
Respiratory protective devices — Vocabulary and graphical symbols

*Appareils de protection respiratoire — Vocabulaire et symboles
graphiques*

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Foreword

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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).

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This document was prepared by Technical Committee ISO/TC 94, *Personal safety — Personal protective equipment*, Subcommittee SC 15, *Respiratory protective devices*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 79, *Respiratory protective devices*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This second edition cancels and replaces the first edition (ISO 16972:2010), which has been technically revised. The main changes compared with the previous edition are as follows:

- the terms used in the field of respiratory protective devices (RPD) have been updated;
- Clause 5, “Units of measurement”, has been deleted;
- Annex A, “Terms and definitions referring to respiratory protective devices in current national standards, regulations or other national contexts”, has been deleted;
- Annex B, “Abbreviations used”, has been deleted.

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.

Respiratory protective devices — Vocabulary and graphical symbols

1 Scope

This document defines terms and specifies units of measurement for respiratory protective devices (RPDs), excluding diving apparatus. It indicates graphical symbols that can be required on RPDs, parts of RPD or instruction manuals in order to instruct the person(s) using the RPD as to its operation.

NOTE Terms and definitions for diving apparatus are given in EN 250.

2 Normative references

There are no normative references in this document.

3 Terms related to respiratory protective devices

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

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

3.1

abrasive blasting respiratory protective device

breathing apparatus (3.32) incorporating a protective *hood* (3.115) or a *blouse* (3.23) fitted with an *impact resistant* (3.119) *visor* (3.252)

Note 1 to entry: *Breathable air* (3.28) is supplied to the *wearer* (3.257) from a source of air not carried by the wearer.

3.2

accessory

item, or items, that are attached to the *respiratory protective device (RPD)* (3.203) that are not necessary for the RPD to meet the requirements of the RPD performance standard and do not compromise its protection

3.3

adequacy assessment

selection method identifying the *respiratory protective device* (3.203) is able to reduce the *wearer's* (3.257) inhalation exposure to acceptable levels

3.4

adequate respiratory protective device

adequate RPD

RPD (3.203) capable of reducing the inhalation exposure to an acceptable level

3.5

aerodynamic diameter

diameter of a unit density sphere having the same settling velocity as the *particle* (3.170) in question

3.6

aerosol

suspension of solid, liquid, or solid and liquid *particles* (3.170) in a gaseous medium, having a negligible falling velocity (generally considered to be less than 0,25 m/s)

3.7

aerosol penetration

ability of *particles* (3.170) to pass through a particle-filtering material

3.8

air flow resistance

pressure difference between upstream and downstream locations caused by the flow of air through the parts and components of a *respiratory protective device* (3.203) such as an *exhalation valve* (3.79), *inhalation valve* (3.120), *filter(s)* (3.86), and *tube* (3.245), etc.

3.9

air supply hose

fresh air supply hose

hose (3.116) for the supply of air at about atmospheric pressure

3.10

ambient air bypass

means to enable the *wearer* (3.257) to breathe the *ambient atmosphere* (3.12) before entering and after leaving a *hazardous atmosphere* (3.108)

3.11

ambient air system

device used to deliver ambient air at a *low pressure* (3.134) directly to a *breathable gas* (3.29) *respiratory protective device* (3.203) (manually or power assisted)

3.12

ambient atmosphere

air surrounding the *wearer* (3.257)

3.13

ambient concentration

concentration of a compound in the air surrounding the *wearer* (3.257)

3.14

ambient laboratory conditions

atmosphere where the temperature is between 16 °C and 32 °C and the relative humidity is between 20 % and 80 %

3.15

apertometer

extended hemispherical dome for measuring the angular area of the *field of vision* (3.85) [*peripheral isopter* (3.176)] of a *respiratory protective device* (3.203) when mounted on a *respiratory protective device headform* (3.204)

3.16

as received

not preconditioned or modified to carry out a test

3.17

assigned protection factor

APF

anticipated level of respiratory protection that would be provided by a properly functioning *respiratory protective device (RPD)* (3.203) or class of RPD within an effective *RPD programme* (3.207)

3.18

assisted filtering respiratory protective device

assisted filtering RPD

filtering RPD (3.90) where *breathable gas* (3.29) is actively supplied to the *wearer* (3.257) by the *RPD* (3.203)

3.19**averaged interactive flow rate**

interactive flow rate (3.126) averaged over 10 consecutive *breathing cycles* (3.34) of the *breathing machine* (3.38)

3.20**averaged maximum interactive flow rate**

average of the highest *flow rate* (3.92) within each *breathing cycle* (3.34) of 10 consecutive breathing cycles of the *breathing machine* (3.38)

3.21**averaged minimum interactive flow rate**

average of the lowest *flow rate* (3.92) within each *breathing cycle* (3.34) of 10 consecutive breathing cycles of the *breathing machine* (3.38)

3.22**averaged peak interactive flow rate**

average of the maximum peak *flow rate* (3.92) within each *breathing cycle* (3.34) of 10 consecutive breathing cycles of the *breathing machine* (3.38)

3.23**blouse**

garment, used as a *facepiece* (3.83), that covers the head and upper part of the body to the waist and wrists and to which air is supplied

3.24**body harness**

means to enable certain components of a *respiratory protective device* (3.203) to be worn on the body

3.25**body temperature pressure saturated****BTPS**

standard condition for the expression of *ventilation* (4.20) parameters

Note 1 to entry: Body temperature (37 °C), atmospheric pressure 101,3 kPa and water vapour pressure (6,27 kPa) in saturated air.

3.26**breakthrough concentration**

concentration of test *gas* (3.97) in effluent air at which a *gas filter* (3.98) undergoing a *gas capacity* (3.44) test is deemed exhausted

3.27**breakthrough time**

t_{br}

time taken from the start of the test until the test *gas* (3.97) and specified reaction products are detected at the specified *breakthrough concentration* (3.26) at the downstream side of the *filter* (3.86) under test

3.28**breathable air**

air of a quality that makes it suitable for safe respiration

Note 1 to entry: For compressed air for *breathing apparatus* (3.32), see EN 12021:2014.

3.29**breathable gas**

mixture of *gases* (3.97) that is suitable for respiration without adverse effects to health

3.30

breathable gas cylinder

integral part of the *respiratory protective device* (3.203) that contains the *breathable gas* (3.29) supply

3.31

breathable gas quality

composition of a *breathable gas* (3.29) as defined in relevant standards

3.32

breathing apparatus

device that enables the *wearer* (3.257) to breathe independently of the *ambient atmosphere* (3.12)

3.33

breathing bag

component of a *respiratory protective device* (3.203) that compensates for variations in the *breathable gas* (3.29) supply or demand and provides for peak inhalation flow requirements

3.34

breathing cycle

respiratory period comprising an inhalation and an exhalation phase

3.35

breathing frequency

number of *breathing cycles* (3.34) taken in a minute

Note 1 to entry: It is expressed in breaths per minute.

3.36

breathing gas regeneration

process whereby a *respiratory protective device* (3.203) absorbs carbon dioxide from exhaled *gas* (3.97), delivers oxygen, and controls the water vapour and temperature of gas to be rebreathed

3.37

breathing hose

<low pressure> flexible *hose* (3.116) connected to the *facepiece* (3.83) through which *breathable gas* (3.29) enters at atmospheric pressure or at a pressure slightly above or below

3.38

breathing machine

ventilation machine that simulates respiratory *ventilation* (4.20) using waveforms, which can be sinusoidal or representative of the *breathing cycle* (3.34)

Note 1 to entry: See also *metabolic simulator* (3.149).

3.39

breathing machine assembly

breathing machine (3.38) plus all the connecting *tubes* (3.245), control valves and other necessary hardware leading to the *trachea tube assembly* (3.244)

3.40

breathing peak resistance

maximum differential pressure of a *respiratory protective device* (3.203) during inhalation (inhalation peak resistance) or exhalation (exhalation peak resistance)

3.41

breathing resistance

pressure differential between the upstream and downstream location caused by a *respiratory protective device* (3.203) to the flow of *breathable gas* (3.29) during inhalation (inhalation resistance) or exhalation (exhalation resistance)

3.42**breath-responsive**

actively or passively responsive following the *wearer's* (3.257) demand for air

3.43**bypass valve**

component part of a *respiratory protective device* (3.203) that is furnished as an emergency manual valve to supply necessary *breathable gas* (3.29) when the ordinary supply path is out of order

3.44**capacity**

volume of available *breathable gas* (3.29) of a *respiratory protective device* (3.203)

3.45**carbon dioxide concentration limits****CO₂ concentration limits**

maximum allowed concentration of carbon dioxide within *inhaled breathable gas* (3.121)

3.46**char length**

length of brittle residue found when a fabric or material is exposed to thermal energy

3.47**checking device**

means to enable the *wearer* (3.257) to verify, before use or periodically during use, that the *manufacturer's minimum design conditions* (3.137) are met

3.48**class Sxxxx respiratory protective device****class Sxxxx RPD**

supplied breathable gas RPD (3.236), where Sxxxx equals the amount of *breathable gas* (3.29) available for respiration in litres

3.49**cleaning/disinfection resistance**

ability of the device to withstand the cleaning and disinfection processes defined by the manufacturer

3.50**combined filter**

filter (3.86) intended to remove dispersed solid and/or liquid *particles* (3.170) and specified *gases* (3.97) and *vapours* (3.251) from the flow of air passing through it

3.51**combined respiratory protective device****combined RPD**

RPD (3.203) that is capable of operating in either a filtering or *breathable gas* (3.29) supply mode

3.52**compatibility**

ability of a *respiratory protective device* (3.203) to be used in conjunction with another item of personal protective equipment (PPE)

3.53**competent fit-test operator**

person with suitable and sufficient experience and with practical and theoretical knowledge of fit-test methods who conducts the fit-testing procedures

3.54**competent person**

person with suitable and sufficient experience and with practical and theoretical knowledge of the elements of a *respiratory protective device programme* (3.207) for which (s)he is responsible

3.55

compressed air filter

filter (3.86) intended to remove dispersed solid and/or liquid *particles* (3.170) and specified *gases* (3.97) and *vapours* (3.251) from compressed air passing through it

3.56

compressed air line breathing apparatus

device that is not self-contained and in which the *facepiece* (3.83) is supplied with *breathable air* (3.28) from a source of compressed air

3.57

compressed air supply tube

tube (3.245) that delivers *breathable air* (3.28) at a maximum pressure of 10 bar from a source of compressed air

3.58

confined space

area with limited access, as described in national regulations, which requires special considerations for entry

3.59

contaminant

undesirable solid, liquid or gaseous substance in the air

3.60

continuous control flow valve

control valve that provides the *wearer* (3.257) of a *supplied breathable gas respiratory protective device* (3.236) with *breathable gas* (3.29) and allows the wearer to regulate a continuous air flow within prescribed limits

3.61

count median diameter

CMD

particle size of a particle distribution for which one-half the total number of *particles* (3.170) are larger and one-half are smaller

3.62

dead space

<technical> space in which exhaled *gas* (3.97) has not been purged and is subject to being rebreathed

3.63

dead space

<anatomical> conducting regions of the pulmonary airways that do not contain *alveoli* (4.7) and, therefore, where no *gas* (3.97) exchange occurs

Note 1 to entry: These areas include the nose, mouth, trachea, large bronchia and the lower branching airways. This volume is typically 150 ml in a male of average size.

3.64

dead space

<physiological> sum of all anatomical *dead space* (3.63) as well as under-perfused (reduced blood flow) *alveoli* (4.7) that are not participating in *gas* (3.97) exchange

Note 1 to entry: The volume of the physiological dead space can vary with the degree of *ventilation* (4.20). Thus, the physiological dead space is the fraction of the *tidal volume* (3.240) that does not participate in gas exchange in the lungs.

3.65**demand type with positive pressure**

type of *respiratory protective device* (3.203) that is fitted with a *demand valve* (3.67), is governed by the breathing action of the lungs, and that actuates at a *positive pressure* (3.179) in the *facepiece* (3.83) under conditions defined in relevant standards

3.66**demand type without positive pressure**

type of *respiratory protective device* (3.203) that is fitted with a *demand valve* (3.67), is governed by the breathing action of the lungs, and that actuates at a *negative pressure* (3.161) during inhalation in the *facepiece* (3.83)

3.67**demand valve**

valve that is governed by the breathing action of lungs and that supplies *breathable gas* (3.29) on demand

3.68**desorption**

process in which one substance (the filter medium) releases an absorbed or adsorbed substance

3.69**dew point**

temperature of air at a specified pressure below which condensation will occur

3.70**doffing**

process of removing or taking off the *respiratory protective device* (3.203)

3.71**donning**

process of putting on the *respiratory protective device* (3.203)

3.72**downstream valve**

valve that opens with the pressure of the air and is normally kept shut by means of a spring

3.73**drip**

to run or fall in drops or blobs

3.74**dynamic breathing resistance**

differential pressure caused by a *respiratory protective device* (3.203) when the *breathable gas* (3.29) is delivered by a *breathing machine* (3.38) adjusted to a specified *breathing minute volume* (3.153) and waveform

3.75**dynamic flame test**

test where the specimen is moving over the flame for the exposure

3.76**elastance**

E

pressure change resulting from a volume change

Note 1 to entry: It is expressed in kPa/l.

3.77

end-of-service-life indicator

ESLI

system that warns the *wearer* (3.257) of the *gas filtering respiratory protective device* (3.102) of the approach of the end of respiratory protection

3.78

escape respiratory protective device

escape RPD

RPD (3.203) designed to be used only during an escape from *hazardous atmospheres* (3.108)

3.79

exhalation valve

non-return valve that allows the release of exhaled and excess *breathable gas* (3.29) from the *respiratory protective device* (3.203)

3.80

exhaled air

air breathed out by the *wearer* (3.257)

3.81

exposed part

part that can be touched in an as-worn state by the exposed surface identification probe specified in ISO 16900-5

3.82

face blank

main body of a *facepiece* (3.83) to which the functional components are attached

3.83

facepiece

part of a *respiratory protective device* (3.203) that connects the *wearer's* (3.257) respiratory tract to the other parts of the device and isolates the respiratory tract from *ambient atmosphere* (3.12)

Note 1 to entry: Facepieces may be *full face masks* (3.96), *half masks* (3.104), *quarter masks* (3.192), *mouthpiece assemblies* (3.157) or *filtering facepieces* (3.89).

Note 2 to entry: *Helmets* (3.113), *hoods* (3.115), *blouses* (3.23) and suits may serve the same purpose.

3.84

face-seal leakage

leakage between the *wearer's* (3.257) face and the *respiratory interface* (3.202)

3.85

field of vision

area of fixed sight while wearing a *respiratory protective device* (3.203)

3.86

filter

device intended to remove specific *contaminants* (3.59) from the ambient air passing through it

3.87

filter holder

filter housing

component that is attached to either a *respiratory interface* (3.202) or another part of the *respiratory protective device* (3.203) and into which a *filter* (3.86), either encapsulated or un-encapsulated, is inserted

3.88**filter self rescuer**

respiratory protective device (3.203) exclusively intended for escape, incorporating a *filter* (3.86) against carbon monoxide through which the ambient air is drawn to a *facepiece* (3.83)

3.89**filtering facepiece**

respiratory protective device (3.203) entirely or substantially constructed of filtering material

Note 1 to entry: Marked "FF" for filtering facepiece.

3.90**filtering respiratory protective device****filtering RPD**

assisted or unassisted *RPD* (3.203) in which air passes through a *gas filter(s)* (3.98), *particle filter(s)* (3.171) or *combined filter(s)* (3.50) before being inhaled

3.91**fit test**

use of a challenge agent and specific protocol to qualitatively or quantitatively determine the effectiveness of the seal between the *wearer's* (3.257) face and *respiratory interface* (3.202) with a specific make, model and size of a *respiratory protective device* (3.203)

3.92**flow rate**

V_{fl}

volume (mass) of *breathable gas* (3.29) passing through the device in a given time

3.93**fogging**

reduction of the *field of vision* (3.85) and/or visual acuity caused by the condensation of humidity on the *visor* (3.252)

3.94**force-fitting**

practice of repeating a failed *fit test* (3.91) with the same *respiratory protective device (RPD)* (3.203) more than three times, re-donning, or otherwise adjusting the RPD (e.g. over-tightening the straps), until a passing fit test is finally achieved

3.95**fresh air hose breathing apparatus**

respiratory protective device (3.203) in which *breathable air* (3.28) is obtained through an *air supply hose* (3.9) either assisted or unassisted

3.96**full face mask**

tight-fitting respiratory interface (3.241) covering the mouth, nose, eyes and chin

3.97**gas**

fluid that is in a gaseous state at a standard temperature and pressure that expands to occupy the space or enclosure in which it is confined

3.98**gas filter**

filter (3.86) intended to remove specific *gases* (3.97) and *vapours* (3.251) from the atmosphere passing through it

3.99

gas filter capacity

mass or volume of a specific test agent that is removed or retained by a *gas filter* (3.98) or *combined filter* (3.50) under specified conditions of temperature, humidity, challenge test gas concentration and *flow rate* (3.92) at *breakthrough concentration* (3.26)

Note 1 to entry: The mass or volume is determined by measuring the *breakthrough time* (3.27) at a defined breakthrough concentration. The formula to calculate the gas capacity (3.44) is:

$$C = V_{fl} \times c_{gas} \times t_{br} \times 10^{-6}$$

where

C is gas capacity (in l);
 V_{fl} is volume *flow rate* (3.92) (in l/min);
 c_{gas} is gas concentration (in ml/m³);
 t_{br} is *breakthrough time* (3.27) (in min).

EXAMPLE $V_{fl} = 30$ l/min
 $c_{gas} = 1\,000$ ml/m³
 $t_{br} = 30$ min
 $C = 30$ l/min $\times$ $1\,000$ ml/m³ $\times$ 30 min $\times$ $10^{-6} = 0,9$ l

3.100

gas filter change schedule

time interval after which a *gas filter* (3.98) is replaced with a new one

3.101

gas filter validation test at specified flow rates

test to evaluate the ability of the *filter* (3.86) to achieve a minimum performance level at its *work rate* (3.260) classification

3.102

gas filtering respiratory protective device

gas filtering RPD

RPD (3.203) consisting of a *respiratory interface* (3.202) with a *filter* (3.86) that removes certain *gases* (3.97) or *vapours* (3.251) from the air to be inhaled by the *wearer* (3.257) for a limited period

3.103

hairnet

head net

head harness (3.110) in the form of a net (mesh fabric)

3.104

half mask

tight-fitting respiratory interface (3.241) covering the mouth, nose and chin

3.105

half mask without inhalation valves

filtering device with a *half mask* (3.104) and without *inhalation valves* (3.120), which may or may not have *exhalation valves* (3.79)

Note 1 to entry: It comprises a half mask and separable and replaceable *filters* (3.86).

3.106**hand wheel diameter***D*

nominal value of twice the largest radius from the centre of the hand wheel

Note 1 to entry: It is expressed in mm.

3.107**hazard ratio**measured airborne concentration of a substance divided by the *occupational exposure limit* (3.163)Note 1 to entry: This ratio is calculated for each *gas* (3.97), *vapour* (3.251) and/or particulate component, or for a mixture when the components have additive effects.**3.108****hazardous atmosphere**

any atmosphere that is oxygen-deficient and/or where the level of substances in the atmosphere is at a concentration deemed to be hazardous

3.109**hazardous substance**

substance that presents a potential to cause injury or ill health if it is inhaled, ingested or comes into contact with, or is absorbed through, the skin

Note 1 to entry: A hazardous substance may be a pure substance or generated as a by-product during work activities. For example, wood dust and stone dust welding fume.

Note 2 to entry: Hazardous substances can be present in the atmosphere in a number of physical states as:

- a) *gases* (3.97);
- b) *vapours* (3.251);
- c) *particles* (3.170).

3.110**head harness**means of holding a *respiratory interface* (3.202) in place on the head**3.111****heads up display****HUD**visual *monitor* (3.155) or warning in the line of sight of the *wearer* (3.257)**3.112****heavy duty construction**mechanical properties of a *respiratory protective device* (3.203) designed to be used in work situations with need for a mechanically robust deviceNote 1 to entry: See also *light duty construction* (3.131).**3.113****helmet***respiratory interface* (3.202) offering head protection**3.114****high pressure**

pressure equal to or greater than 2 MPa absolute pressure

3.115**hood***loose-fitting respiratory interface* (3.132) that covers at least the face and can cover the entire head

3.116

hose

hollow flexible conduit to transport *breathable gas* (3.29)

3.117

hydrostatic test

calibrated expansion pressure test of the structural integrity of cylinders

3.118

immediately dangerous to life or health

IDLH

atmosphere that poses an immediate threat to life, would cause irreversible adverse health effects, or would impair an individual's ability to escape from a *hazardous atmosphere* (3.108)

3.119

impact resistance

ability of a *respiratory protective device* (3.203) to withstand mechanical shock and dynamic stress from the environment

3.120

inhalation valve

valve that opens during inhalation and closes during exhalation

3.121

inhaled breathable gas

breathable gas (3.29) breathed in by the *wearer* (3.257)

3.122

inspection

process that assesses the *respiratory protective device (RPD)* (3.203), components, *marking* (3.139), information supplied by the *RPD manufacturer* (3.206) and any safety data sheets (if applicable) or declarations relevant to the materials used in its construction

3.123

integral dose

volume of the test *gas* (3.97) on the effluent side of the *filter* (3.86) released during the testing period

Note 1 to entry: This is calculated as the integral of the instant effluent concentration (function of time) of the test gas during the testing time multiplied by the volume *flow rate* (3.92).

3.124

integral filter

filter (3.86) that is not separable from the rest of the *respiratory interface* (3.202)

3.125

interactive flow

flow resulting from the combined action of a power-assisted device and a tidal breathing pattern at the *respiratory interface* (3.202)

3.126

interactive flow rate

flow rate (3.92) through the *filters* (3.86) of an *assisted filtering respiratory protective device (RPD)* (3.18) resulting from the combined action of the assisted filtering RPD and the breathing pattern generated by the *breathing machine* (3.38)

3.127

intrinsic safety

(type of) protection where the *respiratory protective device* (3.203) is not a source of ignition in explosive atmospheres

3.128**inward leakage**

leakage of the *ambient atmosphere* (3.12) into the *respiratory interface* (3.202) from all sources excluding the *filter(s)* (3.86), where present, when measured in the laboratory in the specific test atmosphere

Note 1 to entry: It is expressed as a percentage ratio of *contaminant* (3.59) concentration inside a *respiratory protective device* (3.203) and ambient atmosphere.

3.129**leak-tightness**

ability to withstand a loss of pressure inside a *respiratory protective device* (3.203) over a given time as determined by a laboratory test

3.130**life cycle**

time between the date of manufacturing of the device to the date when the device has to be withdrawn from service

3.131**light duty construction**

mechanical properties of a *respiratory protective device* (3.203) designed to be used in work situations with little risk of mechanical damage

Note 1 to entry: See also *heavy duty construction* (3.112).

3.132**loose-fitting respiratory interface****loose-fitting RI**

RI (3.202) that does not rely on forming a complete seal to the *wearer's* (3.257) skin

3.133**low boiling organic compound**

organic compound having a boiling point of ≤ 65 °C at atmospheric pressure

3.134**low pressure**

pressure up to 100 hPa above atmospheric pressure

3.135**lung governed demand valve**

valve for *breathing apparatus* (3.32) by which an air supply is regulated in accordance with the *wearer's* (3.257) breathing

3.136**manufacturer's design duration**

time, as stated by the manufacturer, for which the *manufacturer's minimum design flow rate* (3.138) is exceeded

3.137**manufacturer's minimum design condition**

lowest level of operating conditions of the device, as stated by the manufacturer, at which the complete *respiratory protective device* (3.203) will still meet the requirements for the designated class

3.138**manufacturer's minimum design flow rate**

minimum air *flow rate* (3.92), as stated by the manufacturer, at which the class requirements are met

3.139**marking**

information included on the device to indicate specific *respiratory protective device* (3.203) characteristics

3.140

mass median aerodynamic diameter

MMAD

point in an aerodynamic particle size distribution where half of the mass lies in *particles* (3.170) with a diameter less than the MMAD and half in particles with a diameter greater than the MMAD

3.141

maximum flow condition

factors appropriate to the design specified by the manufacturer that give rise to the highest *flow rate* (3.92)

3.142

maximum use concentration

MUC

maximum atmospheric concentration of a *hazardous substance* (3.109) from which the *wearer* (3.257) can be expected to be protected when wearing a *respiratory protective device (RPD)* (3.203)

Note 1 to entry: This is determined by the *assigned protection factor* (3.17) of the RPD or class of RPD and the *occupational exposure limit* (3.163) of the hazardous substance.

Note 2 to entry: The MUC can usually be determined mathematically by multiplying the assigned protection factor specified for an RPD by the occupational exposure limit used for the hazardous substance.

3.143

measured maximum flow rate

volumetric flow rate (3.92) of an *assisted filtering respiratory protective device (RPD)* (3.18), determined in a laboratory test, when the RPD (3.203) is in the condition that results in the highest air flow rate

Note 1 to entry: This condition takes into account the influence of temperatures, settings of RPD, pre-conditionings, use of accessories and others.

3.144

measured minimum flow rate

volumetric flow rate (3.92) of an *assisted filtering respiratory protective device (RPD)* (3.18), determined in a laboratory test, when the RPD (3.203) is in the condition that results in the lowest air flow rate

Note 1 to entry: This condition takes into account the influence of temperatures, settings of RPD, pre-conditionings, use of accessories and others.

3.145

mechanical strength of the visor

ability of the device to withstand *mechanical stress* (3.146) to the *visor* (3.252)

3.146

mechanical stress

dynamic force on the device during a fall from a given height as determined by a laboratory test

3.147

medium pressure

pressure between 100 hPa to 2 MPa above atmospheric pressure

3.148

medium pressure connecting tube

tube (3.245) connecting the *demand valve* (3.67) or the control valve with the air supply system at a *medium pressure* (3.147)

3.149

metabolic simulator

programmable automatic *breathing machine* (3.38) that can simulate the characteristics of both human breathing [variable *tidal volume* (3.240) and respiratory rate, humidity and temperature] and metabolic functions [variable *oxygen consumption* (4.5) and carbon dioxide production]

3.150**metabolic simulator assembly**

metabolic simulator (3.149) plus all the connecting *tubes* (3.245), control valves and other necessary hardware leading to the *trachea tube assembly* (3.244)

3.151**minimum flow condition**

factors appropriate to the design specified by the manufacturer that give rise to the lowest *flow rate* (3.92)

3.152**minute ventilation**

V_E

total volume of air inhaled (or exhaled) in the lungs during 1 min

Note 1 to entry: It is expressed in l/s *body temperature pressure saturated (BTPS)* (3.25).

3.153**minute volume**

volume of *breathable gas* (3.29) exhaled in 1 min

3.154**mode of operation**

primary means of supplying the *wearer* (3.257) with *breathable gas* (3.29), i.e. particle filtering, gas and vapour filtering, or breathable-gas supplying

3.155**monitor**

component of a *respiratory protective device* (3.203) to enable the *wearer* (3.257) to continuously assess that the manufacturer's minimum design air *flow rate* (3.92) or *manufacturer's minimum design conditions* (3.137) are met

3.156**mounting flange**

device to fix tightly together a *full face mask* (3.96) and a *helmet* (3.113)

3.157**mouthpiece assembly**

respiratory interface (3.202) held by the teeth or by the teeth and a *head harness* (3.110), sealing against the lips and through which air is inhaled and exhaled while the nose is closed by a clip

3.158**multi-functional respiratory protective device****multi-functional RPD**

RPD (3.203) that is capable of operating within its *mode of operation* (3.154) using different operating methods, for example:

- *assisted filtering RPD* (3.18);
- power on/off;
- compressed *breathable gas* (3.29) system with compressed breathable gas RPD

3.159**multiple filters**

construction where the full air flow for a *respiratory protective device* (3.203) is divided between two or more *filters* (3.86)

3.160**multi-type gas filter**

gas filter (3.98) that meets the requirements of more than one type of gas filter

3.161

negative pressure

pressure inside the *respiratory interface* (3.202), *hose* (3.116), etc. that is lower than that of the *ambient atmosphere* (3.12)

3.162

nominal working duration

rated working duration

working time of a device, used for the classification determined in laboratory tests with a specified *flow rate* (3.92)

Note 1 to entry: The nominal or rated working duration does not give an indication of the possible effective working duration of a device in practical use. Possible effective working durations can differ from the nominal or rated working duration in both directions, positive and negative, depending upon the actual *work rate* (3.260).

3.163

occupational exposure limit

OEL

maximum concentration of airborne *contaminants* (3.59) deemed to be acceptable, as defined by the authority having jurisdiction

3.164

open-circuit

technical solution where the *exhaled air* (3.80) passes without recirculation into the *ambient atmosphere* (3.12)

3.165

operating pressure

pressure developed within the *respiratory protective device* (3.203) during service

3.166

overflow valve

non-return valve, fitted to the *breathing hose* (3.37), that is specially designed to allow the excess air supply to escape into the atmosphere

3.167

oxygen compatibility

capability of a *respiratory protective device* (3.203) to allow direct contact with pressurised oxygen without risk of fire or explosion by being oil and grease free

3.168

oxygen deficiency

condition based on an oxygen concentration or *partial pressure* (4.17) below which a person can be adversely affected

Note 1 to entry: Each authority having jurisdiction may establish an alternative definition or specific limit.

3.169

oxygen-enriched breathable gas

breathable gas (3.29) containing oxygen at a higher concentration than that of atmospheric air at sea level

3.170

particle

solid or liquid substance in the finely divided state

3.171

particle filter

filter (3.86) that is intended to remove airborne *particles* (3.170)

3.172**particle filter efficiency**

degree to which a *filter* (3.86) removes *aerosols* (3.6) from the *ambient atmosphere* (3.12)

3.173**particle filter respiratory protective device****particle filter RPD**

device consisting of a *respiratory interface* (3.202) with a *particle filter* (3.171) that removes finely divided *particles* (3.170) from the air to be inhaled by the *wearer* (3.257)

Note 1 to entry: The filter medium may be replaceable or be an integral part of the construction.

3.174**peak inspiratory flow rate**

highest instantaneous *flow rate* (3.92) during the inhalation phase of a *breathing cycle* (3.34)

Note 1 to entry: It is expressed in l/s *body temperature pressure saturated (BTPS)* (3.25).

Note 2 to entry: l/s is the preferred unit as the flow takes place during only a short fraction of the breathing cycle.

3.175**pendulum-type respiratory protective device****pendulum-type RPD**

RPD (3.203) in which the *wearer* (3.257) alternatively inhales and exhales by the same route

3.176**peripheral isopter**

field of vision (3.85) while wearing a *respiratory protective device* (3.203), indicated by the lighted area, which is measured by a solid line connecting the points

3.177**permeation**

process by which a chemical moves through a *respiratory protective device* (3.203) material on a molecular level (diffusion)

3.178**porous device**

respiratory protective device (3.203) incorporating materials, excluding *filters* (3.86), that can be penetrated by *gases* (3.97) and *vapours* (3.251) during an inward leakage test leading to an increase of the *inward leakage* (3.128)

3.179**positive pressure**

pressure inside the *respiratory interface* (3.202), *hose* (3.116), etc. that is higher than that of the *ambient atmosphere* (3.12)

3.180**powered filtering respiratory protective device****powered filtering RPD**

filtering RPD (3.90) in which air is moved through the *filter(s)* (3.86) by means of a blower to supply the *wearer* (3.257) with *breathable air* (3.28)

3.181**powered fresh air hose breathing apparatus incorporating a hood**

apparatus that is not self-contained and in which breathable fresh air is blown from an air source by means of a powered air supply to the *hood* (3.115)

3.182**practical performance**

evaluation of a *respiratory protective device* (3.203) during the simulation of typical work or escape activities in a laboratory

3.183

prefilter

filter (3.86) intended to remove coarse *particles* (3.170) before they enter the filter

3.184

pressure reducer

device that reduces pressure to a lower pressure

3.185

protection class

PC

numerical designation from PC1 to PC6 allocated to an individual *respiratory protective device* (3.203) based upon laboratory testing indicating its relative protection

3.186

protection level

degree of respiratory protection allocated to a *respiratory protective device (RPD)* (3.203) for the purposes of selection and use that is expected to be provided to *wearers* (3.257) when used within an effective *RPD programme* (3.207)

3.187

psychological impact on the wearer

positive and negative influences on the *wearer's* (3.257) state of mind from wearing the *respiratory protective device* (3.203) or by its appearance and/or design

3.188

qualitative fit factor

QLFF

qualitative estimate of the minimum fit of a particular *tight-fitting respiratory interface* (3.241) to a specific individual when a *qualitative fit test* (3.189) is passed, i.e. the test agent is not detected by the subject's senses

3.189

qualitative fit test

QLFT

pass/fail test method that relies on the subject's sensory response to detect a challenge agent in order to assess the adequacy of a *respiratory protective device* (3.203) fit

3.190

quantitative fit factor

QNFF

numeric value of the fit of a particular *tight-fitting respiratory interface* (3.241) to a specific individual

Note 1 to entry: It represents only the *respiratory interface* (3.202) to face leakage. Leakage from other sources [e.g. air-purifying elements, *exhalation valve* (3.79)] should be significantly lower than the measured *face-seal leakage* (3.84). The QNFF is measured with specialized instrumentation.

3.191

quantitative fit test

QNFT

test method that uses an instrument to assess (quantify) the amount of *face-seal leakage* (3.84) into the *respiratory protective device* (3.203) in order to assess the adequacy of its fit

3.192

quarter mask

tight-fitting respiratory interface (3.241) covering the mouth and nose

3.193

rated filling pressure

maximum allowable pressure to which the valved pressure vessel is intended to be filled

3.194**rated working pressure**

maximum allowable pressure for which the apparatus is designed

3.195**ready for assembly state**

component with seals, plugs or other environmental protective means, if applicable, still in place

3.196**ready for use configuration**

complete *respiratory protective device* (3.203), which may not be fully assembled, but is in a state which allows the immediate start of the *donning* (3.71) procedure as described by the manufacturer

3.197**ready for use packaging**

means to protect the functional components from environmental stress while the device is kept in a state that permits rapid *donning* (3.71) by the *wearer* (3.257)

3.198**ready for use state**

respiratory protective device (RPD) (3.203) ready to be *donned* (3.71) as described by the manufacturer

Note 1 to entry: In line with the information supplied by the manufacturer for donning the RPD, further actions can be necessary.

3.199**reconstituted air**

gaseous mixture prepared from pure liquid or gaseous oxygen and pure liquid or gaseous nitrogen

3.200**relief valve**

valve to release overpressure

3.201**required fit factor****RFF**

numeric value established as a pass/fail point or acceptance criterion for *quantitative fit testing* (3.191)

3.202**respiratory interface****RI**

part of a *respiratory protective device* (RPD) (3.203) that forms the protective barrier between the *wearer's* (3.257) respiratory tract and the *ambient atmosphere* (3.12)

Note 1 to entry: The RI is connected to the filtering part of the RPD or the part managing the supply of *breathable gas* (3.29).

3.203**respiratory protective device****RPD**

personal protective equipment designed to protect the *wearer's* (3.257) respiratory tract against the inhalation of *hazardous atmospheres* (3.108)

3.204**respiratory protective device head form****RPD head form**

laboratory test head simulating human heads used in testing a *respiratory protective device* (3.203)

3.205

respiratory protective device head form assembly

RPD head form assembly

RPD head form ([3.204](#)) with *trachea tube assembly* ([3.244](#)) included

3.206

respiratory protective device manufacturer

RPD manufacturer

natural or legal person, who:

- designs and/or manufactures an *RPD* ([3.203](#)) or who has an *RPD* designed and/or manufactured with a view to placing it on the market or for other use, under his/her own name or trademark;
- places an *RPD* on the market and/or puts it into service, under his/her own name or trademark

3.207

respiratory protective device programme

RPD programme

process of selecting, using and maintaining an *RPD* ([3.203](#)) to ensure adequate protection to the wearer ([3.257](#))

3.208

respiratory protective device programme administrator

RPD programme administrator

individual designated to ensure the development, implementation and maintenance of an *RPD programme* ([3.207](#))

3.209

respiratory protective device tool

RPD tool

device that assists with the testing of an *RPD* ([3.203](#))

3.210

respiratory protective device torso

RPD torso

generic body form used in combination with an *RPD head form* ([3.204](#)) used in testing an *RPD* ([3.203](#))

3.211

respiratory protective device verification tool

RPD verification tool

test device that simulates a specific performance characteristic(s) of an *RPD* ([3.203](#))

Note 1 to entry: The theoretical results from the test device are known and are compared with the actual results obtained in a given test laboratory when the test device is used with the appropriate test system in that laboratory.

3.212

reusable particle or combined filter

particle filter ([3.171](#)) or *combined filter* ([3.50](#)) intended to be used for more than a single shift

3.213

risk assessment

process of hazard, adequacy and *suitability assessments* ([3.233](#)) relating to the selection of a *respiratory protective device* ([3.203](#))

3.214

second high pressure inlet connector

component for emergency purposes that receives *breathable gas* ([3.29](#)) from an alternative *high pressure* ([3.114](#)) *breathable gas* source while in use

3.215**second medium pressure inlet connector**

component of *respiratory protective device* (3.203) to receive *breathable gas* (3.29) from an alternative *medium pressure* (3.147) *breathable gas source*

3.216**second medium pressure outlet connector**

component of *respiratory protective device* (3.203) to supply *breathable gas* (3.29) to a second person for the purpose of rescue

3.217**self-contained breathing apparatus****SCBA**

breathing apparatus (3.32) where the *breathable gas* (3.29) supply is carried by the *wearer* (3.257)

3.218**separator**

device to remove liquids from compressed air

3.219**service life**

time period during which the *respiratory protective device* (3.203) or components are expected to give protection to the *wearer* (3.257)

3.220**service life of gas filter**

time until the breakthrough of *contaminants* (3.59) during actual use

3.221**shelf life**

time a *respiratory protective device (RPD)* (3.203) or RPD component can be stored without deteriorating prior to use when stored in accordance with the information supplied by the *RPD manufacturer* (3.206)

3.222**single use**

respiratory protective device (3.203) or *filter* (3.86) that is not designed for repeated applications after the first use

3.223**single-shift use**

descriptor for identifying a *respiratory protective device (RPD)* (3.203) or RPD component that is not designed for reuse after one shift

Note 1 to entry: The duration of a single shift depends on national/local regulations.

3.224**smoke**

aerosols (3.6) generated by an incomplete combustion consisting of liquid and/or solid *particles* (3.170)

3.225**smoke hood**

respiratory protective device (3.203) for escape only

Note 1 to entry: Function based upon a *filter* (3.86) through which ambient air is drawn to a *hood* (3.115).

3.226**sorption**

process in which one substance (the filter medium) takes up or holds another [the test *gas* (3.97)], either by adsorption or absorption

3.227

special application

requirement related to a specific area(s) of *respiratory protective device* (3.203) use

3.228

spiral coiled tube

tube (3.245) that is manufactured such that being in its relaxed state it assumes a natural spiral coil

3.229

standard temperature pressure dry

STPD

standard condition for the expression of *oxygen consumption* (4.5)

Note 1 to entry: Standard temperature (0 °C) and pressure (101,3 kPa, 760 mmHg), dry air (0 % relative humidity).

3.230

standardized connector

device that allows an optional connection between a *filter* (3.86) and a *respiratory interface* (3.202)

Note 1 to entry: Standardized connectors are defined in ISO 17420-3 and EN 148-1.

3.231

static breathing resistance

differential pressure caused by a *respiratory protective device (RPD)* (3.203) when the *breathable gas* (3.29) is passed through the RPD at a constant flow

3.232

static flame test

test where the specimen is maintained still over the flame for the exposure

3.233

suitability assessment

selection method identifying a *respiratory protective device* (3.203) able to provide adequate protection during intended use, taking into consideration the *wearer* (3.257), the *task* (3.237) and the workplace environment

3.234

suitable respiratory protective device

suitable RPD

RPD (3.203) that is adequate and is matched to the requirements of the *wearer* (3.257), the *task* (3.237) and the working environment

3.235

supervisor

employer or a person assigned by the employer having responsibility for the *wearer* (3.257) and control over the workplace

3.236

supplied breathable gas respiratory protective device

supplied breathable gas RPD

RPD (3.203) that supplies the *wearer* (3.257) with *breathable gas* (3.29) from a source independent of the *ambient atmosphere* (3.12) either individually carried or supplied by a stationary source

3.237

task

working activity to be undertaken by the *wearer* (3.257)

3.238

temperature of operation

environmental temperature during the expected conditions of use

3.239**test subject**

human being selected from a panel used for testing a *respiratory protective device* (3.203)

3.240**tidal volume**

V_T

size of a breath

Note 1 to entry: It is expressed in litres.

3.241**tight-fitting respiratory interface****tight-fitting RI**

RI (3.202) that forms a protective barrier between the *wearer's* (3.257) respiratory tract and the *ambient atmosphere* (3.12) by forming a seal to the wearer's skin

3.242**time-weighted average****TWA**

average concentration of a *contaminant* (3.59) in air during a specific time period

3.243**total inward leakage****TIL**

leakage of the *ambient atmosphere* (3.12) into the *respiratory interface* (3.202) from all sources including *filter(s)* (3.86), where present, or a *respiratory protective device* (3.203), when measured in a laboratory in the specific test atmosphere

Note 1 to entry: It is expressed as a percentage ratio of *contaminant* (3.59) concentration inside an RPD and ambient atmosphere.

3.244**trachea tube assembly**

tube (3.245) that simulates the human trachea, containing ports for the measurement of pressure, carbon dioxide content and temperature of breathed *breathable gas* (3.29) and interface connections permitting seating to the *RPD head form* (3.204), *RPD torso* (3.210) or alternative (benchtop) fixture

3.245**tube**

hollow conduit to carry *breathable gas* (3.29) at pressures in excess of the ambient pressure

3.246**unassisted filtering respiratory protective device****unassisted filtering RPD**

filtering RPD (3.90) in which air is drawn through the *filter(s)* (3.86) solely by the breathing of the *wearer* (3.257)

3.247**unencapsulated filter**

filter (3.86) that in itself is not contained in a rigid housing

3.248**user**

person or organization who makes use of *respiratory protective device* (3.203), e.g. those involved in selecting, maintaining and wearing

3.249

validated method

documented procedure that has been scientifically evaluated by qualified persons and determined to be appropriate and acceptable with regards to reproducibility, accuracy, precision and other necessary parameters

3.250

valved filtering half mask

respiratory protective device (3.203) fitted with *exhalation valves* (3.79) and *inhalation valves* (3.120)

3.251

vapour

gaseous phase of a substance that is liquid or solid at 20 °C and 100 kPa (absolute)

3.252

visor

part of the *respiratory interface* (3.202) through which the *wearer* (3.257) sees and that can, in addition, provide eye and face protection

3.253

visual clarity

measure of a *visor(s)* (3.252) to affect the sight within the *field of vision* (3.85) of a *respiratory protective device* (3.203)

3.254

visual field score

VFS

summation of grid points contained within the *peripheral isopter* (3.176) shadow cast onto the *apertometer* (3.15) by the *respiratory protective device* (3.203)

3.255

volume-averaged pressure

WOB/V_T

work of breathing (3.259) divided by its *tidal volume* (3.240)

Note 1 to entry: It is expressed in kPa.

Note 2 to entry: The WOB/V_T can be determined separately for an inspiration, an expiration or for a whole breath.

3.256

warning device

device to inform the *wearer* (3.257) that the *respiratory protective device* (3.203) will soon stop or has already stopped operating at the desired conditions

Note 1 to entry: This informs the *user* (3.248) to take some action.

3.257

wearer

person who actually wears the *respiratory protective device* (3.203)

3.258

wearer-seal check

action conducted by the *wearer* (3.257) to determine if the tight-fitting *respiratory protective device* (3.203) is properly *donned* (3.71) and sealed on the face

3.259

work of breathing

WOB

work required for an entire *breathing cycle* (3.34)

Note 1 to entry: It is expressed in Joules.

3.260**work rate**

demand for *breathable gas* (3.29) by the *wearer* (3.257) per time due to workload

3.261**work rate class**

numerical designation from W1 to W4 allocated to an individual *respiratory protective device* (3.203) based upon laboratory testing indicating its relative ability to meet the *wearer's* (3.257) demand for *breathable gas* (3.29) at different activity levels

3.262**working pressure**

settled pressure of a compressed *gas* (3.97) at a uniform reference temperature of 15 °C in a full gas cylinder

Note 1 to entry: It is expressed in bar.

4 Terms related to human factors**4.1****aerobic energy production**

biochemical process in human cells that delivers energy by combustion of fat, carbohydrates and, to a lesser extent, protein in the presence of oxygen, with water and carbon dioxide as end products

4.2**anaerobic energy production**

biochemical process in human cells that delivers energy by combustion of carbohydrates without oxygen, with lactic acid as the end product

4.3**ambient temperature pressure saturated****ATPS**

standard condition for the expression of *ventilation* (4.20) parameters related to expired air

4.4**ambient temperature pressure humidity****ATPH**

standard condition for the expression of *ventilation* (4.20) parameters related to inspired air

4.5**oxygen consumption**

V_{O_2}

amount of oxygen consumed by human tissues for *aerobic energy production* (4.1)

Note 1 to entry: It is expressed in l/min *standard temperature pressure dry (STPD)* (3.229).

4.6**physical work capacity**

ability of a person to engage in muscular work

4.7**alveoli****s. alveolus**

terminal air sacs of the lungs in which respiratory *gas* (3.97) exchange occurs between the alveolar air and the pulmonary capillary

Note 1 to entry: The alveoli are the anatomical and functional unit of the lungs.

4.8
carbaminohaemoglobin
HbCO₂

haemoglobin (4.11) that has bound carbon dioxide at the tissue site for transport to the lungs

4.9
dyspnoea
sense of air hunger, difficult or laboured breathing, or a sense of breathlessness

4.10
end-tidal carbon dioxide
ET CO₂
volume fraction of carbon dioxide in the breath at the mouth at the end of exhalation

Note 1 to entry: End-tidal carbon dioxide corresponds closely to alveolar carbon dioxide.

4.11
haemoglobin
Hb
specific molecules contained within all red blood cells that bind oxygen or carbon dioxide under normal physiological states and transport either oxygen or carbon dioxide to or from the tissues of the body

4.12
hyperoxia
volume fraction or *partial pressure* (4.17) of oxygen in the breathing environment greater than that which is found in the Earth's atmosphere at sea level, which contributes to an excess of oxygen in the body

Note 1 to entry: This can occur when a person is under hyperbaric conditions (i.e. diving), subjected to *breathable gas* (3.29) mixtures with an elevated oxygen fraction, or during certain medical procedures.

4.13
hypocapnia
volume fraction or *partial pressure* (4.17) of carbon dioxide in the breathing environment or in the body that is lower than that which is found in the Earth's atmosphere at sea level

Note 1 to entry: This usually occurs under *hyperventilation* (4.34) conditions (i.e. diving) or in medical settings that contribute to a reduction of carbon dioxide in the body.

4.14
inotropic
affecting the force of muscle contraction

Note 1 to entry: A negative inotropic effect reduces and a positive inotropic effect increases the force of muscular contraction (e.g. both skeletal and heart muscle).

4.15
medulla oblongata and pons
areas of the brain where the respiratory control centre is located

4.16
oxyhaemoglobin
HbO₂
haemoglobin (4.11) that has bound oxygen from the lungs for transport to the body tissues

4.17

partial pressure

pressure exerted by each of the components of a *gas* (3.97) mixture to form a total pressure

EXAMPLE Air is a mixture of oxygen, nitrogen, carbon dioxide, inert gases (argon, neon) and water vapour. The volume fraction of oxygen in air is about 20,9 %. At sea level, total atmospheric pressure is 101,3 kPa (760 mmHg). Water vapour pressure is 6,26 kPa (47 mmHg) (fully saturated in the lungs at a body temperature of approximately 37 °C). To find the partial pressure of oxygen, subtract vapour pressure from total atmospheric pressure and then multiply the oxygen volume fraction by the dry atmospheric pressure. Thus, $101,3 - 6,3 = 95,1$ kPa ($760 \text{ mmHg} - 47 \text{ mmHg} = 713 \text{ mmHg}$); $0,21 \times 95,1 \text{ kPa} = 19,9 \text{ kPa}$ ($= 149 \text{ mmHg}$). If the ambient pressure increases (as in diving), the partial pressure of each component gas increases. Thus, at 2 atm absolute, the partial pressure of oxygen in dry gas is $101,3 \times 2 = 202,6$ kPa ($760 \text{ mmHg} \times 2 = 1\,520 \text{ mmHg}$); $0,21 \times 202,6 = 42,6$ kPa ($0,21 \times 1\,520 \text{ mmHg} = 319 \text{ mmHg}$) oxygen.

Note 1 to entry: Partial pressure is dependent on the volume fraction of the component gas.

Note 2 to entry: The partial pressure of a gas can increase or decrease while its relative volume fraction remains the same. Partial pressure drives the diffusion of gas across cell membranes and is, therefore, more important than the relative volume fraction of the gas.

4.18

respiratory quotient

R_Q

ratio of the volume of carbon dioxide exhaled to the volume of oxygen consumed

Note 1 to entry: R_Q is calculated as follows:

$$R_Q = \frac{V_{\text{CO}_2}}{V_{\text{O}_2}}$$

where

V_{CO_2} is the volume of carbon dioxide exhaled;

V_{O_2} is the volume of oxygen consumed.

Note 2 to entry: R_Q gives an estimate of the content of substrate utilization during steady-state respiration and *metabolism* (4.36). At rest, $R_Q = 0,82$ reflects a substrate utilization of a combination of carbohydrates and fats as the primary energy source.

4.19

respiratory system

tubular and cavernous organs [mouth, trachea, bronchi, lungs, *alveoli* (4.7), etc.] and structures that bring about pulmonary *ventilation* (4.20) and *gas* (3.97) exchange between ambient air and blood

4.20

ventilation

<general> process of exchange of air between the lungs and the ambient environment

4.21

compliance

change in volume of the human lung that results from a change in pressure

Note 1 to entry: It is expressed in l kPa⁻¹.

Note 2 to entry: This term is the typical term for the elastic behaviour of the lungs and chest. Compliance is the inverse of *elastance* (3.76).

4.22

relaxation volume

functional residual capacity

FRC

expiratory reserve volume

ERV

lung volume when respiratory muscles are relaxed, i.e. the volume at the beginning of an inspiration

4.23

vital capacity

VC

volume of the largest breath a person can take, i.e. the volume difference between a maximum inspiration and a maximum expiration

Note 1 to entry: It is expressed in litres *body temperature pressure saturated (BTPS)* ([3.25](#)).

4.24

clo

unit for the expression of the thermal insulation of clothing

Note 1 to entry: 1 clo is equal to 0,155 K m²/W.

4.25

insulation required

IREQ

cold stress index as determined in accordance with ISO 11079

4.26

metabolic rate

physiological energy utilization per unit of time

4.27

predicted heat strain

PHS

heat stress index as determined in accordance with ISO 7933

4.28

aetiopathology

cause of the pathological state or disorder

4.29

anxiety

state of being uneasy, apprehensive or worried about what might happen

4.30

cardiac arrhythmia

variation from the normal rhythm of the heartbeat

4.31

claustrophobia

abnormal fear or dread of being in an enclosed or *confined space* ([3.58](#))

4.32

dysphoria

sensation of disquiet, restlessness or malaise

4.33

hypercapnia

excess amount of carbon dioxide (CO₂) in the blood

4.34**hyperventilation**

increase in overall respiration resulting from an increase in both the depth and frequency of breathing

Note 1 to entry: This can be voluntary or result from an increase in activity, fear or breathing excess carbon dioxide (CO₂).

4.35**hypoxia**

volume fraction or *partial pressure* (4.17) of oxygen in the breathing atmosphere below that found in the atmosphere at sea level

4.36**metabolism**

energy produced in human cells by aerobic or anaerobic processes

4.37**paresthesia**

abnormal sensation without an objective cause, such as numbness, prickling and tingling

4.38**psycho-physical effect**

effect that pertains to the mind and its relation to physical manifestations

4.39**psycho-physiological effect**

psychological trait(s) and responses to a given situation that can provoke a physiological response, and the physiological responses to a given situation that can provoke a psychological reaction

4.40**oxygen saturation****SaO₂**

degree of saturation of *haemoglobin* (4.11) with oxygen in arterial blood

Note 1 to entry: It is expressed as a % of total saturation.

4.41**stereoacuity**

visual clarity (3.253) in three dimensions

4.42**tachycardia**

increased heart rate due to exercise, pain, *anxiety* (4.29) or pathophysiological state

4.43**transcutaneous carbon dioxide****tcCO₂**

level of CO₂ in tissue vasculature, as measured by a transcutaneous CO₂ detector attached to the earlobe

4.44**phobia**

persistent and irrational fear of a specific object, activity or situation that results in a compelling desire to avoid the feared stimulus

4.45**state-trait anxiety inventory**

psychological assessment tool used to determine the presence and type of *anxiety* (4.29) in an individual and to differentiate between situational anxiety (state anxiety) and chronic feelings of anxiety as part of the overall personality structure (trait anxiety)

4.46

hearing

manner in which the brain and central nervous system recognizes and interprets *sounds* ([4.50](#))

4.47

ototoxicity

damage to *hearing* ([4.46](#)) from overexposure to drugs or toxic substances

4.48

noise

unwanted *sound* ([4.50](#))

4.49

presbycusis

gradual sensorineural *hearing* ([4.46](#)) loss due to natural ageing

4.50

sound

form of energy that moves through media in waves of pressure

4.51

sound pressure

local pressure deviation from the ambient atmospheric pressure caused by a *sound* ([4.50](#)) wave

Note 1 to entry: It is expressed in pascals (Pa).

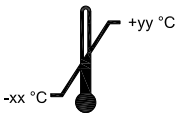
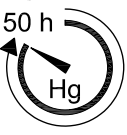
4.52

root mean square sound pressure

RMS sound pressure

deviation from the ambient atmospheric pressure caused by a *sound* ([4.50](#)) wave at an instant in time over a given period of time

5 Graphical symbols for use on respiratory protective devices

No.	Graphical symbol	Symbol title and description	ISO/IEC registration number
5.1		See the information supplied by the <i>RPD manufacturer</i> (3.206)	ISO 7000-1641
5.2	 yyyy/mm	End of <i>shelf life</i> (3.221) Hour glass, with "yyyy" for year and "mm" for month	ISO 7000-2607, modified
5.3	 +yy °C -xx °C	Temperature range of storage conditions	ISO 7000-0632, modified
5.4	 < xx %	Maximum humidity of storage conditions	ISO 7000-0626, modified
5.5		Standardized connector	ISO 14617-15-3085
5.6		Single-shift use (3.223) only Crossed out 2. During one shift, multiple use is allowed.	ISO 7000-1051
5.7	 max 50 h Hg	Maximum time of use of Hg filters	IEC 60417-5417, modified