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Date: 14 April 2025

Origin: International

Latest date for receipt of comments: 07 June 2025

Project No. 2024/03496

Responsible committee: PSE/17 Materials and equipment for petroleum, petrochemical and natural gas industries

Interested committees:

Title: BS EN ISO 25640 Draft Respiratory equipment. Breathing apparatus performance requirements for diving and hyperbaric applications.

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Introduction

This draft standard is based on national and international discussions. Your comments on this draft are invited and will assist in the preparation of the consequent standard.

For international standards, comments will be reviewed by the relevant UK national committee before sending the consensus UK vote and comments to the international committee, which will then decide appropriate action. If the international standard is approved, it is usual for the text to be published as a British Standard.

For national standards, comments will be reviewed by the relevant UK national committee and the resulting standards published as a British Standard.

UK Vote

Please indicate whether you consider the UK should submit a negative (with supporting technical reasons) or positive vote on this draft. Please indicate if you are aware of any reason why this draft standard should not be published as a British Standard.

Submission of Comments

- **Annotated drafts are not acceptable and will be rejected.**
- All comments should be submitted online at <https://standardsdevelopment.bsigroup.com/>. You will need to register in order to comment.

Template for comments and secretariat observations

Date: xx/xx/20xx	Document: ISO/DIS xxxx
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1	2	(3)	4	5	(6)	7
MB	Clause No./ Subclause No./Annex (e.g. 3.1)	Paragraph/ Figure/Table/Note	Type of comment	Comment (justification for change) by the MB	Proposed change by the MB	Secretariat observations on each comment submitted
	3.1	Definition 1	ed	Definition is ambiguous and needs clarifying.	Amend to read '...so that the mains connector to which no connection...'	
	6.4	Paragraph 2	te	The use of the UV photometer as an alternative cannot be supported as serious problems have been encountered in its use in the UK.	Delete reference to UV photometer.	



DRAFT International Standard

ISO/DIS 25640

Respiratory equipment — Breathing apparatus performance requirements for diving and hyperbaric applications

ICS: 97.220.40; 13.340.30

ISO/TC 67

Secretariat: **NEN**

Voting begins on:
2025-04-14

Voting terminates on:
2025-07-07

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Reference number
ISO/DIS 25640:2025(en)

Full document details: 25/30505911 DC

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Published in Switzerland

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee 67, Oil and gas industries including lower carbon energy.

This is the first edition of ISO 25640. It is based on the NORSOK standard U-101 edition 2, Diving respiratory equipment, and published by Standards Norway March 2013. The first edition was published in August 1999. It was based on the "Guidelines for evaluation of breathing apparatus for use in manned underwater operations (MUO) in the petroleum activities" which was published jointly by the Norwegian Petroleum Directorate and the Department of Energy (UK) 1991-01-22 based on a draft published in 1984.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

This is a breathing performance standard. Engineering and manufacturing aspects may be found in other documents.

The requirements within this standard are based on the available knowledge at the time of publication.

This document supports essential requirements of EU Regulation 2016/425^[8] relating to personal protective equipment (PPE).

A given breathing apparatus (BA) may only be approved when the individual components satisfy the requirements of this document, and practical performance tests have been satisfactory carried out on a complete apparatus. If, for any reason, a complete apparatus is not tested, then simulation of the missing element(s) of the apparatus is permitted, provided the respiratory characteristics are similar to those of the complete apparatus.

Since the first edition of the NORSOK standard was published, some European Standards (EN 250, EN 13949, EN 14143, EN 15333-1 and EN 15333-2) have been prepared under mandate by the European Commission and the European Free Trade Association to provide the means of conforming to essential requirements of the New Approach Directive 89/686/EEC 8 (replaced by EU Regulation 2016/425^[8]) on the approximation of the laws of the Member States relating to Personal Protective Equipment. None of these documents explicitly have a scope that includes saturation or bell diving. Because of this the maximum depth given in those documents is significantly limited in comparison to maximum depth given in this document.

[Annex A](#) is informative, giving the correspondence between this document and EU Regulation 2016/425^[8].

[Annex B](#) is informative, listing the complete evaluation of the BA that should be performed in order to find out if it is suitable for the purpose.

[Annex C](#) is informative, providing Body Temperature and Pressure Saturated (BTPS) Calculation of Respiratory Minute Volume (RMV).

Respiratory equipment — Breathing apparatus performance requirements for diving and hyperbaric applications

1 Scope

This document specifies minimum respiratory performance requirements for testing and assessment of breathing apparatus used for diving and hyperbaric applications to depths specified by the manufacturer, but limited to a maximum depth of 500 m (51 bar).

This document does not apply to breathing apparatus (BA) intended for use within the scope of European standards listed below:

- EN 250;
- EN 15333-1 and EN 15333-2;
- EN 13949; and
- EN 14143.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 15333-1, *Respiratory equipment - Open-circuit umbilical supplied compressed gas diving apparatus - Part 1: Demand apparatus*

EN 15333-2, *Respiratory equipment - Open-circuit umbilical supplied compressed gas diving apparatus - Part 2: Free flow apparatus*

EN 14143, *Respiratory equipment - Self-contained re-breathing diving apparatus*

EN 13949, *Respiratory equipment - Open-circuit self-contained diving apparatus for use with compressed nitrox and oxygen - Requirements, testing, marking*

EN 12021, *Respiratory equipment. Compressed gases for breathing apparatus*

EN 250, *Respiratory equipment - Open-circuit self-contained compressed air diving apparatus - Requirements, testing and marking*

ISO 80601-2-90, *Medical electrical equipment, Part 2-90: Particular requirements for basic safety and essential performance of respiratory high-flow therapy equipment*

ISO 16972, *Respiratory protective devices - Terms, definitions, graphical symbols and units of measurement*

3 Terms and definitions

For the purposes of this document, the terms and definitions, given in ISO 16972 and the following apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>

— IEC Electropedia: available at <https://www.electropedia.org/>

3.1 ambient pressure

P_A
pressure in the surrounding environment at the level of the diver's mouth (measured in bar)

Note 1 to entry: For test purposes the P_A is equal to the test pressure.

3.2 bail-out

any diver worn emergency breathing system allowing the diver to reach a place of safety

Note 1 to entry: a diving system may have more than one emergency breathing system.

3.3 built in breathing system

BIBS
BA intended for use only in the dry inside a closed compartment, and with moderate work rates, corresponding RMV less than or equal to $40 \text{ l}\cdot\text{min}^{-1}$

3.4 breathing gas

gas mixture (or O_2) suitable for breathing at P_A

3.5 escape equipment

BA intended for use only for escape from a dry chamber to a place of safety within a chamber complex, and with moderate work rates, corresponding RMV less than or equal to $40 \text{ l}\cdot\text{min}^{-1}$

3.7 hydrostatic imbalance

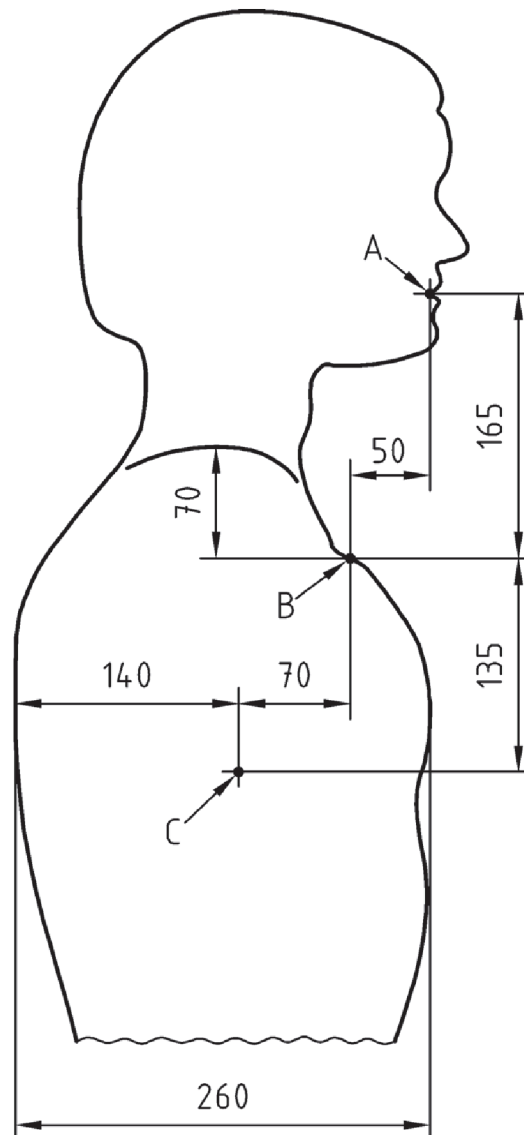
HI
pressure difference between the P_R and the P_{RP}

Note 1 to entry: $HI = P_R - P_{RP}$ (measured in mbar) at “no flow”

3.8 reference points pressure

P_{RP}
either the pressure at the suprasternal notch or the pressure maintaining the normal resting volume of the lungs (lung centroid pressure) (measured in mbar)

Note 1 to entry: See [Figure 1](#) or the suprasternal notch or the lung centroid of the diver and [Figure 2](#), and [Figure 3](#) for the difference at the end exhalation.

**Key**

- A mouth
- B suprasternal notch
- C lung centroid

Figure 1 — Anatomical reference points