Australian Standard®

Fume from welding and allied processes

Part 1: Guide to methods for the sampling and analysis of particulate matter

This Australian Standard was prepared by Committee CH/31, Methods for Examination of Workplace Atmospheres. It was approved on behalf of the Council of Standards Australia on 20 April 1990 and published on 11 February 1991.

The following interests are represented on Committee CH/31:

Aluminium Development Council

Australian Institute of Occupational Hygienists

Australian Institute of Petroleum

Australian Mining Industry Council

Bureau of Steel Manufacturers

Chemical Confederation of Australia

Clean Air Society of Australia and New Zealand

Confederation of Australian Industry

Department of Community Services and Health

Department of Labour, Vic.

Department of Occupational Health Safety and Welfare, W.A.

Government Chemical Laboratory, Qld.

Metal Trades Industry Council

National Occupational Health and Safety Commission

Telecom Australia

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Part 1: Guide to methods for the sampling and analysis of particulate matter

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PREFACE

This Standard was prepared on behalf of the Standards Australia Committee for Workplace Atmospheres under the direction of the Chemical Standard Board. It is identical with and has been reproduced from BS 6691: Part 1—1986, *Fume from welding and allied processes,* Part 1: *Guide to methods for the sampling and analysis of particulate matter,* with the permission of the British Standards Institution, 2 Park Street, London W1A 2BS, England. Important information on the health and safety aspects associated with welding may be obtained from Technical Note 7, *Health and Safety in Welding,* Welding Technology Institute of Australia, July 1989.

This Standard is part of a series which deals with safety in welding and allied processes.

For the purpose of this Australian Standard, the text of the British Standard should be modified as follows:

(a) In Clause 2.1: to the end of paragraph 2, *add* 'A 25 mm diameter filter is often used in Australia.'

(b) In Clause 2.3: to the end of paragraph 1, *add* 'The use of an automatic flow control pump is preferable.'

(c) In Clause 2.4: to the end of paragraph 1, *add* 'if filter blocking is a problem using a 25 mm diameter filter, a lower flowrate may be used.'

(d) In footnote † to page 2: *delete* 'British Occupational Hygiene Society Technical Guide No. 5' and *substitute* AS 3640 and AS 2985.

(e) In Clause 2.6: to the end of paragraph 1, *add* 'At the conclusion of the sampling period record the time, re-measure the flow rate (a later check may give false results due to the temporary recovery of a discharged battery), switch off the pump and remove the sampling system from the worker.

NOTE: The final flow rate should not differ from the initial flow rate by more than 10%. If the flow rates vary by more than ± 10%, the sample should be rejected.

(f) In Clause 2.6: to the end of paragraph 2, *add* 'The sampling period should be such that it is representative of the welder's work day. Short term sampling may be undertaken to examine the efficacy of engineering controls or to evaluate peak exposures.'

(g) In Clause 4: *delete* the first sentence in paragraph 2 and *substitute* 'Each fume sample may be subjected to an appropriate analytical investigation.'

(h) In Clause 5: *delete* the second sentence in Paragraph 3 and *substitute* 'The accuracy of the microbalance shall comply with the requirements in AS 3640.'

(i) In Clause 5: to the end of the third sentence in paragraph 3, *add* 'Advice on filter conditioning and weighing can be obtained from AS 3640'.

(j) In Clause 6: to the end of the Clause, *add* 'Reference should be made to AS 3640 with regard to the reporting of results.'

(k) In Clause 7: to the end of the Clause, *add* 'Sampling procedures and analytical methods should be chosen so that the test results obtained are not at variance with those results obtained from methods used by the relevant Government Department or statutory authority.'

(l) In Clause 7: to Note 1, add 'Bisecting a filter for multiple analysis may only be carried out if the fume collected is known to be uniformly deposited on the filter.'

(m) In Clause 8: to the end of paragraph 1, *add* 'Reference should be made to the appropriate Australian state exposure standards.'

(n) The references to other publications should be replaced by references to Australian Standards:

Reference to—		*Australian Standard*	
BS		AS	
3900	Methods of test for paints	1580	Methods of test for paints and related materials
3900 Part B3	Determination of 'soluble' lead in solid matter in liquid paints	1580.501.1	Method 501.1: Soluble lead content (gravimetric method)
MDHS-14	Methods for the determination of hazardous substances. General methods for the gravimetric determination of respirable and total inhalable dust	2985	Workplace atmospheres—Method for sampling and gravimetric determination of respirable dust
		3640	Workplace atmospheres—Method for sampling and gravimetric determination of inspirable dust

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Guide

1 Scope

This Part of BS 6691 provides guidance on methods for the sampling and analysis of particulate matter in fume from welding and allied processes.

NOTE 1. Advice on sampling strategy may be obtained from HSE Guidance Note EH 42.

NOTE 2. The titles of publications referred to in this standard are listed on the back cover.

2 Breathing zone sampling

2.1 Sampling head

The sampling head should be constructed of a material that will not contaminate the sample; plastics, stainless steel and aluminium are suitable.

The head should be open ended and capable of holding a 37 mm diameter* filter. One suitable design is shown in figure 1.

2.2 Filtering medium

The type of filter should be such that it is free from relevant contaminants and compatible with subsequent analytical procedures and will give more than 95 % filtration efficiency of 0.3 μm at a flow rate of 2 L/min. The filter should have a nominal pore size of 0.8 μm.

NOTE. A PVC or glassfibre filter is preferable for total fume measurement, whilst a PVC or cellulose ester filter is normally preferable when metallic constituent analysis is required.

2.3 Pump†

The pump should be of a type and size capable of being worn by the welder.

The performance of the pump should be such that it provides a smooth flow having a peak-to-trough ratio of 2 to 1 or better.

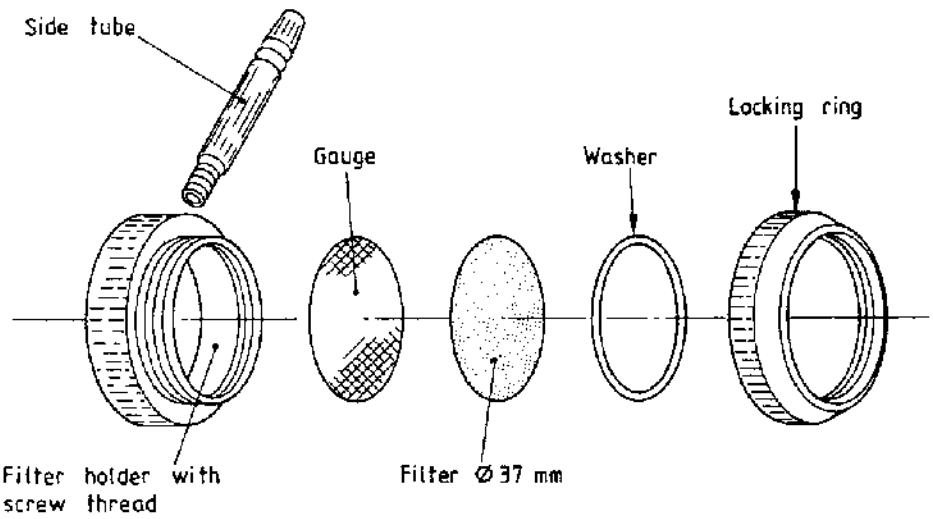

Figure 1. Exploded diagram of one type of sampling head

*The size of filter has been included because:

(a) standardization of one diameter will facilitate reproducibility and comparability of results;

(b) 37 mm diameter filters with suitable sampling heads are frequently used in the United Kingdom and they have also been adopted by the American Welding Society;

(c) the risk of filter blocking is less than with a smaller diameter.

This does not preclude the use of other filter sizes.

†Advice on selection and use of sampling pumps is given in British Occupational Hygiene Society Technical Guide No. 5.