Ministry of Defence

Defence Standard 68-284 Part 01

Issue 1 **Date:** **28 October 2020**

Breathing Gases for Non-Medicinal Life-Support Applications

Part: 01 : Supply Requirements

Section 1

Foreword

Defence Standard Structure

Section 1 (Generated by the StanMIS toolset)

- Revision Note
- Historical Record
- Warning
- Standard Clauses

Section 2 (Technical information provided by Subject Matter Expert)

- Title
- Introduction (optional)
- Table of Contents
- Scope
- Technical Information to include Tables and Figures
- Annexes (as required)

Section 3 (Generated by StanMIS toolset)

- Normative References
- Definitions
- Abbreviation

REVISION NOTE

A long overdue revision to keep the Def Stan aligned with applicable civil / military standards to keep it up-to-date and relevant. Defence Standard 68-284 has been re-issued in 4 new Parts.

HISTORICAL RECORD

This standard supersedes the following:

Def Stan 68-284 Issue 3 Dated 03 April 2009;

Def Stan 68-284 Issue 2 Dated 8 November 2002;

Def Stan 68-284 Issue 1 Dated 12 October 2001;

Def Stan 68-75 Issue 3 Dated 30 June 1995;

Def Stan 68-75 Issue 2 Dated 23 April 1993;

Def Stan 16-8 Issue 4 Dated 19 February 1993;

Def Stan 16-1 Issue 3 Dated 16 October 1992;

Def Stan 68-75 Issue 1 Dated 31 March 1983;

Def Stan 16-8 Issue 3 Dated 31 May 1977;

Def Stan 16-1 Issue 2 Dated 18 July1972;

Def Stan 16-8 Issue 2 Dated 10 February 1972;

WARNING

The Ministry of Defence (MOD), like its contractors, is subject to both United Kingdom and European laws regarding Health and Safety at Work. Many Defence Standards set out processes and procedures that could be injurious to health if adequate precautions are not taken. Adherence to those processes and procedures in no way absolves users from complying with legal requirements relating to Health and Safety at Work.

STANDARD CLAUSES

a) This standard has been published on behalf of the Ministry of Defence (MOD) by UK Defence Standardization (DStan).

b) This standard has been reached following broad consensus amongst the authorities concerned with its use and is intended to be used whenever relevant in all future designs, contracts, orders etc. and whenever practicable by amendment to those already in existence. If any difficulty arises which prevents application of the Defence Standard, DStan shall be informed so that a remedy may be sought.

c) Please address any enquiries regarding the use of this standard in relation to an invitation to tender or to a contract in which it is incorporated, to the responsible technical or supervising authority named in the invitation to tender or contract.

d) Compliance with this Defence Standard shall not in itself relieve any person from any legal obligations imposed upon them.

e) This standard has been devised solely for the use of the MOD and its contractors in the execution of contracts for the MOD. To the extent permitted by law, the MOD hereby excludes all liability whatsoever and howsoever arising (including, but without limitation, liability resulting from negligence) for any loss or damage however caused when the standard is used for any other purpose.

Section 2

Breathing Gases for Non-Medicinal Life-Support Applications
Part 01: Supply Requirements

Introduction

The Defence Standard (Def Stan) aims to provide a unified gas standard to encompass non-medicinal breathing gases procured or in-situ produced for use in Ministry of Defence (MOD) aircraft, diving and marine life-support applications. It provides specifications for, including purity requirements and contaminant limits, breathing gases procured or in-situ produced for aircraft, diving and marine non-medicinal life-support applications. It includes compressed natural breathing air (CNBA), oxygen / helium mixtures (Heliox), oxygen / nitrogen mixtures (Nitrox), oxygen / nitrogen / helium mixtures (Trimix), molecular sieve oxygen concentrating system (MSOCS) product gas, and breathing oxygen (in liquid and gaseous forms), for use by the MOD.

It is arranged in four parts as follows:

- Part 01: Supply Requirements
- Part 02: Breathing Oxygen
- Part 03: Compressed Natural Breathing Air
- Part 04: Breathing Gas Mixtures

The technical authority of the Def Stan is the Defence Strategic Fuels Authority, MOD Abbey Wood, Bristol BS34 8JH, United Kingdom. The Def Stan is produced on behalf of the MOD operating communities.

Scope

This part of the Def Stan specifies the general requirements for supply of breathing gases procured or in-situ produced for non-medicinal life-support applications.

List of Contents

Technical Content

1. Compressed Gas Cylinders

1.1. Cylinder Type

In the context of the Def Stan, compressed gas cylinders fall into two main types:

- Special MOD owned cylinders designed for MOD use, and
- Leased supplier owned cylinders.

1.2. Marking

Compressed gas cylinders shall be marked and identified in accordance with national and/or European Standards, ie BS EN ISO 7225, BS EN 1089-3, and BS EN ISO 13769, or Def Stan 81-24, as appropriate. Please refer to JSP 319 Pt 2 Vol 1 for guidance, and Part 02, 03 and 04 of the Def Stan for specifics.

1.3. Batch Number & Expiry Date

Breathing gases are subject to a life; suppliers shall clearly indicate the batch number and the expiry date of the gas on each cylinder.

1.4. Testing

1.4.1. *Requirements.* After filling, samples of the cylinders' contents shall be taken and analysed using applicable test methods. The gas contents shall comply with the appropriate requirements. Please refer to Part 02, 03 and 04 of the Def Stan for specifics.

1.4.2. Conditioning. Cylinders containing a specified mixture of gases shall be allowed to achieve homogeneity before sampling is carried out.

1.4.3. Sampling. A quantity of cylinders (the number to be the subject of agreement between the purchaser and the supplier) from each production batch shall have their contents tested.

1.4.4. Failure. Failure of the test shall result in the whole batch supplied to the MOD being sampled. The contents of each cylinder failing the test shall be rejected.

1.4.5. Compliance. An integrity seal covering the cylinder's outlet connection shall be placed on each cylinder to show compliance with the tests. The design of the seal shall be such as to prevent pressure build up.

1.5. Certificate

When called up in the contract, a certificate of conformity (CoC) and/or an analytical test certificate shall be supplied with the cylinders or manifolded cylinder packs (MCPs). Please refer to Part 02, 03 and 04 of the Def Stan for specifics.

1.6. Fill Pressure

Compressed gas cylinders shall not be charged above the working pressure stamped on them. Purchaser shall advise the supplier which climatic area if other than the United Kingdom where the cylinders are to be deployed. BCGA CP 35 should be referred for guidance on the maximum filling ratios and developed pressures.

1.7. Returning

Supplier owned cylinders are to be returned to the supplier for refilling unless specifically authorised. Empty cylinders should contain a residual pressure to minimise moisture ingress.

Section 3

Normative References

1 The publications shown below are referred to in the text of this standard. Publications are grouped and listed in alpha-numeric order.

Note: Def Stan's can be downloaded free of charge from the DStan web site by visiting **<http://dstan.uwh.diif.r.mil.uk/>** for those with RLI access or **<https://www.dstan.mod.uk>** for all other users. All referenced standards were correct at the time of publication of this standard (see 2, 3 & 4 below for further guidance), if you are having difficulty obtaining any referenced standard please contact the DStan Helpdesk in the first instance.

Def Stans

Number	Title
81-024, Iss 05	Identification Marking of Transportable Containers, Compressed Gas
68-284, Pt 02, Iss 01	Breathing Gases for Non-Medicinal Life-Support Applications - Breathing Oxygen
68-284, Pt 03, Iss 01	Breathing Gases for Non-Medicinal Life-Support Applications - Compressed Natural Breathing Air
68-284, Pt 04, Iss 01	Breathing Gases for Non-Medicinal Life-Support Applications - Breathing Gas Mixtures

STANAGs

Number	Title

Allied Publications

Number	Title

Other References

Standard Type	Standard Name
BS / BS EN / BS ISO Standards	BS EN 1089-3, Transportable Gas Cylinders – Gas Cylinder Identification (excluding LPG) Part 3: Colour Coding
BS / BS EN / BS ISO Standards	BS EN ISO 13769, Gas Cylinders – Stamp Marking
BS / BS EN / BS ISO Standards	BS EN ISO 7225, Gas Cylinders – Precautionary Labels

Other Civilian/Industry Standards	BCGA CP35, Filling Ratios and Developed Pressure for Liquefied and Compressed Gases
Other Civilian/Industry Standards	JSP 319, Ministry of Defence, Joint Services Safety Regulations for the Storage & Handling of Gases

2 Reference in this Standard to any normative references means in any Invitation to Tender or contract the edition and all amendments current at the date of such tender or contract unless a specific edition is indicated. Care should be taken when referring out to specific portions of other standards to ensure that they remain easily identifiable where subsequent amendments and supersession's might be made. For some standards the most recent editions shall always apply due to safety and regulatory requirements.

3 In consideration of clause 2 above, users shall be fully aware of the issue, amendment status and application of all normative references, particularly when forming part of an Invitation to Tender or contract. Correct identification of standards is as defined in the ITT or contract.

4 DStan can advise regarding where to obtain normative referenced documents. Requests for such information can be made to the DStan Helpdesk. Details of how to contact the helpdesk are shown on the outside rear cover of Defence Standards.

Definitions

For the purpose of this standard, ISO/IEC Guide 2 ‘Standardization and Related Activities – General Vocabulary’ and the definitions shown below apply.

Definition	Description
Compressed Gas	Compressed gas means any contained mixture or material with either an absolute pressure exceeding 275.8kPa at 21.1°C or an absolute pressure exceeding 717.1kPa at 54,4°C, or both, or any liquid having an absolute vapour pressure exceeding 275.8kPa at 37.8°C. Reference source is found at Hazard Communication Glossary (2012), US Department of Labor, Occupational Safety & Health Administration.
Compressed Gas Cylinder	A compressed gas cylinder is a pressure vessel used to store gases at above atmospheric pressure.
Compressed Natural Breathing Air	Compressed air that meets breathing air quality criteria, and the air is taken directly from the atmosphere without additional gaseous additives however some filtering / processing may be necessary.
Could	The verb describes an activity that is a good practice but recognises that there are other methods available to the practitioner that provide an equally satisfactory good outcome.
Heliox	Diving gas mixture, comprising a specified mixture of oxygen and helium, capable of supporting life under defined diving or hyperbaric conditions.
In-Situ Produced	Commodity / product produced at MOD facility.
Must	The verb describes an activity that is mandatory, and descends directly from national legislation.
Nitrox	Diving gas mixture, comprising a specified mixture of oxygen and nitrogen, capable of supporting human life under defined diving or hyperbaric conditions. NOTE: Compressed breathing air made from a mixture of liquefied gases may be considered as Nitrox if it conforms to the Nitrox requirements.
Procured	Commodity / product from manufacturer or value-added re-seller.
Shall	The verb describes an activity that is mandatory, and stems from defence regulations in the absence of national legislation.
Should	The verb describes an activity that is the best practice. If the activity is followed, then this will be considered sufficient to demonstrate compliance with a regulation. However, alternative approaches may be utilised where this produces an outcome as good as required by the Regulation.
Trimix	Diving gas mixture, comprising a specified mixture of oxygen, helium and nitrogen, capable of supporting human life under diving or hyperbaric conditions.

Abbreviations

Abbreviation	Description
BCGA	British Compressed Gases Association
BS EN	British Standard European
BS EN ISO	British Standard European International Standard Organisation
CNBA	Compressed Natural Breathing Air
CoC	Certificate of Conformity
CP	Code of Practice
Def Stan	Defence Standard
DStan	UK Defence Standardization
Heliox	Helium and oxygen gas mixture (Refer to Definitions for details)
JSP	Joint Services Publication
MCP	Manifolded cylinder pack
MOD	Ministry of Defence
MSOCS	Molecular Sieve Oxygen Concentrating System
Nitrox	Nitrogen and oxygen gas mixture (Refer to Definitions for details)
Trimix	Oxygen, helium and nitrogen gas mixture (Refer to Definitions for details)

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Defence Standards are published by and obtainable from:

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File Reference

The DStan file reference relating to work on this standard is 68/284/1.

Contract Requirements

When Defence Standards are incorporated into contracts, users are responsible for their correct application and for complying with contractual and statutory requirements. Compliance with a Defence Standard does not in itself confer immunity from legal obligations.

Revision of Defence Standards

Defence Standards are revised as necessary by an up-issue or amendment. It is important that users of Defence Standards ensure that they are in possession of the latest issue or amendment. Information on all Defence Standards can be found on the DStan Websites https://www.dstan.mod.uk and http://dstan.uwh.diif.r.mil.uk/, updated weekly. Any person who, when making use of a Defence Standard, encounters an inaccuracy or ambiguity is encouraged to notify UK Defence Standardization (DStan) without delay in order that the matter may be investigated and appropriate action taken.