are referred to in this Standard:

AS

- |      |                                                                                            |
|------|--------------------------------------------------------------------------------------------|
| 2162 | Code of practice for the use of volumetric glassware                                       |
| 2164 | One-mark volumetric flasks                                                                 |
| 2166 | One-mark pipettes                                                                          |
| 3640 | Workplace atmospheres—Method for sampling and gravimetric determination of inspirable dust |

**3 DEFINITION** For the purpose of this Standard, the definition below applies.

**3.1 Indoor air**—air within a building occupied for at least 1 h per day. Buildings covered by the definition include homes, schools, restaurants, public buildings, residential institutions (including hostels, hospitals) and offices, but the definition does not cover premises, e.g. workplaces, or part of premises otherwise covered by occupational health Standards.

**4 PRINCIPLE** Sample air is drawn at a known flow rate through one or more impingers containing sodium hydrogen sulfite solution. Formaldehyde in the air is captured by the reagent solution, forming a stable adduct. The formaldehyde concentration is determined by a spectrophotometric method employing chromotropic acid reagent.

## 5 REAGENTS

**5.1 General requirements** All reagents shall be analytical reagent grade. Distilled water free of formaldehyde and other interfering substances shall be used.

NOTE: Deionized water may contain formaldehyde from the resins used in the deionizer.

**5.2 Sulfuric acid** 18 mol/L ( $\rho_{20}$  1.84 g/mL)

**5.3 Sodium hydrogen sulfite solution** (10 g/L) Dissolve 10 g of sodium hydrogen sulfite in distilled water, transfer to a 1 L volumetric flask and dilute to volume with distilled water. Prepare fresh solution weekly.

**5.4 Formaldehyde standard solution A** (1 g/L) Dissolve 4.4703 g of sodium formaldehyde hydrogen sulfite in distilled water, transfer to a 1 L volumetric flask and dilute to volume.

Alternatively, dilute 17.8 mL of 37% formalin solution to 1 L with distilled water. This solution is stable for at least three months. Standardise by placing 5.0 mL of freshly prepared 1.13 M sodium sulfite solution in a 50 mL beaker and stir magnetically. Adjust pH to between 8.5 and 10 with base or acid. Record the pH. Add 10.0 mL formaldehyde solution. The pH should now be about 11. Titrate the solution back to its original pH with 0.02 N sulfuric acid (1 mL acid = 0.600 mg HCHO. About 17 mL acid are needed). If the endpoint is overrun, back-titrate to the endpoint with 0.01 N sodium hydroxide. Calculate the concentration  $C_s$  (mg/mL) of the formaldehyde stock solution:

$$C_s = \frac{30.0 (N_a \times V_a - N_b \times V_b)}{V_s}$$

where

30.0 = 30.0 g/equipment of formaldehyde

$N_a$  = normality of sulfuric acid (0.02 N)

$V_a$  = volume of sulfuric acid (mL) used for titration

$N_b$  = normality of NaOH (0.01 N)

$V_b$  = volume of NaOH (mL) for back-titration

$V_s$  = volume of formaldehyde stock solution (10.0 mL)

**5.5 Formaldehyde standard solution B** (0.01 g/L) Add 1 mL of standard solution A to a 100 mL volumetric flask and dilute to volume with distilled water. Prepare fresh shortly before use.

NOTE: If solution A was prepared from diluted formalin solution, the exact concentration of solution B must be calculated following standardization of solution A.