AS/NZS 2299.1:2007

Australian/New Zealand Standard™

Occupational diving operations

Part 1: Standard operational practice

This Joint Australian/New Zealand Standard was prepared by Joint Technical Committee SF-017, Occupational Diving. It was approved on behalf of the Council of Standards Australia on 29 June 2007 and on behalf of the Council of Standards New Zealand on 13 July 2007.
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The following are represented on Committee SF-017:

Association of Diving Contractors, New Zealand
Australian Council of Trade Unions
Australian Diver Accreditation Scheme
Australian Diving Contractors Association
Australian Industry Group
Australian Marine Sciences Association Inc
Australian Medical Association
Australian Seafood Industry Council
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Department of Defence, Australia
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Dive Queensland
Hyperbaric Engineering Industry Forum
Maritime Union of Australia
NSW Police Service
National Association of Occupational Diver Training Establishments, Australia
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PREFACE

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee SF-017, Occupational Diving, to supersede AS/NZS 2299.1:1999.

This Standard is the initial Part of a series of Standards for the conduct of occupational diving operations. It is intended for application to all diving operations, however, diving operations in specific sectors of the diving industry for which other Parts in the AS/NZS 2299 series are published may be conducted using either this Standard or the sector-specific Standard. At the time of publication, sector-specific Standards for scientific diving, recreational industry diving and film and photographic diving were published.

The objective of this revision is to clarify and update the Standard and to reflect the requirements of the regulatory authorities. Significant differences from the 1999 edition include the following:

(a) Revised text dealing with exposure to altitude after diving with guidance provided in an appendix.

(b) Revision of the compression chamber availability requirements.

(c) Clarification concerning the time in which a standby diver should be able to enter the water and fitness to dive criteria.

(d) Changes to lifeline signals to be known by divers.

(e) Reference to AS 2815.5 for dive supervisor training and certification.

(f) Clarification of diver's equipment requirements, with particular focus on buoyancy control requirements, which have been made more flexible and outcome oriented to cover the need to ensure buoyancy management equipment suits any emergency function it is expected to perform as well as providing the required operational buoyancy control.

(g) Specific emphasis on the importance of avoiding breathing gas contamination by volatile hydrocarbons. Low molecular weight hydrocarbon contamination of breathing gas has been identified as a risk which has probably been involved in a number of fatalities and 'near misses' and which needs further research. At the time of publication of this Standard it was felt premature to make major changes to existing requirements for compressor system operation and breathing gas testing. Future editions of this Standard and of related breathing gas standards may call for more conservative maximum contamination levels and more elaborate filtering and monitoring requirements for breathing gas. Guidance on these matters has been expanded in this edition.

The provision of guidance on delay times between diving and altitude exposure has considered at length by Committee SF-017. Internationally, there are many different recommendations regarding appropriate limits for altitude exposure following diving but the previous delay to altitude exposure tables included in the body of the Standard as recommendations have been interpreted as rules, which were excessively restrictive for certain situations. Local and international diving medicine experts were consulted and the Committee agreed to encourage diving operators to obtain specialist advice to assist in working out delay protocols to suit their particular situation prior to the diving operation's commencement. It was also agreed to continue to include one set of guidelines that may be used when an individualized protocol had not been arranged but these guidelines have been moved to an informative appendix to reinforce their status as one consensus recommendation only, rather than the definitive publication on this subject. The values in the guidelines provided in this Standard are generally consistent with other published guidelines. The importance of normal health before travel to altitude has been emphasized in view of the frequency with which altitude associated decompression illness seems to be preceded by at least some pre-travel warning symptoms.

The Committee also sought local and overseas expert opinion concerning recompression chamber support requirements. Previous editions of this Standard have included a table of maximum dive durations in cases where there is no on-site chamber, with varying limits depending upon the dive depth and time to recompression. This concept was originally introduced to make requirements for compression chamber support more evidence based. The Committee acknowledges that whilst the previous table was based upon decompression illness risk equivalence, the decompression illness (DCI) risk levels chosen to require chamber availability and the travel times selected were derived from expert opinion rather than hard data. Further, while the data set used as the original table's source is the largest, most analysed set available, the dives that provided the data may not necessarily reflect the types of dives conducted during onshore commercial diving and scientific diving, where multi-level dive profiles are often used.

This table concept has been updated and simplified based upon current decompression illness risk advice. It should be noted that reliance solely upon dive depth and time for determining compression chamber needs was not supported. Requirements for on-site chamber support of dives involving certain types of work or factors that significantly increased risk of arterial gas embolism or high gas load/ rapid progression decompression illness have been retained and clarified. During preparation of AS/NZS 2299.2:2002, it was decided there was a need for repetitive diving to be taken into account when determining compression chamber support needs and Defence and Civil Institute of Environmental Medicine (DCIEM) repetitive dive groups were selected to enable this. This development has been updated and carried over into this Standard, i.e. AS/NZS 2299.1:2007.

The procedures, tables, figures and worksheets from the DCIEM Diving Manual, which have been used in Appendix F, are reproduced with the permission of Defence Research and Development Canada-Toronto (DRDC-Toronto). The copyright for this material remains with Her Majesty the Queen in Right of Canada. The Department of National Defence (Canada), Defence Research and Development Canada-Toronto and Standards Australia disclaim any and all responsibilities for the use of these tables and procedures.

The illustrations for the hand signals shown in Appendix L are reproduced with the permission of PADI Asia Pacific.

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

Page

Page

STANDARDS AUSTRALIA/STANDARDS NEW ZEALAND

Australian/New Zealand Standard
Occupational diving operations

Part 1: Standard operational practice

SECTION 1 SCOPE AND GENERAL

1.1 SCOPE

This Standard provides organizational and logistical requirements for the use of compressed gas supply apparatus in occupational diving operations and specific requirements for the use of surface-supplied breathing apparatus (SSBA) and self-contained underwater breathing apparatus (SCUBA) in occupational underwater operations in depths not exceeding 50 m (165 ft).

1.2 OBJECTIVE

The objective of this Standard is to provide persons engaged in, or connected with, occupational diving with a set of requirements to promote uniformity of practice in relation to the occupational health and safety of the diver.

1.3 APPLICATION

This Standard applies to persons directly involved in occupational diving operations and industries either employing those persons or supplying equipment for use in connection with occupational diving operations. This Standard has been developed for diving activity using air or oxygen-nitrogen mixtures where the oxygen concentration is in the range of 20% to 22% and depths not exceeding 50 m.

This Standard may also be used for organizational and logistical requirements for other occupational diving activities, such as those using oxygen-nitrogen mixtures with higher or lower concentrations or to depths greater than 50 m. Additional training and procedures will be necessary. Similarly, this Standard may be used for guidance for diving activities in liquids other than water and for breathing apparatus such as hookah or rebreather units with the appropriate additional training and procedures. The Standard does not apply to the following:

(a) Recreational diving.

NOTE: Recreational industry diving is covered by AS/NZS 2299.3.

(b) Diving covered by Commonwealth Petroleum (Submerged Lands) (Diving Safety) Regulations 2002 or State Petroleum (Submerged Lands) legislation.

NOTES:

1 Specialized gas mixing, filling, analysis, labelling and diving procedures are necessary for safe diving using breathing gases other than air. In particular, special equipment selection and cleaning procedures are needed for diving using oxygen enriched gas mixtures. This Standard does not provide adequate guidance on these procedures.

2 For the types of diving in Items (a) or (b) above, the relevant regulatory authority should be consulted along with other relevant Standards. A list of some of those authorities is given in Appendix A.