

Australian Standard[®]

**Methods for sampling and analysis of
ambient air**

**Part 14: Meteorological monitoring for
ambient air quality monitoring
applications**



This Australian Standard® was prepared by Committee EV-007, Methods for Examination of Air. It was approved on behalf of the Council of Standards Australia on 28 June 2011. This Standard was published on 9 August 2011.

The following are represented on Committee EV-007:

- 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, Climate Change and Water, NSW
 - Department of Environment and Conservation, WA
 - Environment Protection Authority, Vic.
 - Environmental Protection Agency, Qld
 - National Association of Testing Authorities Australia
 - Ministry for the Environment, New Zealand
-

This Standard was issued in draft form for comment as DR AS 3580.14.

Standards Australia wishes to acknowledge the participation of the expert individuals that contributed to the development of this Standard through their representation on the Committee and through the public comment period.

Keeping Standards up-to-date

Australian Standards® are living documents that reflect progress in science, technology and systems. To maintain their currency, all Standards are periodically reviewed, and new editions are published. Between editions, amendments may be issued.

Standards may also be withdrawn. It is important that readers assure themselves they are using a current Standard, which should include any amendments that may have been published since the Standard was published.

Detailed information about Australian Standards, drafts, amendments and new projects can be found by visiting **www.standards.org.au**

Standards Australia welcomes suggestions for improvements, and encourages readers to notify us immediately of any apparent inaccuracies or ambiguities. Contact us via email at **mail@standards.org.au**, or write to Standards Australia, GPO Box 476, Sydney, NSW 2001.

Australian Standard[®]

**Methods for sampling and analysis of
ambient air**

**Part 14: Meteorological monitoring for
ambient air quality monitoring
applications**

Originated as AS 2923—1987.
Revised and redesignated as AS 3580.14—2011.

COPYRIGHT

© Standards Australia Limited

All rights are reserved. No part of this work may be reproduced or copied in any form or by any means, electronic or mechanical, including photocopying, without the written permission of the publisher, unless otherwise permitted under the Copyright Act 1968.

Published by SAI Global Limited under licence from Standards Australia Limited, GPO Box 476, Sydney, NSW 2001, Australia

ISBN 978 0 7337 9902 0

PREFACE

This Standard was prepared by the Standards Australia Committee EV-007, Methods for Examination of Air, to supersede AS 2923—1987, *Ambient air—Guide for measurement of horizontal wind for air quality applications*.

The Committee acknowledges the significant source of reference material provided by both the World Meteorological Organization and the United States Environmental Protection Agency (US EPA).

The objective of this Standard is to provide users with methods for the collection of meteorological data for ambient air quality monitoring and modelling applications.

CONTENTS

	<i>Page</i>
SECTION 1 SCOPE AND GENERAL	
1.1 SCOPE	5
1.2 NORMATIVE REFERENCES	5
1.3 DEFINITIONS	5
1.4 TEST REPORT	8
SECTION 2 WIND SPEED AND DIRECTION	
2.1 SCOPE OF SECTION	10
2.2 APPLICATION	10
2.3 PRINCIPLE	10
2.4 APPARATUS	10
2.5 INSTRUMENT	11
2.6 PROCEDURE	12
2.7 OBSTRUCTIONS	13
2.8 INSTALLATION	14
2.9 WIND SENSOR ORIENTATION	16
2.10 INSTRUMENT CALIBRATION	19
2.11 OPERATION AND MAINTENANCE	20
2.12 MEASUREMENT UNCERTAINTY	22
SECTION 3 AMBIENT TEMPERATURE AND TEMPERATURE GRADIENT	
3.1 SCOPE OF SECTION	23
3.2 APPLICATION	23
3.3 PRINCIPLE	23
3.4 APPARATUS	23
3.5 PROCEDURE	25
3.6 MEASUREMENT UNCERTAINTY	29
SECTION 4 RELATIVE HUMIDITY	
4.1 SCOPE OF SECTION	30
4.2 APPLICATION	30
4.3 PRINCIPLE	30
4.4 APPARATUS	30
4.5 PROCEDURE	31
4.6 MEASUREMENT UNCERTAINTY	35
SECTION 5 GLOBAL SOLAR RADIATION	
5.1 SCOPE OF SECTION	36
5.2 APPLICATION	36
5.3 PRINCIPLE	36
5.4 APPARATUS	36
5.5 PROCEDURE	38
5.6 MEASUREMENT UNCERTAINTY	41

SECTION 6	ATMOSPHERIC PRESSURE	
6.1	SCOPE OF SECTION	42
6.2	APPLICATION	42
6.3	PRINCIPLE	42
6.4	APPARATUS	42
6.5	PROCEDURE	43
6.6	MEASUREMENT UNCERTAINTY	46
SECTION 7	PRECIPITATION	
7.1	SCOPE OF SECTION	48
7.2	APPLICATION	48
7.3	PRINCIPLE	48
7.4	APPARATUS	48
7.5	PROCEDURE	49
7.6	MEASUREMENT UNCERTAINTY	51
BIBLIOGRAPHY		52

STANDARDS AUSTRALIA

Australian Standard

Methods for sampling and analysis of ambient air

Part 14: Meteorological monitoring for ambient air quality monitoring applications

SECTION 1 SCOPE AND GENERAL

1.1 SCOPE

This Standard sets out methods for the collection of meteorological data for use in ambient air quality monitoring and modelling applications. Requirements and guidance are provided for the *in situ* monitoring of primary meteorological variables being; wind speed, wind direction, temperature, humidity, atmospheric pressure, precipitation and solar radiation.

1.2 NORMATIVE REFERENCES

The following are the normative documents referenced in this Standard:

NOTE: Documents referenced for informative purposes are listed in the Bibliography.

ASTM

E104 Standard Practice for Maintaining Constant Relative Humidity by Means of Aqueous Solutions

E563 Standard Practice for Preparation and Use of an Ice-Point Bath as a Reference Temperature

ISO

9060 Solar energy—Specification and classification of instruments for measuring hemispherical solar and direct solar radiation.

Guide 98 Guide to the expression of uncertainty in measurement (ISO GUM)

US Environmental Protection Agency (EPA)

Meteorological Monitoring Guidance for Regulatory Modelling Applications, EPA-454/B-08-002, March 2008

World Meteorological Organization

Guide to Meteorological Instruments and Methods of Observation, WMO-No.8, Seventh edition 2008

1.3 DEFINITIONS

For the purpose of this Standard, the definitions below apply.

1.3.1 Accuracy

The degrees of closeness of measurements of a quantity to its actual (true) value.

1.3.2 Air temperature

The temperature indicated by a thermometer exposed to the air in a place sheltered from direct solar radiation.

1.3.3 Anemometer

A device for measuring wind speed or wind speed and direction.