

SVENSK STANDARD

SS-EN ISO 13293:2012



Fastställt/Approved: 2012-11-19
Publicerad/Published: 2012-11-21
Utgåva/Edition: 1
Språk/Language: engelska/English
ICS: 03.080.30; 03.200

Fritidsdykning – Krav på träningsprogram för gasblandare (ISO 13293:2012)

Recreational diving services – Requirements for gas blender training programmes (ISO 13293:2012)

This preview is downloaded from www.sis.se. Buy the entire standard via <https://www.sis.se/std-88072>

Standarder får världen att fungera

SIS (Swedish Standards Institute) är en fristående ideell förening med medlemmar från både privat och offentlig sektor. Vi är en del av det europeiska och globala nätverk som utarbetar internationella standarder. Standarder är dokumenterad kunskap utvecklad av framstående aktörer inom industri, näringsliv och samhälle och befrämjar handel över gränser, bidrar till att processer och produkter blir säkrare samt effektiviserar din verksamhet.

Delta och påverka

Som medlem i SIS har du möjlighet att påverka framtida standarder inom ditt område på nationell, europeisk och global nivå. Du får samtidigt tillgång till tidig information om utvecklingen inom din bransch.

Ta del av det färdiga arbetet

Vi erbjuder våra kunder allt som rör standarder och deras tillämpning. Hos oss kan du köpa alla publikationer du behöver – allt från enskilda standarder, tekniska rapporter och standardpaket till handböcker och onlinetjänster. Genom vår webbtjänst e-nav får du tillgång till ett lättnavigerat bibliotek där alla standarder som är aktuella för ditt företag finns tillgängliga. Standarder och handböcker är källor till kunskap. Vi säljer dem.

Utveckla din kompetens och lyckas bättre i ditt arbete

Hos SIS kan du gå öppna eller företagsinterna utbildningar kring innehåll och tillämpning av standarder. Genom vår närhet till den internationella utvecklingen och ISO får du rätt kunskap i rätt tid, direkt från källan. Med vår kunskap om standarders möjligheter hjälper vi våra kunder att skapa verklig nytta och lönsamhet i sina verksamheter.

Vill du veta mer om SIS eller hur standarder kan effektivisera din verksamhet är du välkommen in på www.sis.se eller ta kontakt med oss på tel 08-555 523 00.



Standards make the world go round

SIS (Swedish Standards Institute) is an independent non-profit organisation with members from both the private and public sectors. We are part of the European and global network that draws up international standards. Standards consist of documented knowledge developed by prominent actors within the industry, business world and society. They promote cross-border trade, they help to make processes and products safer and they streamline your organisation.

Take part and have influence

As a member of SIS you will have the possibility to participate in standardization activities on national, European and global level. The membership in SIS will give you the opportunity to influence future standards and gain access to early stage information about developments within your field.

Get to know the finished work

We offer our customers everything in connection with standards and their application. You can purchase all the publications you need from us - everything from individual standards, technical reports and standard packages through to manuals and online services. Our web service e-nav gives you access to an easy-to-navigate library where all standards that are relevant to your company are available. Standards and manuals are sources of knowledge. We sell them.

Increase understanding and improve perception

With SIS you can undergo either shared or in-house training in the content and application of standards. Thanks to our proximity to international development and ISO you receive the right knowledge at the right time, direct from the source. With our knowledge about the potential of standards, we assist our customers in creating tangible benefit and profitability in their organisations.

If you want to know more about SIS, or how standards can streamline your organisation, please visit www.sis.se or contact us on phone +46 (0)8-555 523 00



Europastandarden EN ISO 13293:2012 gäller som svensk standard. Detta dokument innehåller den officiella engelska versionen av EN ISO 13293:2012.

The European Standard EN ISO 13293:2012 has the status of a Swedish Standard. This document contains the official version of EN ISO 13293:2012.

© Copyright/Upphovsrätten till denna produkt tillhör SIS, Swedish Standards Institute, Stockholm, Sverige. Användningen av denna produkt regleras av slutanvändarlicensen som återfinns i denna produkt, se standardens sista sidor.

© Copyright SIS, Swedish Standards Institute, Stockholm, Sweden. All rights reserved. The use of this product is governed by the end-user licence for this product. You will find the licence in the end of this document.

Upplysningar om sakinnehållet i standarden lämnas av SIS, Swedish Standards Institute, telefon 08-555 520 00. Standarder kan beställas hos SIS Förlag AB som även lämnar allmänna upplysningar om svensk och utländsk standard.

Information about the content of the standard is available from the Swedish Standards Institute (SIS), telephone +46 8 555 520 00. Standards may be ordered from SIS Förlag AB, who can also provide general information about Swedish and foreign standards.

Denna standard är framtagen av kommittén för Fritidsdykning, SIS/TK 388.

Har du synpunkter på innehållet i den här standarden, vill du delta i ett kommande revideringsarbete eller vara med och ta fram andra standarder inom området? Gå in på www.sis.se - där hittar du mer information.

EUROPEAN STANDARD

EN ISO 13293

NORME EUROPÉENNE

EUROPÄISCHE NORM

November 2012

ICS 03.080.30; 03.200

English Version

Recreational diving services - Requirements for gas blender training programmes (ISO 13293:2012)

Services relatifs à la plongée de loisirs - Exigences relatives aux programmes de formation à la préparation des mélanges gazeux (ISO 13293:2012)

Dienstleistungen des Freizeittauchens - Anforderungen an Ausbildungsprogramme für Gas Blender (ISO 13293:2012)

This European Standard was approved by CEN on 31 October 2012.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.



EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

Management Centre: Avenue Marnix 17, B-1000 Brussels

SS-EN ISO 13293:2012 (E)

Contents		Page
Foreword		iv
Introduction		v
1 Scope		1
2 Normative references		1
3 Terms and definitions		1
4 Competencies of gas blenders		2
5 Theoretical knowledge		3
5.1 Purpose of gas blender training		3
5.2 Gas blending and delivery methods		3
5.3 Gases and gas blends		3
5.4 Considerations for elevated oxygen levels		4
5.5 Cylinder marking and handling		5
5.6 Gas analysis and record keeping		5
5.7 Gas blending calculations		5
6 Practical skills		5
7 Gas blender instructors		6
8 Qualification		6
Annex A (informative) Background information for gas blender training programmes		7
Annex ZA (informative) A–deviations		8
Bibliography		10

Foreword

This document (EN ISO 13293:2012) has been prepared by Technical Committee ISO/TC 228 "Tourism and related services" in collaboration with Technical Committee CEN/TC 329 "Tourism services", the secretariat of which is held by DIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by May 2013, and conflicting national standards shall be withdrawn at the latest by May 2013.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

According to the CEN/CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Endorsement notice

The text of ISO 13293:2012 has been approved by CEN as a EN ISO 13293:2012 without any modification.

SS-EN ISO 13293:2012 (E)

Introduction

The requirements specified in this International Standard are minimum requirements; they do not preclude the provision of additional training or the assessment by a service provider of additional competencies. This International Standard represents a tool for comparison of existing (or future) qualifications of gas blenders who want to mix gases for diving purposes.

Recreational diving services — Requirements for gas blender training programmes

1 Scope

This International Standard specifies requirements for gas blender training programmes and the competencies required of an individual in order to obtain a gas blender certificate from a training organization, attesting that he/she has met or exceeded the requirements specified in this International Standard.

This International Standard specifies two levels of gas blender qualification, as follows:

- Level 1 gas blender;
- Level 2 gas blender.

This International Standard recognizes that a training programme can be organized and delivered in a modular way.

2 Normative references

The following referenced documents are indispensable for the application 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.

ISO 11107:2009, *Recreational diving services — Requirements for training programmes on enriched air nitrox (EAN) diving*

ISO 24802-1, *Recreational diving services — Safety related minimum requirements for the training of scuba instructors — Part 1: Level 1*

ISO 24802-2, *Recreational diving services — Safety related minimum requirements for the training of scuba instructors — Part 2: Level 2*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1

training organization

entity which provides training in accordance with this International Standard and awards qualifications, and which is responsible for the implementation and quality management of such training

NOTE Can include scuba diving federations and scuba diver training agencies.

3.2

enriched air nitrox

EAN

mixture of nitrogen and oxygen with more than 21 % oxygen

3.3

helium-based gas mixture

helium-based gas blend

mixture of oxygen and helium, or breathable mixture of oxygen, helium and nitrogen

3.4

trimix

mixture of oxygen, helium and nitrogen

SS-EN ISO 13293:2012 (E)

- 3.5**
heliox
mixture of oxygen and helium
- 3.6**
oxygen clean
verified that particulates, fibres, oils, greases and other contaminants are absent
- NOTE Any mixture of gases can contain trace gases at levels no higher than those found in ambient air. Permissible levels of trace gases can be specified in national, regional and/or International Standards.
- 3.7**
oxygen compatible
capable of coexisting with elevated oxygen concentrations and a potential source of ignition without flashing, based on a system's maximum operating pressure and temperature
- 3.8**
oxygen-compatible air
air with a reduced level of condensable hydrocarbon mist or vapour
- 3.9**
oxygen design
design that minimizes any tendency for heat generation, ignition of particulates, or the accumulation of contaminants for an intended partial pressure of oxygen and temperature
- 3.10**
oxygen service
system or component that has been designed and tested for oxygen use, has been tested as oxygen clean and is oxygen compatible

4 Competencies of gas blenders

The gas blender training programme shall ensure that persons assessed in accordance with Clause 8 are qualified to blend gases for diving purposes, following accepted safety protocols and standards.

This International Standard specifies two levels of competence for gas blenders, as follows:

- a) Level 1 gas blenders are qualified to blend enriched air nitrox (EAN);
- b) Level 2 gas blenders are qualified to blend and supply any gases and gas mixes covered by this International Standard.

Gas blenders are competent to provide specific mixtures of gases in a compatible cylinder (e.g. working pressure, correct marking, test validity).

The completion of a training programme in accordance with this International Standard does not qualify a person to do the following:

- advise a diver on the gas mixture to be used for a given dive;
- establish operational parameters for a diver, e.g. the maximum operating depth or maximum partial pressure of a component gas;
- provide oxygen cleaning and servicing of diving equipment.

5 Theoretical knowledge

5.1 Purpose of gas blender training

The training programme shall ensure that students have knowledge of issues related to the following aspects of diver breathing gas mixes (appropriate to Level 1 or Level 2 gas blender qualification) for diving purposes and associated risks:

- safe production;
- analysis;
- handling;
- use.

5.2 Gas blending and delivery methods

The training programme shall ensure that students for both the Level 1 and the Level 2 gas blender qualification have knowledge of operating principles, design features, advantages, disadvantages and safety issues related to the following gas blending and delivery methods:

- nitrogen reduction methods (e.g. using a membrane or a molecular sieve);
- continuous blending;
- partial pressure blending;
- using premixed gases;
- “gravimetric mixing method” (mixing by weight);
- booster pumps.

5.3 Gases and gas blends

5.3.1 The training programme shall ensure that students for both the Level 1 and the Level 2 gas blender qualification have knowledge of the uses, characteristics, advantages, disadvantages and safety issues of the following gases and gas mixtures used by divers:

- oxygen;
- nitrogen;
- air;
- enriched air nitrox (EAN).

NOTE It is advisable that the training programme states that gases obtained from a third party which will be used in breathing mixtures for diving purposes need to be formally certified to be fit for use for breathing purposes (e.g. diving grade oxygen, medical grade oxygen, aviator grade oxygen or any other formally certified breathing-grade oxygen).

5.3.2 In addition to the items listed in 5.3.1, the training programme shall ensure that students for the Level 2 gas blender qualification have knowledge of the uses, characteristics, advantages, disadvantages, safety issues of the following gases and gas mixtures used by divers:

- helium,
- argon;
- trimix;