

---

---

**Respiratory protective devices —  
Performance requirements —**

**Part 1:  
General**

*Appareils de protection respiratoire — Exigences de performances —*

*Partie 1: Généralités*

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

ISO 17420-1:2021

<https://standards.iteh.ai/catalog/standards/sist/77c17be9-ec3c-417c-ae1e-5e0b69a3f572/iso-17420-1-2021>



**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

ISO 17420-1:2021

<https://standards.iteh.ai/catalog/standards/sist/77c17be9-ec3c-417c-ae1e-5e0b69a3f572/iso-17420-1-2021>



**COPYRIGHT PROTECTED DOCUMENT**

© ISO 2021

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office  
CP 401 • Ch. de Blandonnet 8  
CH-1214 Vernier, Geneva  
Phone: +41 22 749 01 11  
Email: [copyright@iso.org](mailto:copyright@iso.org)  
Website: [www.iso.org](http://www.iso.org)

Published in Switzerland

# Contents

	Page
<b>Foreword</b> .....	<b>iv</b>
<b>Introduction</b> .....	<b>v</b>
<b>1 Scope</b> .....	<b>1</b>
<b>2 Normative references</b> .....	<b>1</b>
<b>3 Terms, definitions and abbreviations</b> .....	<b>2</b>
3.1 Terms and definitions.....	2
3.2 Abbreviated terms.....	2
<b>4 Classification overview</b> .....	<b>2</b>
4.1 General.....	2
<b>5 General requirements for RPD</b> .....	<b>3</b>
5.1 General.....	3
5.2 Field of vision.....	4
5.3 Resistance to flame – Single burner dynamic.....	5
5.4 Compatibility with additional equipment.....	5
5.5 Monitor performance.....	5
5.6 Warning and checking device(s).....	5
5.6.1 Performance of warning device(s).....	5
5.6.2 Performance of checking device(s).....	5
5.7 Protection class determination.....	6
5.7.1 General.....	6
5.7.2 Total inward leakage (TIL).....	6
5.8 Validation by practical performance.....	8
5.8.1 General.....	8
5.8.2 Donning/doffing.....	9
5.8.3 Communication performance - hearing and speech.....	9
5.8.4 Eye irritation caused by the RPD.....	9
5.8.5 Fogging of visor.....	9
5.8.6 Ergonomic requirements.....	9
5.9 Requirements for elements/components.....	10
5.9.1 RI.....	10
<b>6 Testing</b> .....	<b>11</b>
6.1 General.....	11
6.2 Inspection.....	11
6.3 Testing of leak tightness of RI class a using negative pressure.....	11
<b>Bibliography</b> .....	<b>12</b>

## 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](http://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](http://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 voluntary nature of standards, 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](http://www.iso.org/iso/foreword.html). (standards.iteh.ai)

This document was prepared by Technical Committee ISO/TC 94, *Personal safety — Personal protective equipment*, Subcommittee SC 15, *Respiratory protective devices*.

A list of all parts in the ISO 17420 series can be found on the ISO website.

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](http://www.iso.org/members.html).

## Introduction

To apply the standards properly consider the following:

- ISO 17420-1 specifies the general requirements for supplied breathable gas RPD and filtering RPD and cannot be used as a standard for "certification" alone. Therefore, compliance with the requirements and tests of ISO 17420-2 or ISO 17420-4 is required in addition.
- Should supplied breathable gas RPD and filtering RPD also be used for special applications, take into account the requirements of ISO 17420-5 to ISO 17420-9 addition to the requirements of ISO 17420-1 and ISO 17420-2 or ISO 17420-4.

The structure of the standards is as follows:

ISO 17420-1 specifies the general requirements for RPD.

ISO 17420-2 and ISO 17420-4 gives requirements for filtering RPD or supplied breathable gas RPD and give information if any of the general requirements in Part 1 needs an addition.

EXAMPLE for ISO 17420-4 5.8.1 General

ISO 17420-1:2021, 5.8.1 applies with the following in addition:

ISO 17420-5 to ISO 17420-9 gives requirements for supplied breathable gas RPD or filtering RPD — Special application and some of the requirements will supersede requirements specified in ISO 17420-2 or ISO 17420-4.

EXAMPLE for ISO 17420-6 7.2.1 Contact with hot and cold surfaces generated by the RPD

This clause supersedes ISO 17420-4:2021, 6.7.

For more information see also the introduction in the other parts of the ISO 17420 series.

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

ISO 17420-1:2021

<https://standards.iteh.ai/catalog/standards/sist/77c17be9-ec3c-417c-ae1e-5e0b69a3f572/iso-17420-1-2021>

# Respiratory protective devices — Performance requirements —

## Part 1: General

### 1 Scope

This document specifies general requirements for the performance and testing of respiratory protective devices (RPD) in accordance with their classification and for use in the workplace to protect the wearer from hazardous atmospheres and/or environments.

The requirements are based on human factors and are for complete respiratory systems.

Requirements for marking and information supplied by the RPD manufacturer are also included.

Additional requirements for special application such as fire services, marine, mining, abrasive blasting, welding and escape as well as RN (Radiological, Nuclear), CBRN (Chemical, Biological, Radiological, Nuclear) and CBRN Escape RPD are addressed in ISO 17420-5 to ISO 17420-9.

This document does not apply to respiratory devices for:

- underwater diving application;
- military application; [ISO 17420-1:2021](https://standards.iteh.ai/catalog/standards/sist/77c17be9-ec3c-417c-ae1e-5e0b69a3f572/iso-17420-1-2021)
- use in aircraft and spacecraft; <https://standards.iteh.ai/catalog/standards/sist/77c17be9-ec3c-417c-ae1e-5e0b69a3f572/iso-17420-1-2021>
- medical life support applications;
- resuscitators.

### 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 16900-6, *Respiratory protective devices — Methods of test and test equipment — Part 6: Mechanical resistance/strength of components and connections*

ISO 16900-7:2020, *Respiratory protective devices — Methods of test and test equipment — Part 7: Practical performance test methods*

ISO 16900-10, *Respiratory protective devices — Methods of test and test equipment — Part 10: Resistance to ignition, flame, radiant heat and heat*

ISO 16900-11, *Respiratory protective devices — Methods of test and test equipment — Part 11: Determination of field of vision*

ISO 16972, *Respiratory protective devices — Vocabulary and graphical symbols*

# ISO 17420-1:2021(E)

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

ISO 17420-2:2021, *Respiratory protective devices — Performance requirements — Part 2: Requirements for filtering RPD*

ISO 17420-4:2021, *Respiratory protective devices — Performance requirements — Part 4: Requirements for supplied breathable gas RPD*

ISO 18526-1, *Eye and face protection — Test methods — Part 1: Geometrical optical properties*

## 3 Terms, definitions and abbreviations

### 3.1 Terms and definitions

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

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/>

#### 3.1.1

##### RPD in as worn state

RPD where all components are connected and assembled in the way that it is intended to be used and worn (e.g. worn by the wearer, adapted to a RPD headform or RPD headform and torso or suitable holder)

iTeh STANDARD PREVIEW  
(standards.iteh.ai)

### 3.2 Abbreviated terms

	<a href="https://standards.iteh.ai/catalog/standards/sist/77c17be9-cc3c-417c-ae1e-3e0b69a31572/iso-17420-1-2021">https://standards.iteh.ai/catalog/standards/sist/77c17be9-cc3c-417c-ae1e-3e0b69a31572/iso-17420-1-2021</a>
FMEA	Failure Mode and Effects Analysis
RPD	Respiratory protective devices
RI	Respiratory Interface

## 4 Classification overview

### 4.1 General

The detailed classification and examples are described in ISO/TS 16973 and a condensed overview for RPD is given in [Table 1](#).

All filtering RPD are classified based on their performances and their characteristics of the RI.

All supplied breathable gas RPD are classified based on their performance and the characteristic of the RI as well as their breathable gas capacity.



**Table 1 — Basic classification of filtering RPD and supplied breathable gas RPD**

Classification		Classes (range)
Protection class		PC6 (highest) PC5 PC4 PC3 PC2 PC1 (lowest)
Work rate class		W4 (highest) W3 W2 W1 (lowest)
RI class	Area of coverage (barrier lines)	e (more than head, up to complete body) d (head) c (face) b (mouth and nose) a (mouth only)
	Type	T (tight fitting) L (loose fitting)
Filter performance	Particle filter class	F5 (highest) F4 F3 F2 F1 (lowest)
	Gas filter type and class	Several types based on test gas(es) with up to 4 classes, with class 1 being the lowest (see ISO 17420-2:2021, Table 1)
Supplied breathable gas capacity class		SXXXX (where XXXX equals the amount of breathable gas available for respiration in litres) SY (where Y is the indication for airline devices, including ambient air systems as defined in ISO 16972:2020, 3.11)

## 5 General requirements for RPD

### 5.1 General

The requirements in this document shall be fulfilled by all RPD or their components, if applicable.

For reasons of safety, all testing which requires the use of test subjects shall only be carried out after all other tests have been satisfactorily completed.

Allocation of RI size(s) to the appropriate RPD head form(s)/size(s) according to ISO 16900-5 used for testing shall be stated by the manufacturer. The allocated RPD head form sizes shall be used for all testing and their numbers shall be given in the information supplied by the manufacturer using the symbol 3.3.6 in ISO 17420-2:2021, or the symbol 3.3.4 in ISO 17420-4:2021 and an explanation shall be given in the information supplied by the manufacturer. The RI shall be marked by using the symbol 3.3.2 of ISO 17420-2:2021 and ISO 17420-4:2021.

# ISO 17420-1:2021(E)

The number of test samples is specified in each individual sub-clause. Sample schemes and test schedules are given in ISO 17420-2:2021, Annex C and ISO 17420-4:2021, Annex C respectively.

The number of samples necessary for testing for each requirement depends on the following:

- the requirement itself,
- the required preconditioning(s), if applicable;
- the number of RI sizes, one or more.

EXAMPLE If the requirement includes

- two temperatures (-5 °C and +35 °C),
- three pre-conditionings [vibration and shock (VS), as received (AR), exposure to corrosive atmosphere (CR)],
- RI in three sizes [small (s), medium (m) and large (l)].

see [Table 2](#) for examples of combination for testing.

**Table 2 — Example of combinations for testing**

Example of combinations	Preconditioning <sup>a</sup>	Test temperature	RI size
1	VS	+35 °C	s
2	VS	-5 °C	m
3	AR	-5 °C	m
4	CR	+35 °C	l

<sup>a</sup> The preconditioning is specified in the other parts of ISO 17420.

The combinations for testing shall be defined by agreement between the involved parties.

Unless otherwise specified in the individual requirement clauses,

- testing shall be performed on test samples without pre-conditioning,
- each sample shall pass the test, and
- testing shall be performed at ambient laboratory conditions between 16 °C and 32 °C and a relative humidity of (50 ± 30) %.

## 5.2 Field of vision

For special application welding RPD and abrasive blasting RPD see ISO 17420-7<sup>1)</sup>.

One non-preconditioned sample of each RI size in its as worn state shall be tested with the appropriate RPD headform(s) as allocated by the manufacturer.

The RPD shall have an average visual field score (VFS) of at least 98. Six out of eight dots of the section between 20° and 30°; 340° and 350°, 150° and 160° and 190° and 200° in the modified VFS scale shall be included in the visual field score.

In addition, at least two of the four critical dots which lie in the section between 20° and 30°; 340° and 350°, 150° and 160° and 190° and 200° shall be included in the field score.

Testing shall be performed in accordance with ISO 16900-11 without corrective eyewear.

1) Under preparation. Stage at the moment of publication: ISO/FDIS 17420-7:2020.

### 5.3 Resistance to flame – Single burner dynamic

The RPD shall be tested by subjecting all the parts or components exposed to the flame of a single burner dynamic test while the RPD is in its as worn state. The flame needs to touch only one area of each part/component that is exposed while the RPD is in its as worn state.

When tested, the materials shall not

- drip at all,
- undergo complete combustion, or
- continue to burn for more than 5 s after removal from the flame.

Deformation/decomposition is allowed.

One sample shall be tested.

The sample does not need to fulfil any other requirement of this standard after this test.

Testing shall be performed in accordance with ISO 16900-10.

### 5.4 Compatibility with additional equipment

Other PPE and/or accessories, specified by the manufacturer of the RPD for specific use with the RPD shall not degrade the performance of the RPD below the requirements for its class. Any RPD performance requirement whose results can be affected by the addition of such PPE or accessories shall be tested with such PPE or accessory in place according to 5.1 and 5.8 and to the appropriate requirements when tested in accordance with ISO 17420-2, ISO 17420-4, ISO 17420-5<sup>2)</sup>, ISO 17420-6<sup>3)</sup>, ISO 17420-7, ISO/TS 17420-8<sup>4)</sup> and ISO/TS 17420-9<sup>5)</sup>.

Information about such PPE or accessories shall be given in the information supplied by the RPD manufacturer.

Check in accordance with 6.2 and ISO 17420-2:2021, Clause 9 or ISO 17420-4:2021, Clause 9.

### 5.5 Monitor performance

If the RPD is equipped with a means of monitoring any performance function of the RPD, the monitor function shall be assessed in accordance with the information supplied by the RPD manufacturer.

Test in accordance with ISO 16900-7.

### 5.6 Warning and checking device(s)

#### 5.6.1 Performance of warning device(s)

Requirements for the performance of warning device(s) are given in ISO 17420-2, ISO 17420-4 and ISO 17420-5.

#### 5.6.2 Performance of checking device(s)

If the RPD is equipped with checking device(s) two samples shall be assessed.

2) Under preparation. Stage at the moment of publication: ISO/DIS 17420-5:2020.

3) Under preparation. Stage at the moment of publication: ISO/FDIS 17420-6:2020.

4) Under preparation. Stage at the moment of publication: ISO/CD TS 17420-8: 2020.

5) Under preparation. Stage at the moment of publication: ISO/CD TS 17420-9: 2020.