PD ISO/TS 16975-1:2016

BSI Standards Publication

Respiratory protective devices — Selection, use and maintenance

Part 1: Establishing and implementing a respiratory protective device programme

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National foreword

This Published Document is the UK implementation of ISO/TS 16975-1:2016.

This International technical specification introduces the concept of ISO Protection levels (PLs). The ISO PLs represent the degree of respiratory protection that is expected to be provided to wearers by a class of respiratory protective devices (RPD) when used within an effective RPD programme.

The proposed ISO PLs have been derived from professional judgement based on previous assigned protection factors (APF), their associated nominal protection factors (NPF) and knowledge of differences between laboratory and workplace protection performance of current products.

However, until the proposed ISO PLs have been validated, (when RPD conforming to the requirements of the performance standards are available) they are provided for information only. In the interim period, the assigned protection factors as published by the UK Health and Safety Executive (HSE) in guidance document HSG53 *Respiratory protective equipment at work- A practical guide* (HSE, 2013) should be used.

Further information on the selection of suitable and adequate RPE can be found on the HSE website at http://www.hse.gov.uk/respiratory-protective-equipment

Subclause 7.6.4 of this technical specification states that where national or local regulations exist for the breathable gas quality, then these shall be met. Attention is drawn to BS EN 12021 *Respiratory equipment - Compressed gases for breathing apparatus* as a reference standard for breathable gas quality.

The UK participation in its preparation was entrusted to Technical Committee PH/4, Respiratory protection.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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Compliance with a British Standard cannot confer immunity from legal obligations.

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ISO/TS 16975-1

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Respiratory protective devices — Selection, use and maintenance —

Part 1: Establishing and implementing a respiratory protective device programme

Appareils de protection respiratoire — Choix, utilisation et entretien —

Partie 1: Élaboration et mise en oeuvre d'un programme pour les appareils de protection respiratoire

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Foreword

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

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

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

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

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

The committee responsible for this document is ISO/TC 94, *Personal safety — Protective clothing and equipment*, Subcommittee SC 15, *Respiratory protective devices*.

ISO 16975 consists of the following parts, under the general title *Respiratory protective devices — Selection, use and maintenance*:

— *Part 1: Establishing and implementing a respiratory protective device programme* [Technical Specification]

— *Part 2: Condensed guide to establishing and implementing a respiratory protective device programme* [Technical Specification]

— *Part 3: Fit testing procedures*

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Introduction

This part of ISO 16975 contains the essential requirements for establishing and implementing a complete respiratory protective device (RPD) programme for respiratory protective devices that meet the requirements of the performance standards. It contains information on risk assessment, selection procedure, training, use and maintenance.

Informative Annexes provide additional guidance on how to implement such a programme.

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Respiratory protective devices — Selection, use and maintenance —

Part 1: Establishing and implementing a respiratory protective device programme

1 Scope

This part of ISO 16975 specifies detailed information to assist persons responsible for establishing and implementing a programme for respiratory protective devices (RPD) that meet the performance requirements of the performance standards.

This part of ISO 16975 does not apply to RPD programmes for RPD used exclusively under water, for use in aircraft, and medical life support respirators and resuscitators.

NOTE The information contained in this part of ISO 16975 can be used to assist in the preparation of national or local regulations; however, this part of ISO 16975 does not supersede national or local regulations.

WARNING — Failure to select, use and maintain RPD correctly can result in injury, illness or death.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 16900-1, *Respiratory protective devices — Methods of test and test equipment — Part 1: Determination of inward leakage*

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

ISO/TS 16975-2, *Respiratory protective devices — Selection, use and maintenance — Part 2: Condensed guide to establishing and implementing a respiratory protective device programme*

ISO 16975-3[1)], *Respiratory protective devices — Selection, use and maintenance — Part 3: Fit testing procedures*

ISO 17420-3, *Respiratory protective devices — Performance requirements — Part 3: Thread connection*

3 Terms and definitions

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

3.1
adequate RPD
RPD (3.8) capable of reducing the inhalation exposure to an acceptable level

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3.2
assigned protection factor
APF
anticipated level of respiratory protection that would be provided by a properly functioning *RPD* (3.8) or class of RPD within an effective *RPD programme* (3.10)

3.3
competent person
person with suitable and sufficient experience and with practical and theoretical knowledge of the elements of an *RPD programme* (3.10) for which (s)he is responsible

3.4
hazardous substance
substance that presents a potential to cause injury or ill health if it is inhaled, ingested or comes into contact with, or absorbed through, the skin.

Note 1 to entry: A hazardous substance may be a pure substance or generated as by-products 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, such as ammonia and chlorine,

b) vapours, such as from solvents, and

c) particles, such as dust, mist, smoke, fumes, fibres, fog and bioaerosols.

3.5
hazardous atmospheres
atmosphere that is oxygen-deficient and/or the level of substances in the atmosphere is at a concentration deemed to be hazardous

3.6
protection class
PC
numerical designation from PC1 to PC6 allocated to individual *RPD* (3.8) based upon laboratory testing indicating its relative protection

3.7
protection level
degree of respiratory protection allocated to an *RPD* (3.8) for the purposes of selection and use that is expected to be provided to wearers when used within an effective *RPD programme* (3.10)

3.8
respiratory protective device
RPD
personal protective equipment designed to protect the wearer's respiratory tract against inhalation of *hazardous atmospheres* (3.5)

3.9
risk assessment
process of hazard, adequacy and suitability assessments relating to the selection of *RPD* (3.8)

3.10
RPD programme
process of selecting, using and maintaining *RPD* (3.8) to ensure adequate protection to the wearer

3.11
suitable RPD
RPD (3.8) that is adequate and is matched to the requirements of the wearer, the task and the working environment

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3.12
work rate class
numerical designation from W1 to W4 allocated to individual *RPD* (3.8) based upon laboratory testing indicating its relative ability to meet the wearer's demand for breathable gas at different activity levels

Note 1 to entry: Further information on work rate is given in 7.3.3.4.

3.13
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 dangerous atmosphere

4 Abbreviated terms

AB	Abrasive Blasting (Special Application Class)
ADE ASM	Adequacy Assessment
APF	Assigned Protection Factor
CBRN	Chemical, Biological, Radiological, and Nuclear (Special Application Class)
ES	Escape (Special Application Class)
FF	FireFighting (Special Application Class)
HAZ-ASM	Hazard Assessment
HHG	Health Hazard Group
HR	Hazard Ratio
IDLH	Immediately Dangerous to Life or Health
MA	Marine (Special Application Class)
MN	Mining (Special Application Class)
NPF	Nominal Protection Factor
OEL	Occupational Exposure Level
OEL-TWA	Occupational Exposure Level-Time Weighted Average
PC	Protection Class
PL	Protection Level
PPE	Personal Protective Equipment
QLFT	Qualitative Fit Test
QNFF	Quantitative fit factor
QNFT	Quantitative Fit Test
RFF	Required Fit Factor
RI	Respiratory interface

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RPD	Respiratory Protective Devices
S	Breathable gas capacity
SU ASM	Suitability Assessment
SY	Breathable gas capacity Class of airline supplied RPD
W	Work rate Class
WE	Welding (Special Application Class)

5 Situations for using RPD

RPD is considered to be at the bottom of the hierarchy of control measures and should only be used after an acceptable case for its use has been established by way of an appropriate risk assessment. RPDs are used to further reduce inhalation exposures to hazardous atmospheres:

— when sufficient engineering and administrative controls are lacking;

— when these controls are not reasonably practical (maintenance, escape or rescue work);

— prior to implementing or improving a control measure.

6 RPD programme

6.1 General

The RPD programme includes processes for selecting, using and maintaining RPD to ensure adequate protection to the wearer.

Prior to using RPD, it is essential to establish a written RPD programme. The RPD programme needs to be understood by all persons within the organization, as appropriate.

6.2 RPD programme elements

The RPD programme consists of the following elements:

a) roles and responsibilities (see 6.3);

b) RPD programme implementation (see 6.4);

c) risk assessment (see Clause 7);

d) selection procedures (see Clause 7);

e) medical assessment (see 7.3.3.2);

f) fit testing (see 7.4);

g) training (see 7.5);

h) use (see 7.6);

i) maintenance procedures (see 7.7);

j) storage (see 7.8);

k) programme review (see 7.9);

l) records and record keeping (see 7.10).

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6.3 Roles and responsibilities

6.3.1 General

All persons involved in the respiratory protection programme shall be competent in their area of responsibility within the RPD programme and maintain the appropriate knowledge, experience and training to effectively carry out their duties.

6.3.2 Employer

The employer shall

— be responsible for the entire RPD programme,

— define, implement and document the RPD programme,

— provide adequate resources and organization to ensure the programme's continued effectiveness, and

— assign an RPD programme administrator.

The employer and the programme administrator may be the same person.

6.3.3 RPD Programme administrator

The programme administrator shall be responsible for effective management of the entire RPD programme.

6.3.4 Wearer

The wearer shall be responsible for

— using the RPD in accordance with the instructions and training received,

— reporting of any damage, defects or non-function of the RPD provided, and

— reporting any physical or medical limitations or changes that can impact their ability to wear and use the RPD correctly.

6.4 RPD programme implementation

The RPD programme shall be implemented, evaluated and updated as necessary to reflect those changes in workplace conditions that affect RPD use.

7 Risk assessment and RPD selection

7.1 General

A risk assessment is essential for the correct selection and use of RPD. It shall be conducted by a competent person before RPD is used for routine work, emergency work, rescue (including response to catastrophic incidents) or escape.

The risk assessment shall be conducted

— prior to the start of all new work processes,

— if the work conditions change,

— for new wearers, not covered by the existing suitability assessments, and

— periodically thereafter, at least annually or in accordance with national or local regulations.

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The RPD selection procedure, shown in the following flow charts in 7.2 and described in 7.3, uses the information gathered from the risk assessment which shall include the following.

a) The Hazard Assessment flow charts identify the nature of the hazard, e.g. oxygen deficiency, contaminant level, Immediately Dangerous to Life or Health (IDLH).

b) The Adequacy Assessment flow chart determines the protection level required for the hazard.

c) The Suitability Assessment flow charts identify the factors to consider when selecting the RPD that meets the needs of the wearer and is appropriate for the task and the environment.

d) The special application flow chart identifies the minimum work rates and the minimum protection classes of the various classes within the special applications.

(0) This is an example of a navigation marker. These navigation markers precede text and are cross referenced in the flow charts. All markers are listed sequentially in 7.3. In addition, a flow chart may contain markers out of sequence. Follow the flow charts in the order given above and always begin at the top block. Read the contents of each block in sequence and follow the decision logic.

◇ The diamond shape indicates that a decision shall be made in order to proceed. Answer each with a "Yes" or "No" response and follow the arrow to the next block.

▱ The rhomboid shape provides data that leads to the final specification and class of suitable RPD.

The "wave shape" is an instruction to document the output of the suitability assessment.

The irregular pentagon is an instruction to go to the next flow chart.

The cylinder is an indication of the mode of operation.

Record the outcome of the selection procedure in accordance with ISO/TS 16975-2. The example of the selection record sheet can be used (see Annex J). Where the table in Annex J recommends seeking professional advice RPD manufacturers/suppliers and safety consultants are a good source of information.

7.2 Selection procedure — Flow charts

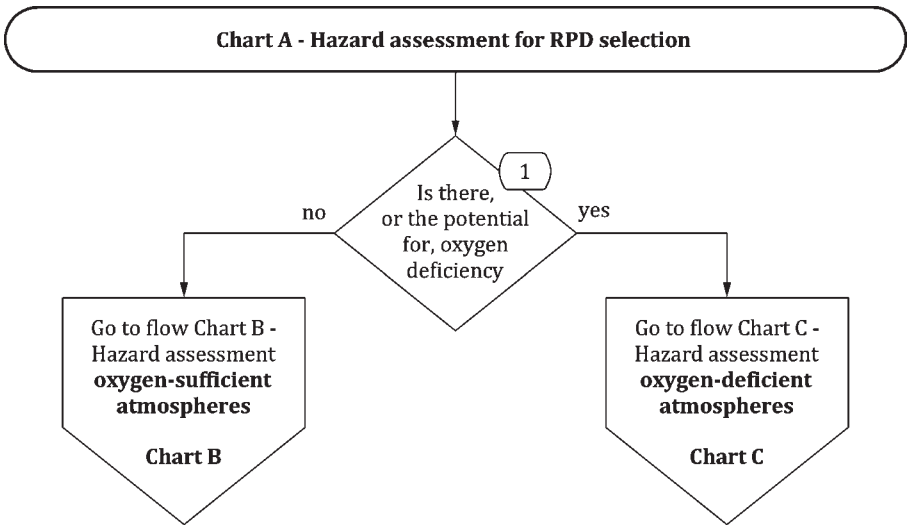

Figure 1 — Chart A Hazard assessment (HAZ-ASM)

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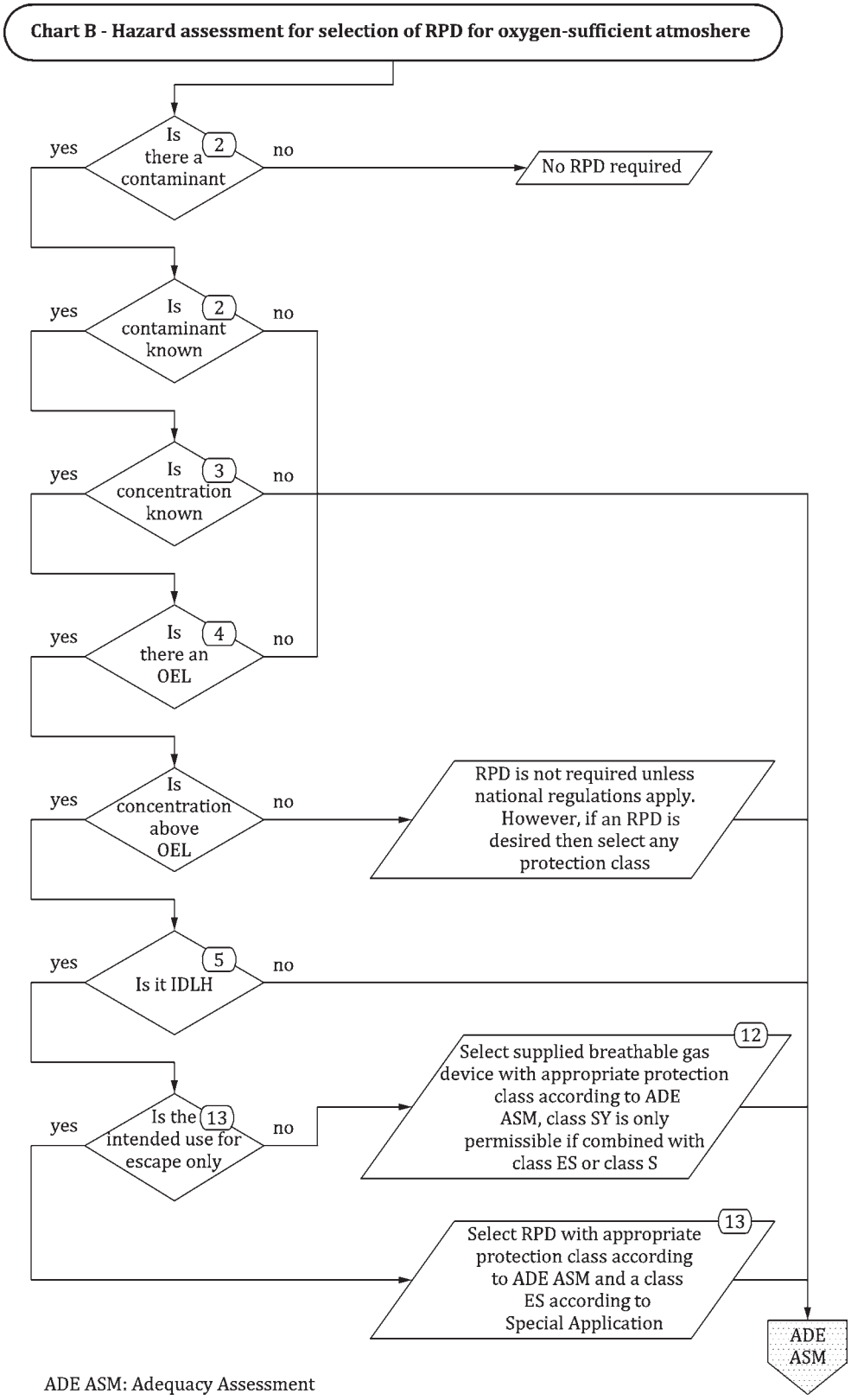

Figure 2 — Hazard ASM — Chart B for oxygen-sufficient atmospheres

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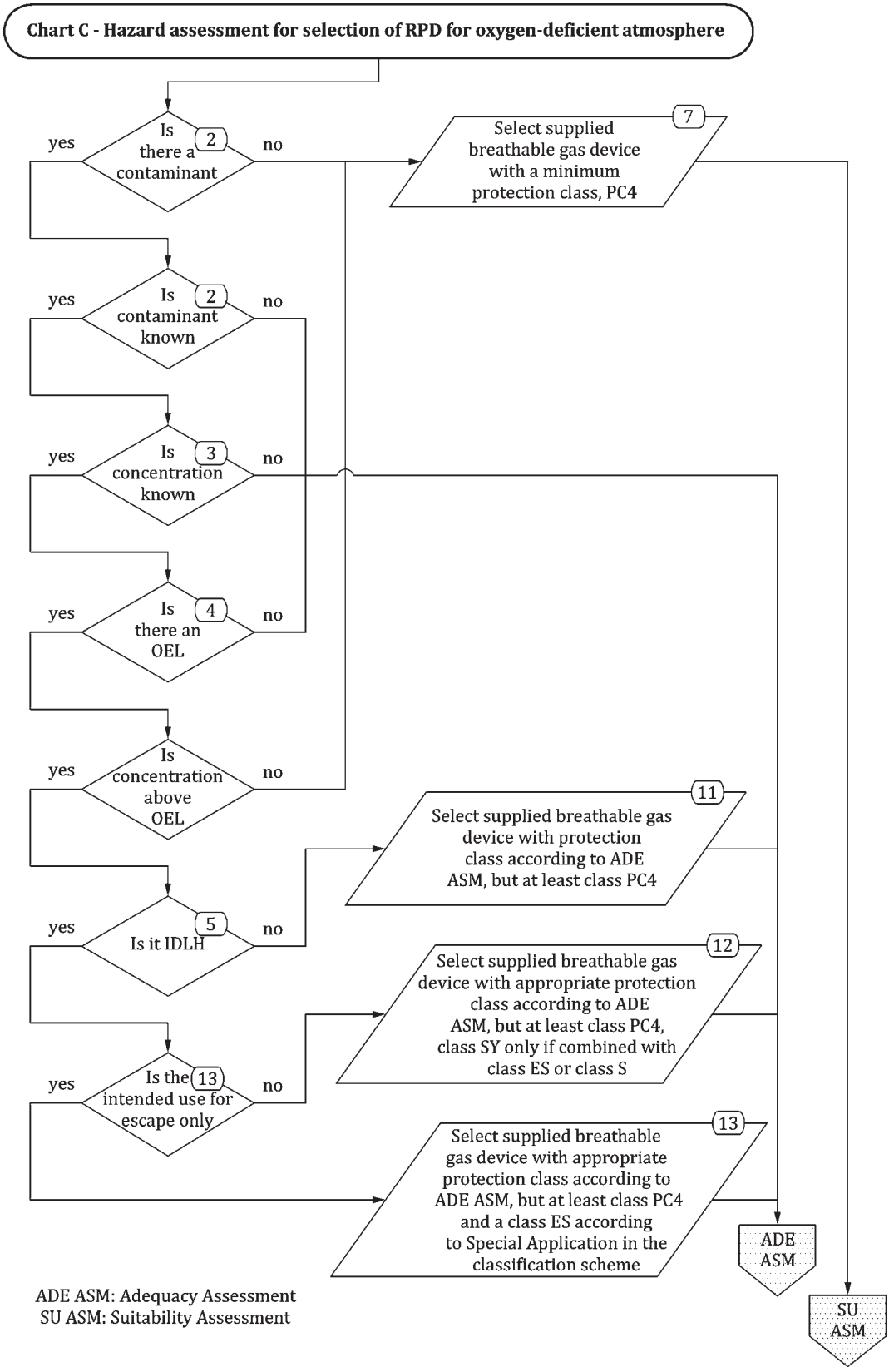

Figure 3 — Hazard ASM — Chart C for oxygen-deficient atmospheres

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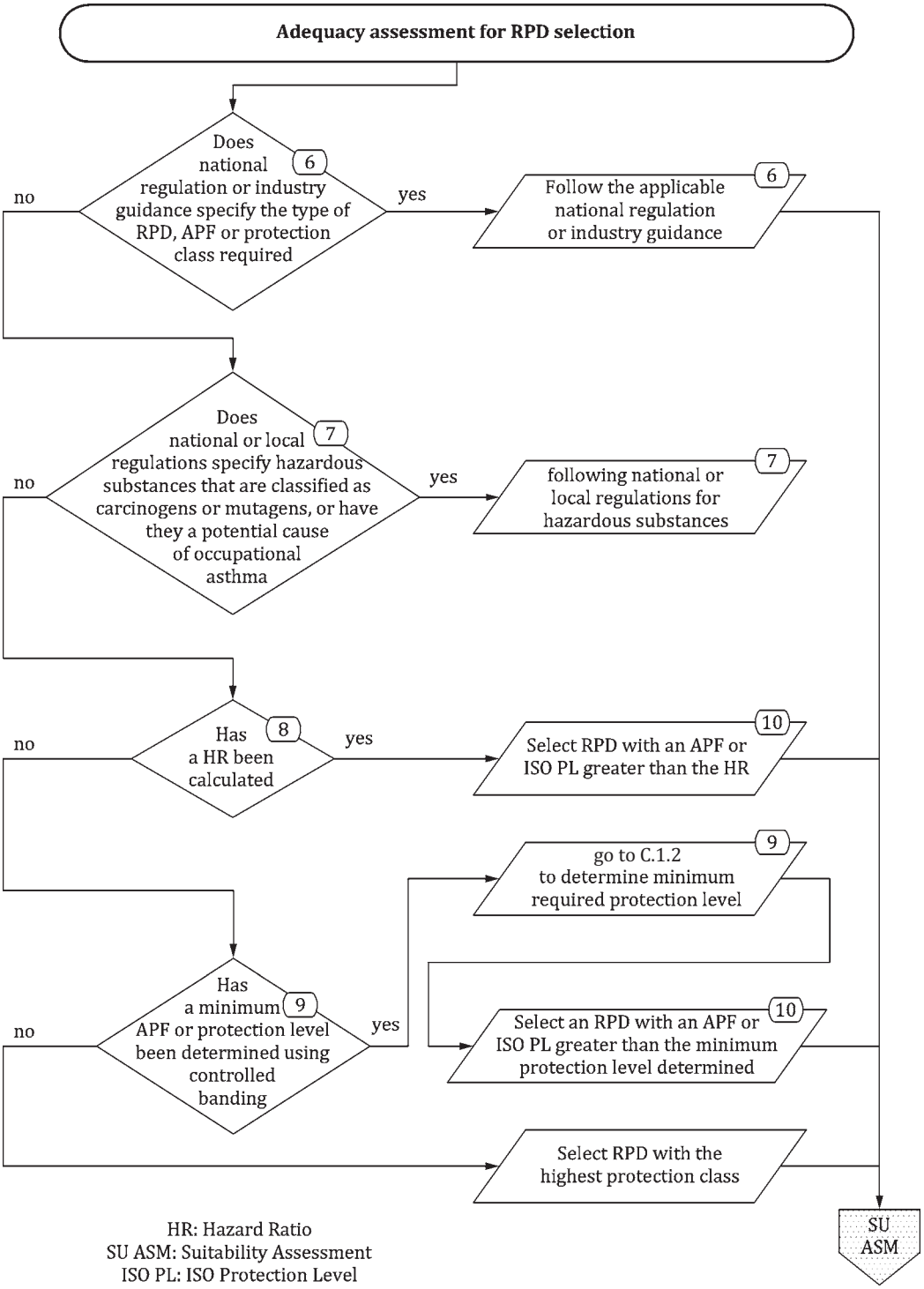

Figure 4 — Adequacy assessment

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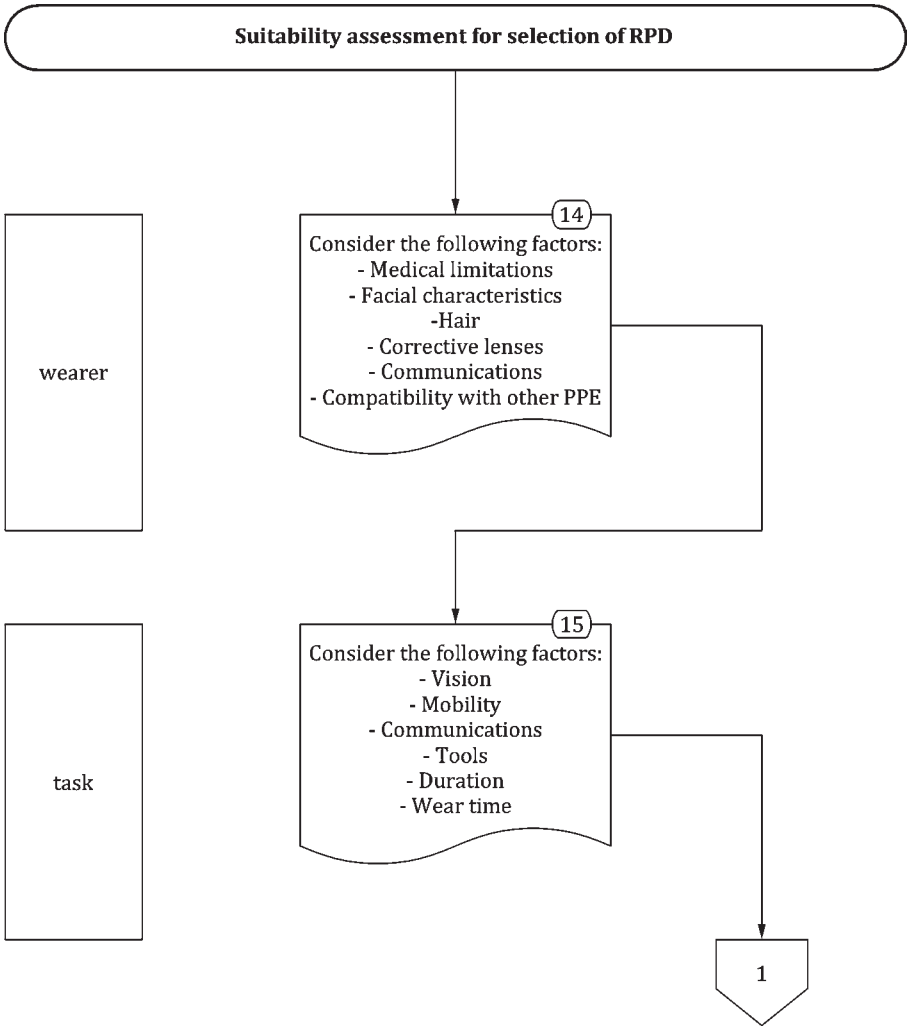

Figure 5 — Suitability assessment — Wearer/task

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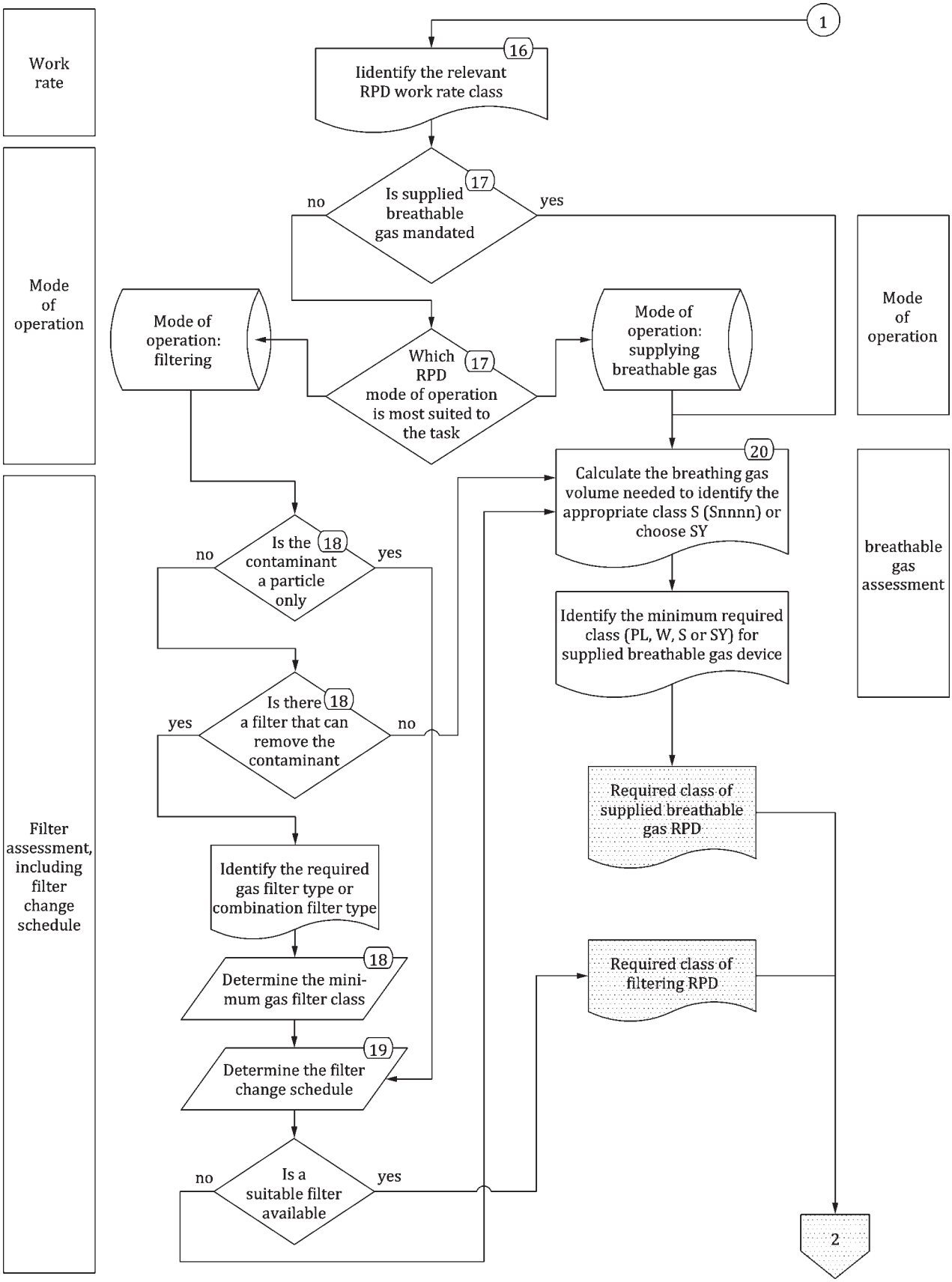

Figure 6 — Suitability assessment — Work rate, mode of operation, filter assessment, filter exchange programme, breathable gas supply assessment

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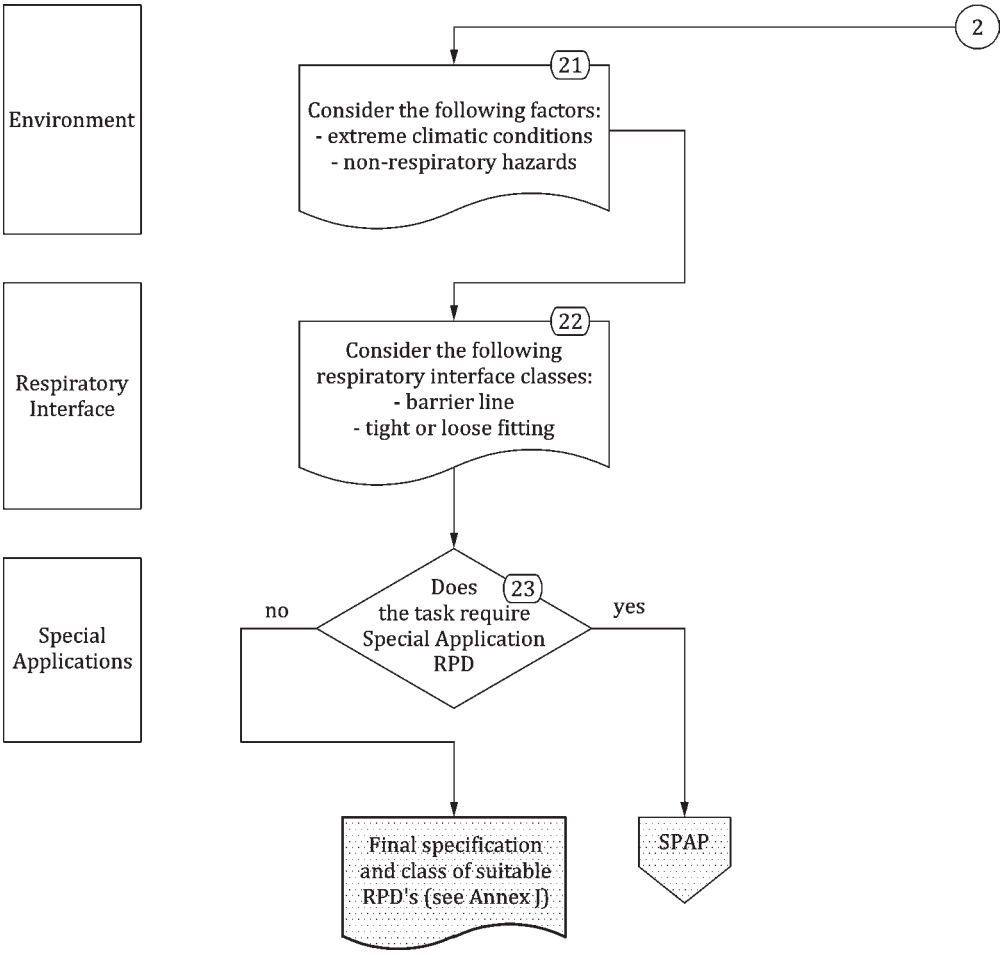

Figure 7 — Suitability assessment — Intended work, mode of operation, filter assessment and change schedule

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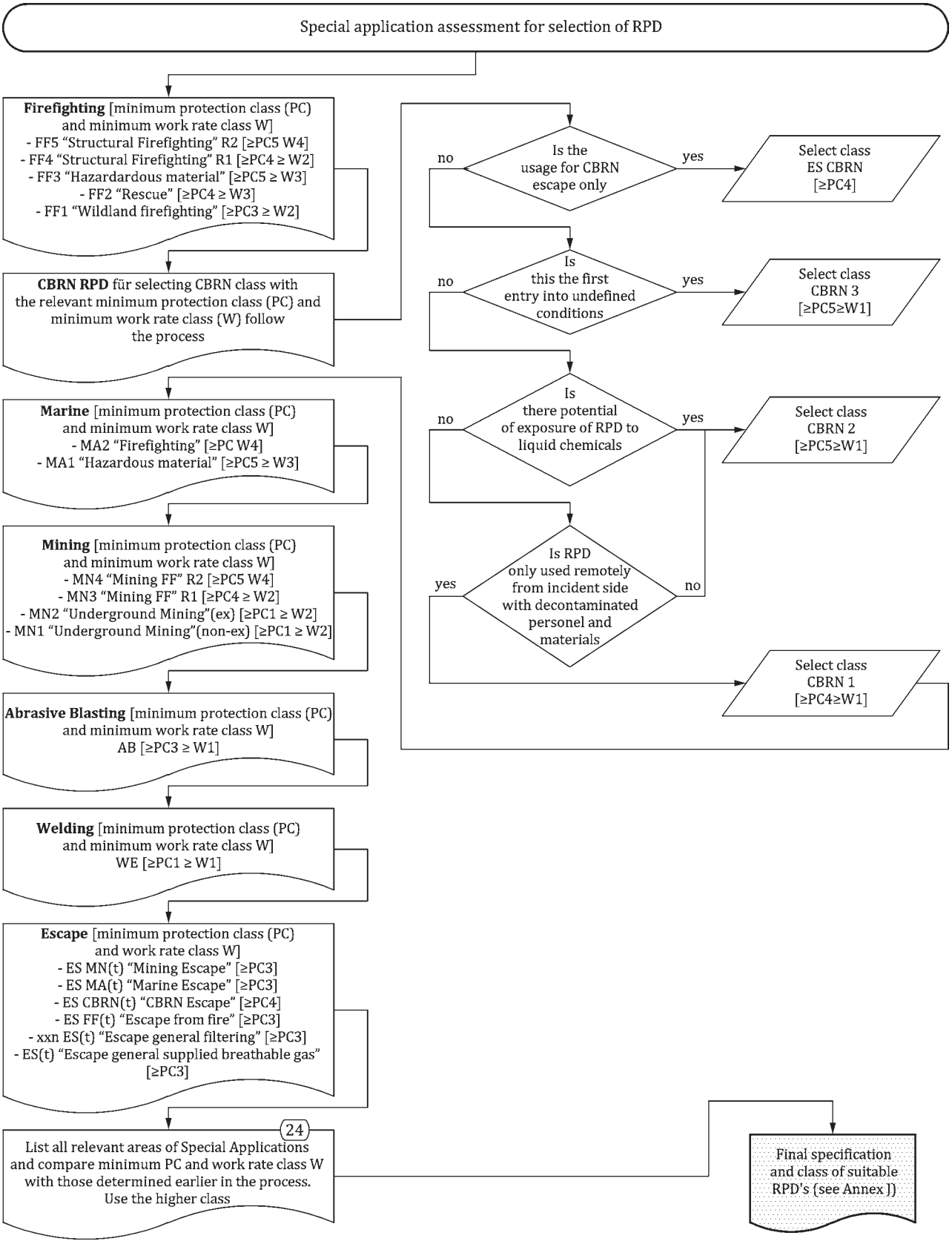

Figure 8 — Special application assessments

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7.3 Selection procedure

7.3.1 Hazard assessment

7.3.1.1 General

The hazard assessment shall identify the nature of the hazard(s) present for which respiratory protection may be required.

7.3.1.1.1 Oxygen deficiency

1 The potential for oxygen deficiencies shall be considered. When national or local regulations that relate to oxygen deficiency levels exist, these should be followed.

7.3.1.1.2 Identification of contaminants

2 The contaminant(s) likely to be present as gas, vapour or particle shall be identified.

All materials used, produced or stored, including raw materials, end products, by-products and wastes, should be reviewed by assessing the work process and by referring to the safety data sheets (SDS). From this review, the contaminant(s) that may be present in the workplace shall be identified.

National or local regulations that relate to specific contaminants (e.g. asbestos, lead, benzene) shall be followed. If the contaminant is unknown and if there is a national or industry guidance document that is specific to the task, then the assigned protection factors (APF) or the recommended Protection Level shall be chosen.

When the contaminants cannot be identified and no guidance is available, the hazard is considered unknown and the atmospheres shall be considered IDLH, and only breathable gas supplying RPD with the highest APF or protection class shall be selected.

3 The foreseeable worst-case airborne exposure concentrations of contaminants in the atmosphere shall be determined. If the contaminant concentration is unknown and if there is a national or industry guidance document that is specific to the task, then the assigned protection factors (APF) or the recommended Protection Level shall be chosen.

4 The occupational exposure limits or the safe exposure levels shall be identified for contaminants where available. Where no OEL is published for the contaminant and there are no national or local regulations that relate to the contaminant, then control-banding method may offer a solution; see C.1.3. If the control banding method cannot be used, then select an RPD with the highest protection class.

5 Does the potential for IDLH conditions exist? An IDLH atmosphere is one that poses an immediate threat to life, would cause irreversible adverse health effects, or would impair an individual's ability to escape. It is an atmosphere where the potential exists where one could not escape without the aid of an RPD. Selection of RPD for work in IDLH atmospheres shall consider the method of escape in the event that the primary RPD mode fails, including level during the escape. IDLH levels may be established by national or local regulations or published by professional bodies. If there is uncertainty whether the concentration is above or below IDLH, the atmosphere shall be considered to be IDLH.

7.3.2 Adequacy assessment

7.3.2.1 General

The adequacy assessment determines the minimum protection required from the RPD for adequate protection against the identified hazardous substance and/or oxygen deficiency.

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7.3.2.2 Methods for determining the protection required:

The required protection shall be determined by one of the following methods:

a) 6 following national or local regulations that specify the type of RPD, APF or protection class for specific contaminants;

b) 7 following national or local regulations for hazardous substances that are classified as carcinogens or mutagens, or are a potential cause of occupational asthma. These may require that exposure be reduced to as low as is reasonably practicable or technically feasible and to below any control or exposure levels/limits;

c) 8 calculating the hazard ratio using the determined foreseeable worst-case airborne concentration (see C.1.2) and the relevant occupational exposure limit values;

The hazard ratio (HR) can be calculated using Formula (1):

$$HR = \frac{CC_{out}}{PC_{in}} \tag{1}$$

where

CC_{out} is the contaminant concentration outside the RPD;

PC_{in} is the permissible concentration allowed inside the respiratory interface, i.e. OEL.

d) 9 using the "control banding method". The control banding method utilizes the hazard statements associated with the hazardous substance(s) being used or generated, combined with the potential for inhalation exposure based on the amount of substance used and its dustiness or volatility. See C.1.3.

7.3.2.3 Use of Assigned Protection Factors (APF)

10 Where nationally accepted APF are used, an RPD having an APF higher than the hazard ratio (HR) shall be selected.

APF relate to the protection provided by specific design types and classes of RPD and these will be different than the ISO RPD classifications. RPD complying with the performance standards are classified based on laboratory performance measured in accordance with ISO 16900-1, and therefore, RPD of the same basic design can have different laboratory performance and can therefore fall into a different protection class (PC).

National or local regulations can require that RPD be selected using APF or equivalent. In this case, the adequacy assessment and related flow chart (see Figure 4) provide a method for using APF.

7.3.2.4 Use of ISO Protection Classes (PC) and Protection Levels (PL)

The PC is the class of respiratory protection allocated to an RPD as a result of laboratory testing. The PL is the level of protection associated with the PC that is expected to be provided to wearers when the RPD is used within an effective RPD programme as described in this part of ISO 16975. The PL is used in the selection process. These can be found in the Selection Record Form; see Annex J.

11 For oxygen-deficient atmospheres, a supplied breathable gas RPD of class SY ES or class S shall be selected. The PC needed depends upon the concentration of any hazardous substance(s) present.

12 For working in IDLH atmospheres, only supplied breathable gas RPD shall be selected. The minimum PL shall be determined by the hazard ratio in the adequacy assessment (See C.1). When class

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SY RPD, e.g. airline RPD, is selected, it shall be combined with a class ES (escape only RPD) or class S RPD, e.g. self-contained breathing apparatus.

For oxygen-deficient atmospheres, a supplied breathable gas RPD with a protection class of at least PC4 shall be selected.

13 For escape from oxygen-sufficient IDLH atmosphere, an RPD of class ES with the minimum PL determined by the hazard ratio in the adequacy assessment shall be selected.

For escape from oxygen-deficient IDLH atmospheres, only a supplied breathable gas RPD of class SY ES or class S with a protection class of at least PC4 shall be selected.

When class SY RPD, e.g. airline device, is selected, it shall be combined with a class ES, (escape only device) or class S RPD, e.g. self-contained breathing apparatus. A higher PC can be needed depending upon the concentration of any hazardous substance(s) present.

7.3.3 Suitability assessment

7.3.3.1 General

The suitability assessment shall consider the following:

— wearer;

— task;

— work rate;

— environment;

— any special application.

7.3.3.2 Wearer

14 The suitability assessment for the wearer shall consider the following factors.

a) **Medical limitations**. The programme administrator shall arrange for appropriate medical assessment, in accordance with national or local regulations, to ensure that the individual is free from any condition that may preclude or limit the use of RPD.

NOTE Further information is given in D.2.1.

b) **Facial characteristics**. The RPD selected shall accommodate the facial characteristics of the wearer, such as deep scars or grooves. Where these facial characteristics prevent a good fit, consider the use of a loose-fitting respiratory interface, which does not rely on a tight seal in this region. Body jewellery which affects the fit shall be removed while wearing the RPD, or a different type of RI may be considered.

NOTE Further information is given in D.2.2.

c) **Hair**. No hair comes between the sealing surfaces of a tight-fitting respiratory interface and the wearer's skin, or interferes with the function of the RPD, e.g. interference with the operation of valves shall not be permitted. Where any hair comes between the sealing surface, the use of loose-fitting respiratory interface, which do not rely on a tight seal in this region may be considered.

d) **Corrective lenses**. The RPD shall be able to accommodate corrective lenses (spectacles or contact lenses) if needed.

NOTE Further information is given in D.2.3.

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e) **Communication.** The RPD shall permit communication to the level needed for the task (e.g. speaking, hearing and visual communications).

NOTE Further information is given in D.2.4.

f) **Compatibility with other PPE**. Different items of PPE shall not interfere with the RPD during use, preventing one or more of the components from working correctly. Where possible, RPD, where the different forms of protection required are integrally combined, (e.g. RPD providing eye, face, head and respiratory protection) should be considered.

NOTE Further information is given in D.2.5.

7.3.3.3 Task

15 Suitability assessment for the task shall consider the following factors.

a) **Vision**. Special needs for vision, e.g. magnification, clarity or wide field of view, shall be considered.

NOTE Further information is given in D.3.1.

b) **Mobility**. Mobility requirements demanded by the task and location can limit the type of RPD that can be used safely. Confined spaces require special considerations. RPD that does not impede mobility shall be selected.

NOTE Further information is given in D.3.2.

c) **Communications**. Communication requirements shall be taken into consideration especially for confined spaces and IDLH atmospheres. RPD with speech transmitters and RPD models incorporating voice amplifiers or radios should be considered to aid communications.

NOTE Further information is given in D.3.3.

d) **Tools**. Use of tools (e.g. welding equipment, equipment used during spraying operations and power tools) can influence the performance of RPD and shall be considered. RPD compatible with the tools shall be selected. If the RPD and air-powered tools are connected to the same air supply, it shall be ensured that the compressor can supply enough air for both at the same time and that the air supplied to the RPD remains of breathable quality (see 7.6.3.2). This practice can result in excess oil in the breathable gas. Some types of RPD, e.g. compressed breathable gas supplied RPD, are equipped with an air take-off for air-powered tools. Preferably, the RPD air supply and other air sources should be kept separated. Any national or local regulations prohibiting the supply of both RPD and tool from the same air source shall be followed.

NOTE Further information is given in D.3.4.

e) **Duration**. Task duration (including any preparation, entry, exit and decontamination time) shall be considered in order to establish the requirements for the service life of the RPD. Depending upon the type of RPD, this shall include consideration of breathable gas capacity, battery life, filter service life and a filter change schedule.

NOTE Further information is given in D.3.5.

f) **Wear time**. This is the length of time the RPD has to be worn continuously to perform the task. For some types of RPD, the maximum possible wear time and frequency of use may be limited due to wearer comfort and physical burden. Using assisted RPD can help minimize fatigue and discomfort. Any national or local regulations concerning wear time shall be followed.

7.3.3.4 Work rate

16 The expected work rate shall be determined in order to select RPD with the appropriate work rate class.

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Four work rate classes, W1, W2, W3 and W4, are designated for RPD; however, those with standardized connector according to ISO 17420-3 are limited up to work rate W2.

To determine the required work rate class, the highest class according to the descriptions in Table 1 shall be selected.

NOTE Further information on work rates and work activities is given in ISO/TS 16976-1.

Table 1 — Work rates and examples of corresponding activities

Work rate class	Work	Examples of work and activities
W1	Light to moderate	Average for full work shifts including breaks Sitting at ease: light manual work (writing, typing, drawing, sewing, bookkeeping); hand and arm work (small bench tools, inspection, assembly or sorting of light materials); arm and leg work [driving vehicle in normal conditions, operating foot switch or pedal, standing drilling (small parts), milling machine (small parts), coil winding, small armature winding, machining with low power tools] To: Sustained hand and arm work (hammering in nails, filing); arm and leg work (off-road operation of lorries, tractors or construction equipment); arm and trunk work (work with pneumatic hammer, tractor assembly, plastering, intermittent handling of moderately heavy material, weeding, hoeing, picking fruits or vegetables, pushing or pulling light-weight carts or wheelbarrows, forging); walking at a speed of up to 5,5 km/h
W2	Heavy to very heavy	Average for full work shifts including breaks Intense arm and trunk work (carrying heavy material, shovelling, sledgehammer work, sawing, planing or chiselling hard wood, hand mowing, digging, pushing or pulling heavily loaded hand carts or wheelbarrows, chipping castings, concrete block laying) To: Very intense activity at fast pace; working with an axe; intense shovelling or digging; climbing stairs, ramp or ladder; walking quickly with small forms; running; walking at a speed greater than 5,5 km/h
W3	Very, very heavy to extremely heavy	Continuous work for up to 2 h without breaks Safety and rescue work with heavy equipment and/or personal protective equipment; fit individuals pacing themselves at 50 % to 60 % of their maximal aerobic capacity; walking quickly or running with protective equipment and/or tools and goods; walking at 5 km/h and 10 % elevation To: Continuous work for up to 15 min without breaks. Rescue and fire-fighting work at high intensity; fit and well-trained individuals pacing themselves at 70 % to 80 % of their maximal aerobic capacity; searching contaminated spaces; crawling under and climbing over obstacles; removing debris; carrying a hose; walking at 5 km/h and 15 % elevation
W4	Maximal	Continuous work for less than 5 min without breaks Rescue and firefighting work at maximal intensity; fit and well-trained individuals pacing themselves at 80 % to 90 % of their maximal physical work capacity; climbing stairs and ladders at high speed; removing and carrying victims; walking at 5 km/h and 20 % elevation

7.3.3.5 Mode of operation

17 The mode of operation gives the primary means of supplying the wearer with breathable gas, i.e. filtration or breathable gas supply.

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