

Australian/New Zealand Standard™

**Respiratory protective devices**



## **AS/NZS 1716:2012**

This Joint Australian/New Zealand Standard was prepared by Joint Technical Committee SF-010, Occupational Respiratory Protection. It was approved on behalf of the Council of Standards Australia on 23 January 2012 and on behalf of the Council of Standards New Zealand on 24 January 2012.  
This Standard was published on 13 February 2012.

The following are represented on Committee SF-010:

Accident Compensation Corporation, New Zealand  
Association of Accredited Certification Bodies  
Australasian Fire and Emergency Service Authorities Council  
Australian Aluminium Council  
Australian Chamber of Commerce and Industry  
Australian Council of Trade Unions  
Australian Industry Group  
Australian Institute of Occupational Hygienists  
Australian Institute of Petroleum  
Australian Mines and Metals Association  
Business New Zealand  
Composites Australia  
Department of Defence, Australia  
Department of Labour New Zealand  
Department of Primary Industries, NSW  
Energy Networks Association, Australia  
Hyperbaric Engineering Industry Forum  
Independent Chairperson  
NSW Department of Primary Industries  
NSW Mines Rescue  
Queensland Mines Rescue Brigade  
Safety Institute of Australia  
Sydney Water Corporation  
TestSafe Australia  
The University of New South Wales  
United Firefighters Union of Australia  
WorkCover New South Wales  
WorkSafe Victoria

### **Keeping Standards up-to-date**

Standards are living documents which reflect progress in science, technology and systems. To remain in 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 Standards may also be withdrawn.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 which may have been published since the Standard was purchased.

Detailed information about joint Australian/New Zealand Standards can be found by visiting the Standards Web Shop at [www.saiglobal.com.au](http://www.saiglobal.com.au) or Standards New Zealand web site at [www.standards.co.nz](http://www.standards.co.nz) and looking up the relevant Standard in the on-line catalogue.

For more frequent listings or notification of revisions, amendments and withdrawals, Standards Australia and Standards New Zealand offer a number of update options. For information about these services, users should contact their respective national Standards organization.

We also welcome suggestions for improvement in our Standards, and especially encourage readers to notify us immediately of any apparent inaccuracies or ambiguities. Please address your comments to the Chief Executive of either Standards Australia or Standards New Zealand at the address shown on the back cover.

*This Standard was issued in draft form for comment as DR AS/NZS 1716.*

# Australian/New Zealand Standard™

## Respiratory protective devices

Originated in Australia as AS Z18—1963.  
Originated in New Zealand as part of NZS 1568:1961.  
Previous edition AS/NZS 1716:2003.  
Seventh edition 2012.

### **COPYRIGHT**

© Standards Australia Limited/Standards New Zealand

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 (Australia) or the Copyright Act 1994 (New Zealand).

Jointly published by SAI Global Limited under licence from Standards Australia Limited, GPO Box 476, Sydney, NSW 2001 and by Standards New Zealand, Private Bag 2439, Wellington 6140.

## PREFACE

This Standard was prepared by the Joint Australian/New Zealand Standards Committee SF-010, Occupational Respiratory Protection to supersede AS/NZS 1716:2003.

This Standard was revised with the objective of incorporating some improvements but keeping these to a minimum, in light of current work still under way by ISO (International Organization for Standardization) in the field of respiratory protective devices.

The changes that have been made are mostly editorial or to clarify and improve existing testing procedures for exhalation resistance as well as include specific requirements for full facepieces used in extreme environments by fire and emergency services (special use facepieces).

It is anticipated that a new series of ISO Standards will be published in the next few years that will incorporate major developments that will address most, if not all, concerns highlighted in the previous edition. When such ISO Standards are published it is planned that they be adopted as the next revision of AS/NZS 1716.

Advice on the selection, use and maintenance of respiratory protective equipment is not covered by the Standard but given in AS/NZS 1715, *Selection, use and maintenance of respiratory protective equipment*.

The terms 'normative' and 'informative' have been used in this Standard to define the application of the appendix to which they apply. A 'normative' appendix is an integral part of a Standard, whereas an 'informative' appendix is only for information and guidance.

## CONTENTS

	<i>Page</i>
<b>SECTION 1 SCOPE AND GENERAL</b>	
1.1 SCOPE.....	6
1.2 OBJECTIVE.....	6
1.3 APPLICATION.....	6
1.4 REFERENCED DOCUMENTS.....	6
1.5 DEFINITIONS.....	7
1.6 NOMINAL VALUES AND TOLERANCES.....	9
1.7 UNITS FOR GAS AND VAPOUR CONCENTRATIONS.....	10
1.8 APPLICATION OF DESIGN AND CONSTRUCTION REQUIREMENTS.....	11
<b>SECTION 2 DESIGN AND CONSTRUCTION OF ASSEMBLED RESPIRATORS</b>	
2.1 GENERAL REQUIREMENTS.....	12
2.2 FACIAL FIT.....	13
2.3 BREATHING AND CONNECTING TUBE.....	15
2.4 DEMAND VALVE.....	15
<b>SECTION 3 FACEPIECES HEAD COVERINGS AND HARD HATS</b>	
3.1 DESIGN REQUIREMENTS.....	16
3.2 PERFORMANCE REQUIREMENTS.....	17
<b>SECTION 4 PARTICULATE FILTER RESPIRATORS</b>	
4.1 DESIGN AND CONSTRUCTION.....	20
4.2 CLASSIFICATION AND COMPONENTS.....	20
4.3 PERFORMANCE REQUIREMENTS.....	20
<b>SECTION 5 GAS AND VAPOUR FILTER RESPIRATORS</b>	
5.1 DESIGN AND CONSTRUCTION.....	22
5.2 TYPES OF FILTER.....	22
5.3 CLASSIFICATION AND COMPONENT PARTS.....	23
5.4 PERFORMANCE REQUIREMENTS.....	23
<b>SECTION 6 POWERED AIR-PURIFYING RESPIRATORS</b>	
6.1 DESIGN AND CONSTRUCTION.....	28
6.2 COMPONENTS.....	28
6.3 PERFORMANCE REQUIREMENTS.....	29
<b>SECTION 7 ESCAPE RESPIRATORS—FILTRATION TYPE</b>	
7.1 DESIGN AND CONSTRUCTION.....	31
7.2 CLASSIFICATION.....	31
7.3 FILTER SELF-RESCUER (MINES).....	31
7.4 SMOKE MASK.....	33
7.5 FILTER SELF-RESCUER (INDUSTRIAL).....	34
<b>SECTION 8 AIR-HOSE AND AIR-LINE RESPIRATORS</b>	
8.1 DESIGN AND CONSTRUCTION.....	36
8.2 WAIST BELT OR BODY HARNESS.....	38
8.3 AIR-HOSE AND AIR-LINE.....	38
8.4 PERFORMANCE REQUIREMENTS.....	39

<b>SECTION 9 COMPRESSED AIR SELF-CONTAINED BREATHING APPARATUS</b>	
9.1	DESIGN AND CONSTRUCTION ..... 43
9.2	NOMINAL EFFECTIVE LIFE..... 44
9.3	PRESSURE TUBES AND HOSES..... 44
9.4	COMPRESSED AIR SCBA—DEMAND FLOW TYPES ..... 45
9.5	CONTINUOUS-FLOW—ESCAPE TYPES ..... 46
9.6	AUXILIARY AIR SUPPLY ..... 46
9.7	CYLINDERS ..... 46
9.8	CYLINDER VALVE ..... 46
9.9	PRESSURE MEASURING DEVICES ..... 46
9.10	PRESSURE INDICATOR ..... 47
9.11	RESTRICTION OF AIR LOSS ..... 47
9.12	ACTIVE WARNING DEVICE..... 47
9.13	BODY HARNESS AND SECURING HARNESS..... 47
9.14	MASS ..... 47
9.15	TESTING..... 47
9.16	REQUIREMENTS FOR AIR QUALITY (CYLINDERS) FOR SUPPLIED-AIR RESPIRATORS..... 48
<b>SECTION 10 COMPRESSED OXYGEN SELF-CONTAINED BREATHING APPARATUS</b>	
10.1	DESIGN AND CONSTRUCTION ..... 49
10.2	COMPONENTS ..... 49
10.3	NOMINAL EFFECTIVE LIFE..... 50
10.4	INHALATION TEMPERATURE ..... 50
10.5	RESISTANCE TO BREATHING..... 50
10.6	SIMULATED ROUGH USAGE..... 50
10.7	SIMULATED WORK TEST ..... 50
10.8	DEMAND VALVE..... 51
10.9	CONTINUOUS FLOW VALVE ..... 51
10.10	RELIEF VALVE ..... 51
10.11	CARBON DIOXIDE ABSORBENT ..... 51
10.12	BREATHING BAG ..... 51
10.13	PRESSURE TUBES AND HOSES..... 51
10.14	PRESSURE GAUGE ..... 51
10.15	PRESSURE GAUGE ISOLATING VALVE ..... 52
10.16	BODY HARNESS AND SECURING HARNESS..... 52
10.17	MASS ..... 52
10.18	CYLINDERS ..... 52
10.19	CYLINDER VALVE ..... 52
10.20	COMPRESSED OXYGEN (DRY BREATHING)..... 52
10.21	LEAK TIGHTNESS ..... 52
<b>SECTION 11 CHEMICAL OXYGEN (KO<sub>2</sub>) SELF-CONTAINED SELF-RESCUERS</b>	
11.1	DESIGN AND CONSTRUCTION ..... 53
11.2	COMPONENTS ..... 53
11.3	PERFORMANCE REQUIREMENTS ..... 53
<b>SECTION 12 MARKING AND INSTRUCTIONS</b>	
12.1	MARKING ..... 57
12.2	INSTRUCTIONS FOR USE..... 61
12.3	ADDITIONAL MARKING ..... 62

## APPENDICES

A	NOISE LEVEL TEST.....	63
B	METHOD OF SELECTING PERSONNEL FOR ASSEMBLED RESPIRATORS TESTS .....	65
C	RESISTANCE TO FLAME TEST.....	67
D	TOTAL INWARD LEAKAGE OF ASSEMBLED RESPIRATORS— QUANTITATIVE SODIUM CHLORIDE TEST.....	69
E	BREATHING SIMULATOR TESTS—OPEN CIRCUIT.....	73
F	EXHALATION VALVE LEAKAGE TEST.....	78
G	BREATHING RESISTANCE TEST.....	81
H	SIMULATED ROUGH USAGE TESTS .....	82
I	PARTICULATE FILTERS—TEST FOR FILTERING EFFICIENCY .....	86
J	SIMULATED WORK TESTS .....	88
K	VOID.....	92
L	APPARATUS TO BE USED IN SODIUM CHLORIDE AEROSOL TESTS.....	93
M	PRESSURE CONVERSION TABLE .....	100
N	TESTS FOR CHEMICAL OXYGEN (KO <sub>2</sub> ) SELF-CONTAINED SELF-RESCUERS.....	101
O	TYPICAL EXAMPLE OF A REPORT FORM FOR ASSESSMENT OF CHEMICAL OXYGEN SELF-CONTAINED SELF-RESCUERS .....	105
P	SUMMARY OF CONDITIONING AND TESTING REQUIREMENTS.....	108
Q	POWERED AIR PURIFYING RESPIRATORS AIR SUPPLY FLOW RATE TEST .....	113
R	BREATHING SIMULATOR TESTS—CLOSED CIRCUIT.....	118

## STANDARDS AUSTRALIA/STANDARDS NEW ZEALAND

**Australian/New Zealand Standard**  
**Respiratory protective devices**

## SECTION 1 SCOPE AND GENERAL

**1.1 SCOPE**

This Standard specifies requirements for respiratory protective devices (respirators) intended to provide, according to type, varying degrees of protection against atmospheres containing substances which may be harmful if breathed; also, with certain types, to provide protection against atmospheres which may be deficient in oxygen. It does not purport to give guidance on the selection, use and maintenance of respirators. This is covered in AS/NZS 1715.

The Standard specifies requirements, performance and testing criteria to be observed in the manufacture of respirators.

The Standard does not apply to respirators for use in aircraft, for operations under water (see AS/NZS 2299 series), or for life support respirators used for medical purposes or resuscitation (see AS 2488).

**1.2 OBJECTIVE**

The objective of this Standard is to provide minimum performance and testing criteria to be observed in the manufacture of respiratory protective devices.

**1.3 APPLICATION**

Every respirator shall comply with the general requirements of Sections 2, 3 and 12, and with the specific requirements of the particular section applicable to the respirator type, as follows:

Particulate filter respirators .....	Section 4.
Gas and vapour filter respirators .....	Section 5.
Powered air-purifying respirators .....	Section 6.
Escape respirators—Cartrage type .....	Section 7.
Air-hose and air-line respirators .....	Section 8.
Compressed air self-contained breathing apparatus .....	Section 9.
Compressed oxygen self-contained breathing apparatus .....	Section 10.
Chemical oxygen self-contained self-rescuers .....	Section 11.

**1.4 REFERENCED DOCUMENTS**

AS	
1349	Bourdon tube pressure and vacuum gauges
2030	Gas cylinders (series)
2488	Resuscitators intended for use with humans
4484	Gas cylinders for industrial, scientific, medical and refrigerant use—Labelling and colour coding