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Oprema za varovanje dihal – Priporočila za izbiro, uporabo, nego in vzdrževanje – Navodilo

Respiratory protective devices - Recommendations for selection, use, care and maintenance - Guidance document

Atemschutzgeräte - Empfehlungen für Auswahl, Einsatz, Pflege und Instandhaltung - Leitfaden

Appareils de protection respiratoire - Recommandations pour le choix, l'utilisation, l'entretien et la maintenance - Guide

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Contents

Foreword

This European Standard (EN 529:2005) has been prepared by Technical Committee CEN/TC 79 "Respiratory protective devices", 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of an identical text or by endorsement, at the latest by March 2006, and conflicting national standards shall be withdrawn at the latest by March 2006.

This European Standard supersedes CR 529:1993.

Users of this European Standard, prepared in the field of application of Article 118A of the EC Treaty, should be aware that European Standards have no formal legal relationship with Directives which may have been made under Article 118A of the Treaty. In addition, national legislation in the Member States may contain more stringent requirements than the minimum requirements of a Directive based on Article 118A. Information on the relationship between the national legislation implementing Directives based on Article 118A and this European Standard may be given in a national foreword of the national standard implementing this European Standard.

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Introduction

Hazardous substances such as dusts, fibres, fumes, vapours, gases, micro-organisms and radioactive particulates and gases encountered at work can cause significant damage to health or, in extreme cases, can lead to death. This frequently occurs by the inhalation of harmful levels of hazardous substances that are present in the workplace air. Besides the inhalation exposure dermal exposure to hazardous substances can also lead to local skin damage, and sensitisation, as well as systemic effects.

Similarly exposure to an oxygen deficient atmosphere can lead to death.

Exposure (via all routes - inhalation, dermal and ingestion) to hazardous substances at work should be eliminated or alternative substances which are less hazardous used. Where elimination is not practicable adequate protective measures should be put in place so that exposures are reduced to a minimum.

The use of suitable protective measures at source should be the first choice for minimising the exposure. Such measures protect everyone in the workplace, whereas a respiratory protective device only protects the person who wears it. If adequate protective measures at source or any other administrative measures are not reasonably practicable or found to be inadequate for controlling inhalation exposure then an adequate and suitable respiratory protective device should be used.

Respiratory protective devices are designed to be worn in hazardous environments and should provide wearers with an adequate supply of breathable air or gas. Respiratory protective devices are considered to be at the bottom of the hierarchy of protective measures and should only be used after an acceptable case for their use has been established by way of an appropriate risk assessment.

Fatalities and serious accidents can occur if there is a failure to select and use a respiratory protective device suited to the substances, the wearer, the task and the environment in which the device is used. The failure to maintain the device in good working condition can also lead to similar consequences. These problems should be avoided by implementing a suitably designed respiratory protective device programme.

1 Scope

This European Standard provides guidance on the best practice for establishing and implementing a suitable respiratory protective device programme. It is published to provide a Europe-wide baseline for the selection, use, care and maintenance of respiratory protective devices. It provides guidelines for preparing national guidance in this area. The guidance contained in this European Standard is not intended to be exhaustive, but highlights important aspects to which attention should be given. The recommendations in this European Standard will help to comply with national legislation on this subject where it exists, or with European legislation.

Respiratory protective devices used exclusively in diving and at increased or reduced atmospheric pressures are not covered by this guidance.

2 Normative references

The following referenced documents are indispensable for the application of this European Standard. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 132:1998, *Respiratory protective devices – Definitions of terms and pictograms*

EN 134:1998, *Respiratory protective devices – Nomenclature of components*

3 Terms and definitions

For the purposes of this European Standard, the terms and definitions given in EN 132:1998 and EN 134:1998 and the following apply.

3.1
atmosphere immediately dangerous to life or health
atmosphere in which the concentrations of hazardous substances, including asphyxiants, or the oxygen levels present create one or more of the following conditions:

— immediate threat to life;

— could cause delayed threat to life;

— would cause immediate acute health effects;

— would prevent the respiratory protective device wearer from an unaided escape to safety in case of the device malfunctioning or failing to operate correctly

3.2
assigned protection factor (APF)
level of respiratory protection that can realistically be expected to be achieved in the workplace by 95 % of adequately trained and supervised wearers using a properly functioning and correctly fitted respiratory protective device and is based on the 5th percentile of the Workplace Protection Factor (WPF) data

3.3
breathing zone
space outside the facepiece extending 0,3 m in radius in front of the respiratory protective device wearer's face and centred on the mid-point of a line joining the ears

3.4
competent person
person with suitable and sufficient experience and with practical and theoretical knowledge of the elements of respiratory protective device programme for which that person is responsible

3.5
emergency breathing facility
facility, as specified by the respiratory protective device manufacturer, coming into operation when the normally operating respiratory protective device is not functioning. The facility provides an adequate level of protection for a period to enable the device wearer to exit the work area, unassisted, to a place of safety

3.6
nominal protection factor
number derived from the maximum percentage of total inward leakage permitted in relevant European Standards for a given class of respiratory protective device. The relationship between nominal protection factor and total inward leakage can be expressed as follows:

$$\text{nominal protection factor} = \frac{100}{\text{permitted maximum percentage total inward leakage}}$$

3.7
maximum allowed occupational exposure limit
limit of the time weighted average concentration of hazardous substances in the air within the breathing zone of a worker in relationship to a specified reference period

3.8
specified reference period
specified time for the purposes of time-weighting the exposure concentration as stated for the occupational exposure limit value of hazardous substances. The specified reference period for the long-term limit value is normally 8 h and for the short-term limit value is normally 15 min

3.9
peak inhalation rate
maximum instantaneous volume flow rate which occurs during an inhalation cycle of a respiratory protective device wearer

3.10
respiratory protective device passport
document for recording the details of initial and refresher training provided to a respiratory protective device wearer

3.11
workplace protection factor
ratio between the breathing zone (see 3.3) concentration (outside the facepiece) of a chosen hazardous substance and its concentration inside the facepiece (suitable sampler being placed as near as possible to the mouth of respiratory protective device wearer) of a correctly functioning respiratory protective device when correctly worn and used in the work place. The workplace protection factor may be expressed as:

$$\text{workplace protection factor} = \frac{\text{concentration within the breathing zone (outside the facepiece)}}{\text{concentration inside the facepiece}}$$

3.12
work rate
physiological load (strain) imposed on an individual respiratory protective device wearer due to his work rate can be defined in terms of the maximal oxygen uptake rate in l/min. The rate of oxygen uptake due to work rate can be categorised into light, moderate, heavy and very heavy metabolic rates (watts)

NOTE Metabolic rate may be calculated using the international standard method (see EN ISO 8996).

4 Classification

4.1 General classification

There are two distinct types of respiratory protective devices:

a) Filtering devices: These purify the ambient air to be breathed using filters able to remove contaminants in the air.

b) Breathing apparatus: These supply the wearer with breathable air (e.g. compressed air), or breathable gas, (e.g. compressed oxygen) from an uncontaminated source.

Details of different types of devices are given in Annex A.

4.2 Main components

4.2.1 General

A respiratory protective device consists of two main components, a facepiece and filter(s) or a facepiece and a means of supplying uncontaminated breathable air or gas.

4.2.2 Facepieces

The facepiece directs the uncontaminated breathable air or gas to the wearer's nose and mouth area. Filtering devices and breathing apparatus are available with a range of different facepieces but there are some important limitations.

— Tight-fitting facepieces (filtering facepieces, quarter masks, half masks and full face masks) rely heavily on a good seal between the mask and the wearer's face. Full face masks, half masks and quarter masks may be used for both types of devices as described in 4.1.

— Loose-fitting facepieces (e.g. hoods, helmets, visors, blouses, suits) rely on enough air being provided to prevent contaminants leaking into the facepiece as the wearer breathes and moves about. They are only used on powered filtering devices or with suitable breathing apparatus. In other words, loose-fitting facepieces are not suitable for devices which rely on the breathing action of the wearer to draw air. These include unpowered filtering devices and some breathing apparatus.

— Mouthpieces are used with certain devices. They make any form of verbal communication impossible. They are used in conjunction with a nose clip.

4.2.3 Filters

Filtering devices should have the correct type of filter(s) matched to the substance(s) from which the wearer needs protection. The filters can only protect against limited concentration ranges of contaminants as specified by the manufacturers. The filter can be for protection against particles (particle filters), gases/vapours (gas filters) and for protection against particles and gases/vapours (combined filters). Further details are given in A.2.

4.2.4 Breathable air or gas supply source for breathing apparatus

A source (e.g. chemical oxygen generator or compressed air line) or a vessel (e.g. a gas cylinder) which is capable of supplying uncontaminated breathable air or gas to a breathing apparatus. The quality of the compressed air for breathing apparatus should be in accordance with EN 12021. Further details are given in A.4.5.

5 Programme process

5.1 Employers and self-employed persons responsibilities

5.1.1 Programme policy

The employer and self-employed persons have legal responsibilities for the correct selection, maintenance and issue of respiratory protective devices and the management of their correct use in the workplace. Therefore, they should define and document a suitable policy for a respiratory protective device programme including the objectives for the programme.

The policy should be relevant to the needs of the organisation and adequate for the health and safety risks involved. The policy should be understood at all levels in the organisation.

When developing the policy the employer should involve the device wearers and their representatives.

NOTE The responsibilities of the employer are detailed in the Directive 89/656/EEC.

5.1.2 Provision of respiratory protective devices

There is no charge to the employee when a respiratory protective device is provided.

5.1.3 Organisation

The people tasked with the responsibility, authority, implementation and running of an effective respiratory protective device programme should be able to demonstrate the relevant competency.

5.1.4 Resources

The employer should identify and make available the necessary resources for the implementation and running of an effective programme including the need for supervision, training and developing the relevant competency.

5.1.5 Management review

The employer should review the programme at defined intervals or when necessary to ensure the continued effectiveness of the programme and to monitor the progress of improvement objectives.

In any event a review should take place annually. An audit schedule relevant to the programme should also be put in place to review the effectiveness of implementation at all levels within the employer's responsibilities.

5.1.6 Training

The employer should ensure that the programme supervisors, the wearers and others involved in the maintenance of the devices receive suitable training. Refresher training should be provided as necessary. In any event this should take place at least annually unless otherwise decided by individual risk assessments.

5.1.7 Supervision

The employer should ensure that the devices are used in accordance with the manufacturers instructions and that no respiratory protective device is modified.

5.2 Employees responsibilities

5.2.1 Wearers

Individuals involved in a respiratory protective device programme should always follow procedures and systems laid down by the programme and be responsible for the delegated responsibilities.

Individuals who are provided with and required to wear respiratory protective devices or any other personal protective equipment which includes respiratory devices should use the devices in accordance with the manufacturer's instructions including the pre-use checks and the training provided by the employer. They should make known to their supervisor any problems encountered during wear or use.

5.2.2 Competent persons

Individuals nominated as competent persons should co-operate with their employer to ensure that they have the relevant knowledge, experience and training to undertake respiratory protective device related tasks.

5.3 Manufacturers' responsibilities

Manufacturers or their appointed representatives are responsible for CE-marking (see 9.3.5) the respiratory protective devices before the devices are supplied to users.

Respiratory protective device manufacturers and suppliers should ensure that the information they provide with their devices is accurate, reflects the current knowledge and assists the employers/users in making the correct choice. The duty to select and use adequate and suitable respiratory protective devices remains with the employer.

6 Risk assessment process

The exposure to hazardous substances at work should be eliminated. If this is not reasonably practicable then the exposure should be minimised by other means at source before using respiratory protective devices.

The employer should carry out an adequate and suitable risk assessment wherever hazardous substances are in use or there are foreseeable risks to health and safety.

The risk assessment should take into account at least the hazard, its nature, the sources contributing to the exposure, the degree of exposure, the working environment, the tasks and the people carrying out the tasks, the effectiveness of preventive measures taken or to be taken as well as other foreseeable consequences of failure of protective measures.

When deciding the protective measures, the steps given in Table 1 should be evaluated in the order given and put in place as appropriate. It should be noted that in many workplace situations a combination of the steps described in Table 1 will be needed to minimise exposure. In addition, administrative, including supervisory, systems should be in place to ensure that the protective measures remain adequate at all times.

The risk assessment should be recorded and be kept up to date through a process of regular review or whenever the assessment is found to be no longer valid. A review should take place at least annually.

Table 1 — Protective measures

1	The use of alternative substances which are less hazardous.
2	The substitution of a given substance in a form that is less hazardous.
3	The substitution of a process by an alternative process likely to generate lower airborne concentrations of substances.
4	Total or partially enclosed process and handling systems.
5	Partial enclosure with local exhaust ventilation.
6	Local exhaust ventilation.
7	General ventilation.
8	Reducing period of exposure.
9	The introduction of appropriate working practices and systems of work (e.g. to close and store containers securely when not in use).
10	Use of monitoring and warning devices to give a clear indication when unsafe airborne concentrations are present.
11	Good housekeeping.
12	The use of adequate and suitable personal protective equipment including respiratory protective device.

7 Criteria for using respiratory protective devices

Respiratory protective devices should only be used when one or more of the following conditions are met:

a) other protective measures are in place, yet an unacceptable inhalation exposure risk still exists;

b) exposures exceed the relevant occupational exposure limit value and protective measures are in the process of being installed;

c) emergency work which cannot wait until other protective measures at source are put in place;

d) exposures are infrequent and of short duration and permanent installation of other protective measures are not practicable;

e) respiratory protective device is needed for escape in the event of an emergency;

f) emergency rescue work by trained personnel.

However, there are situations where adequate control measures may be in place and the employer may decide to provide suitable respiratory protective devices as an extra precaution.

8 Risk assessment for respiratory protective device use

8.1 Elements of respiratory protective device programme

Where a respiratory protective device is needed for minimising the exposure it should only be used when a suitable respiratory protective device programme is in place. The elements of a respiratory protective device programme will include the following:

a) hazard appreciation and identification;

b) risk assessment to comply with legal requirements;

c) selection of adequate and suitable devices;

d) training for users and others involved in the programme;

e) maintenance of the devices in accordance with manufacturer's instructions;

f) record keeping which will include programme policy, management systems implementing the programme, risk assessments, adequacy and suitability assessment, training details and maintenance records;

g) auditing of the programme;

h) management systems for implementing the programme.

8.2 Factors to consider in risk assessment

The risk assessment for minimising the inhalation exposure by using respiratory protective device should consider at least the following:

a) Will the atmosphere contain sufficient oxygen during the whole period of work/exposure?

b) Which hazardous substances including asphyxiants are likely to be present? What are their physical and chemical properties?

c) Which forms do the air contaminants take – dust, fibre, mist, fume, micro-organism, gas, vapour or radioactive particulates or gases?

d) What health effects can these substances have on the body?

e) What are the foreseeable worst-case concentrations in the atmosphere?

f) What are the relevant occupational exposure limit values or the safe exposure levels?

g) What other hazards (e.g. potential for splashing, sparks, fire, flammability) are associated with the job/process, which will influence the selection and use of a respiratory protective device?

9 Adequacy and suitability

9.1 General

The process of selecting a correct device should only be undertaken after an appropriate risk assessment has been carried out. The next step in a selection process should be the determination of adequacy. Once the adequacy has been established suitability should be determined for the correct selection of the device.

9.2 Adequacy

9.2.1 General

A respiratory protective device is considered adequate if it has the capacity to reduce the wearer's exposure to a hazard to acceptable levels (e.g. to comply with occupational exposure limit values).

9.2.2 Assessing atmospheres immediately dangerous to life or health

When an environment is considered as an atmosphere immediately dangerous to life and health (see Annex B) a high level of respiratory protection is required, for example, a self-contained breathing apparatus with a full face mask operating in a pressure demand or positive pressure mode; a compressed air line breathing apparatus with a full face mask operating in a pressure demand or positive pressure mode.

The device used in an atmosphere immediately dangerous to life or health may incorporate an emergency breathing facility which would last long enough for the wearer to reach a place of safety. Where an emergency breathing facility is not provided other measures which are equally effective should be put in place.