Replacement Copy

AS 2299—1979
UDC 614.894.7:626.025

Australian Standard 2299–1979

UNDERWATER AIR BREATHING OPERATIONS

[Title Allocated by Defence Cataloguing Authority:
UNDERWATER AIR BREATHING OPERATIONS .... NSC 4220]

STANDARDS ASSOCIATION OF AUSTRALIA
Incorporated by Royal Charter

THE FOLLOWING SCIENTIFIC, INDUSTRIAL AND GOVERNMENTAL ORGANIZATIONS and departments were officially represented on the committee entrusted with the preparation of this standard:

Australian Council of Trade Unions

Australian Mines and Metals Association

Department of Defence

Department of Health

Department of Health, Qld

Department of Industrial Relations and Technology, N.S.W.

Department of Labour and Industry, S.A.

Department of Labour and Industry, Vic.

Department of Labour Relations

Department of Minerals and Energy, Vic.

Department of National Development

Diver employer interests

Diving equipment manufacturers

Health Commission of New South Wales

Health Commission, Vic.

Maritime Services Board of New South Wales

Melbourne and Metropolitan Board of Works

Metal Trades Industry Association of Australia

N.S.W. Police Department

Port of Melbourne Authority

Professional Divers Association of Australia

South Australian Health Commission

This standard, prepared by Committee SF/17, Work in Compressed Air, was approved on behalf of the Council of the Standards Association of Australia on 31 July 1979 and was published on 1 December 1979.

This standard was issued in draft form for public review as DR 77107.

STANDARDS ASSOCIATION OF AUSTRALIA
Incorporated by Royal Charter

Amendment No 1
to
AS 2299—1979
UNDERWATER AIR BREATHING OPERATIONS

REVISED TEXT

SUMMARY: This amendment applies to Clauses 3.3(a) and 4.1.

Published on 6 December 1982.

Page 9. Clause 3.3(a).

AMDT No 1 DEC. 1982

Number existing note as 'Note 1' and *add* following Note 2.

NOTE 2: There may be occasions during research diving operations using SCUBA where it is necessary to dive, for short periods, to depths up to 30 m (e.g. collection of marine samples). In such cases, dispensation from the 20 m limit should be sought from the relevant Statutory Authority or organization controlling the dive. Prior to undertaking or authorizing such dives, consideration should especially be given to—

(i) the training and qualification of the diver,

(ii) additional pre-dive planning and on-site considerations (e.g. rescue arrangements, adequacy of air supply, availability of compression chamber, transportation arrangements).

Page 14. Clause 4.1.

AMDT No 1 DEC. 1982

Add following Note 3

3. Attention is drawn to Note 2 to Clause 3.3 regarding the possibility of short excursions on SCUBA to depths in excess of 20 m. Such dives should not be undertaken unless a compression chamber is available, in accordance with the above requirements or unless special dispensation is sought from the relevant Statutory Authority or organization controlling the diving. When considering such dives without ready access to a compression chamber, close attention should be given to necessary pre-dive planning, especially the need to determine the location of the nearest chamber and the time which would be taken, under all likely weather conditions, to transport a sick diver to such location. In this regard, the urgent need to provide treatment for a diver suffering from 'bends' within the shortest possible time is highlighted.

AUSTRALIAN STANDARD

UNDERWATER AIR BREATHING OPERATIONS

AS 2299–1979

First published (as AS CZ18 and Z67)	1972
Revised and issued as AS 2299	1979

PUBLISHED BY THE STANDARDS ASSOCIATION OF AUSTRALIA
STANDARDS HOUSE, 80 ARTHUR ST, NORTH SYDNEY, N.S.W.

ISBN 0 7262 1789 1

PREFACE

This standard was prepared by the Association's Committee on Work in Compressed Air as a revision of the 1972 editions of AS CZ18 and Z67, both of which it accordingly supersedes.

The standard is intended to apply to those situations where a person works in water to conduct his particular work or project. It is not necessary that the person should physically enter the water as there are many situations where an individual is subjected to pressure equivalent to the sea pressure experienced at a particular depth of working, e.g. going down from the surface in a diving bell under pressure or transferring to a sub-sea habitat placed on the ocean floor, also under pressure. Under these conditions the individual need not necessarily enter the water to be subjected to ambient water pressure.

The standard is restricted to underwater operations conducted at a depth not exceeding 54 m (180 ft) and using air as the breathing medium. It applies to diving from a barge, lighter, beach or shore, or platform fixed or not to the ocean floor, or from any other medium used for the purpose of diving underwater. Specifically, the standard covers diving using self-contained breathing apparatus (i.e. the 'scuba' type), helmet diving, work chamber diving, and diving using surface supply breathing apparatus.

Significant differences from the 1972 editions of the standards include:

(a) The revised operational rules (previously AS CZ18) and apparatus specifications (previously AS Z67) are in the one document.

(b) Dimensions, depths and other units have been expressed in metric (SI) units. However, because incorrect interpretation could jeopardize the safety of personnel, approximate imperial values have been shown in parentheses. It is expected that the diving industry will convert to the use of metric units in the near future and that imperial equivalents will not be retained in the next edition of this standard.

(c) The details of personnel to be present at any dive have been greatly expanded and include supervisors, standby divers, etc.

(d) A new section outlines procedures for the organization, planning and equipping for dives.

(e) Requirements for the various types of air hose have been expanded.

(f) Provision of recompression chambers on site or within 15 min of work sites for dives of specified limits has been included.

(g) Design and manufacturing requirements for recompression chambers have been expanded. In particular, the working pressure capability of chambers have been increased to be adequate for the treatment pressures likely to be required.

(h) Chambers are required either to be large enough to accommodate a medical attendant or to have facilities to provide for transfer under pressure to a larger chamber.

(j) More detailed explanation of breathing systems have been included in section 5.

(k) New medical standards have been included in Appendix A.

(l) Decompression tables have been metricated and supported by explanatory detail.

(m) A new Appendix C dealing with Therapeutic Recompression Treatments has been included. Therapeutic tables in this Appendix have been reproduced from the Royal Navy Manual.

During the preparation of this standard, the committee was aware of discussions and investigations outside the committee concerning two important aspects related to diving but not referred to in this section of the standard, viz —

- possible establishment of an Underwater Central Medical Registry; and
- possible establishment of standards of competence of diving personnel, their training and certification.

Any developments in these areas will be examined when this standard is next revised.

This standard requires reference to the following Australian standards:

AS 1210	SAA Unfired Pressure Vessels Code
AS 1269	SAA Hearing Conservation Code
AS 1337	Industrial Eye Protectors
AS 1885	Code of Practice for Recording and Measuring Work Injury Experience
AS 2030	SAA Gas Cylinders Code
AS 3000	SAA Wiring Rules Part 1 — Wiring Methods
AS CK15	Code of Recommended Practice for the Storage of Vulcanized Elastomers.

CONTENTS

STANDARDS ASSOCIATION OF AUSTRALIA

Australian Standard
for
UNDERWATER AIR BREATHING OPERATIONS

SECTION 1. SCOPE AND DEFINITIONS

1.1 SCOPE. This standard applies to underwater operations using compressed air as the breathing medium. In particular, the standard is intended to provide the basis for uniformity of practice throughout the Commonwealth of Australia in relation to the safety and health of personnel engaged in professional and/or commercial underwater operations.

NOTE: This standard is not intended for application to sports divers or to any other divers not associated with professional and/or commercial operations. However, much of the standard and in particular, the equipment requirements, is appropriate for such divers and is recommended for guidance.

The standard includes, in either mandatory or advisory form, requirements for personnel, procedures to be followed in diving, the equipment and the compressed air supply utilized, together with appendices dealing with the following subjects:

(a) Medical standards and examination reports.

(b) Example of approved decompression table.

(c) Therapeutic recompression treatment.

(d) Minimum qualifications for diver.

(e) Personal records of dives and medical examination.

(f) Dimensions of transfer under pressure facilities of chambers.

(g) Example of lifeline signals.

(h) Example of employer's record(s) of dives.

1.2 DEFINITIONS. For the purpose of this standard, the following definitions (in alphabetical order) apply.

1.2.1 Breathing tubes — those tubes attached to a regulator and designed to:

(a) supply air to the diver;

(b) carry away expired air; and

(c) operate at near ambient pressure.

1.2.2 Compression (recompression) chamber — a chamber situated on the surface in which persons may be subjected to pressures equivalent to or greater than those experienced when underwater or at simulated conditions to that experienced on an actual dive.

NOTE: For the purpose of this standard, 'compression chamber' is taken to include 'recompression chamber'.

1.2.3 Decompression schedule — schedules used to bring a diver who has been subjected to pressure back to normal atmospheric pressure by a prescribed routine which is a function of the time, depth and breathing medium.

1.2.4 Decompression sickness (bends) — the development, during or after diving, of any abnormality which is a direct result of a reduction in the tension of inert and other gases disolved in the body, with the production of gas bubbles. Any organ may be involved and its presentation can vary from the acute to the chronic.

1.2.5 Diver — a person trained and experienced —

(a) in diving;

(b) in underwater breathing; and

(c) in the use of equipment used in diving operations.

1.2.6 Habitat worker — any person who is subjected to pressure underwater, but who does not physically enter the water. The person is not enveloped by water even though he may be in a housing, a diving chamber or a diving bell that is, in itself, under or in a water environment.

1.2.7 Limiting line — a line shown in air decompression tables, which indicates time limits (bottom times) beyond which decompression schedules are less safe. Diving for periods indicated below the limiting line carries a greater risk of decompression sickness, and this risk increases with the increase in time.

1.2.8 Saturation — that condition where the person's body tissues are totally saturated with the particular inert element of the breathing medium.

1.2.9 Self-contained breathing apparatus — open-circuit diving equipment which supplies the wearer with air from cylinders carried by him.

1.2.10 Submersible work chamber — a chamber designed to withstand both external and internal pressures and which would enable divers to descend and ascend from their submerged workplace at atmospheric pressure or pressures up to the pressures at work depth and which may be able to be mated to deck compression chambers.